Colour field guide to the native

Orchids

of New Zealand

Eric Scanlen & Ian St George

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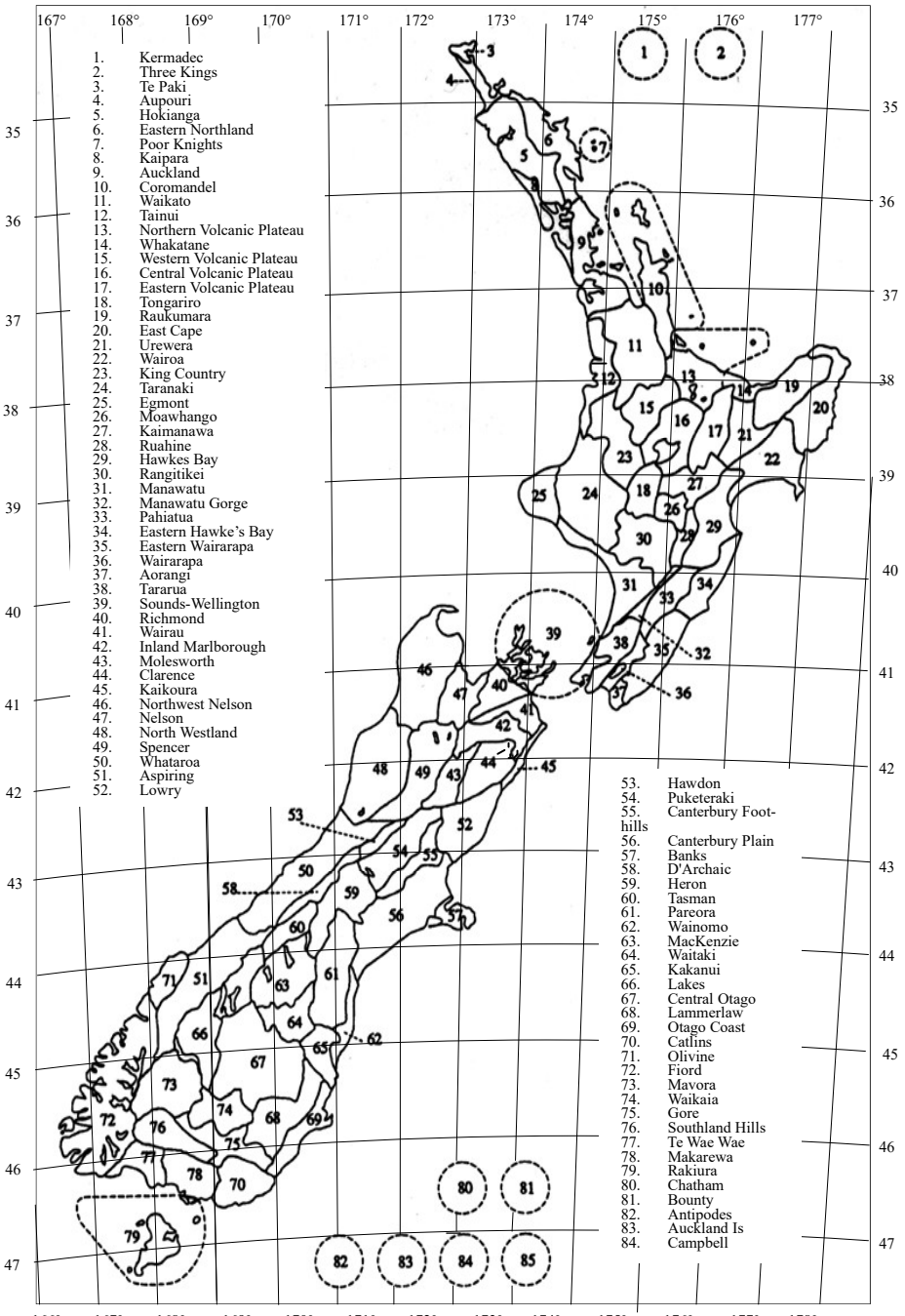
New Zealand Ecological Regions (ERs)



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Pterostylis subsimilis Colenso
Thelymitra caesia Petrie, alternative
Prasophyllum "Tohanga"

PREFACE

The pace of advance in Australasian orchid taxonomy has been accelerated of late by molecular studies in Australia, New Zealand and Poland. A raft of new genera and species has resulted, confirming in some cases what many of us have suspected—but we have had a number of surprises too, with similar looking plants being split into different genera—for example *Nematoceras pandurata* separated from *N. rivulare* because of occasional pandurate leaves and *Chiloglottis cornuta* changed to *Simpliglottis* despite having a fixed labellum in New Zealand.

A New Zealand colour field guide has been needed for some time to cover these new names, to show described species, and to draw attention to undescribed orchids. This book attempts to do that informally with well known and less well known taxa that have not yet been formally described. At the same time it includes some described but disallowed species—especially those of W. Colenso, H.B. Matthews (in manuscript) and T.F. Cheeseman. These continue to be rediscovered by dedicated field observers and that raises new taxonomic questions.

The authors have not shown every claimed but undescribed taxon: in fact about 30 were not included where variability implied either serried hybridism or several species yet to be separated. Our own opinions diverge on the authenticity of some taxa included, and no doubt others will also have differing views.

We recognise, of course, that tag-naming and publishing descriptions of unnamed taxa will raise questions from some orthodox botanists. However, we make no apology for drawing attention to them. Indeed, we challenge that conservative view. Our purpose here is to stimulate discussion, to hasten the recognition and thus the preservation of undescribed taxa that are already rare, or to drop taxa that turn out, after greater scrutiny, to be no more than minor variations of described species or flash-in-the-pan experiments of nature.

To those ends the authors will welcome discussion and criticism in the pages of the *New Zealand Native Orchid Journal*.

Ian St George & Eric Scanlen.
February 2009.

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February 2009

INTRODUCTION

The theme of this book is as a field guide with photos in a block, numbered alphabetically to keep genera together for comparison. Tag named taxa and some well known natural hybrids are included alphabetically with described species for convenience. The numbers ascribed to each orchid are clearly displayed on both the descriptions and the photos for easy location.

Criteria for tag-named taxa included herein are:—

1. *Seed propagating*, to ensure natural evolution and exclude sterile mutants. Some exceptions include *Thelymitra "*Comet" and *T.* x *dentata* which set no seed, propagate vegetatively and are suspected of being natural back-crosses to amphidiploid parents, thus making them sterile. (Molloy & Dawson 1995).

2. *Successful and long lasting,* to eliminate weak mutants.

3. *Well distributed* and/or a large, healthy colony or two, to ensure continued success.

4. *Well documented* with definitive drawings and/or photos in a recognised publication to establish clear descriptions This to avoid isolated specimens and hybrid swarms such as numerous slightly differing colonies of *Nematoceras trilobum.* and *Pterostylis* aff. *montana* agg etc.

5. *Clearly on their own evolutionary path* to separate for instance, similar taxa flowering a month or two apart (such as *Nematoceras rivulare* in the far north and at New Plymouth) or in different habitats.

6. *Putative hybrids* where they are numerous, persisting and stable forms, without variable characters trending to one parent or another. This includes amphidiploid hybrid *Thelymitra.* (Molloy et al 1995)

Common names, where available, have been included in the text, after the species names so are only alphabetical in the index. The authors appreciate the common names more of late because of the numerous classification changes in recent years. The changes followed major advances in genus and species delineation consequent on modern molecular analysis. When both genus and species have to be changed, it can be a comfort to resort to common names for continuity in references.

Recognising the orchids in the field, is best from the colour photos, in conjunction with a ten times magnifier and/or a camera with macro capability. Of course, all orchids have stigma and pollen on a single column — their trademark — but many of the columns are hidden deep inside the flowers for only the pollinator to blunder into. All three sepals may not be visible either — as in *Corybas cheesemanii*. All New Zealand orchids do have two lateral petals although these are only tiny fingers in the case of *Anzybas* and *Corybas* but are often long, wire-like filaments. The labellum or third petal is usually ornamented but is like an ordinary petal in the case of *Thelymitra* and *Petalochilus* Rog.

Care of the orchids in the field is a must especially for rare taxa. Orchid sites are dwindling and introduced pasture species are supplanting the orchids in areas where they still exist. Taking them in parks and reserves is only allowed if you have a permit from Department of Conservation or other administering body. Orchids in private property are the responsibility of the owner who may

allow specimen taking for common species. Rare orchids should not be taken except for planned relocation in the face of road-works, forest harvesting etc. Herbarium specimens were once a prerequisite for a species description but, for rare ones, where taking one specimen could endanger the species, good photographs showing all the defining traits are now acceptable for new descriptions.

Nomenclature

In the text, preceding each genus of two or more species, is a description giving the general traits of the genus. These with the illustrations, plus emphasis of distinctive traits IN SMALL CAPITALS, replace traditional keys to the species to keep descriptions clear and concise.

Each described species has its title first followed by the citation and any common name. For undescribed taxa, the initiator is named with references to where the taxon was first announced.

Flowering time follows.

Next is the **Image** credit with date and place of photography where available. No credit means the writer (Eric Scanlen) took the photo.

The **Traits** (additional to the preceding genus description), **Habitat, Similar taxa** and **Rarity** (de Lange et al 2004) follow, then **Notes** where appropriate.

Described species have the Linnaean binomial classification in italics; genus first with capital initial, and species last. An "aff." between denotes an undescribed similar species. Tag-names in "quotes" have genus first and in some cases, a similar aff. species epithet is included.

Nomenclature has been kept simple where possible but botanical terms are included for some specific meanings or where quoting others, so a glossary has been included on p. 75.

Caladenia is used herein in the traditional sense. Its recent move to *Petalochilus* is not being observed, in the hope that Dr. R.S. Rogers' *Petalochilus* genus with the petaloid labella will soon show itself more positively in the far north. One tantalising specimen each of *P. saccatus* and *P. calyciformis* have turned up in recent years only as mature buds before weather or a browser curtailed the evidence. In the meantime, further evidence is being diligently sought for the continued existence of these disallowed species.

Historic misunderstandings left some notable taxa such as *Gastrodia* "long column" in confusion since 1893 when Donald Petrie almost certainly found it at Kelly's Creek, Otira River, and recorded it as *G. sesamoides*. They both have long columns but flower two months apart. Then in 1896, T.F. Cheeseman received specimens of *G.* aff. *sesamoides* from R.H. Matthews of Kaitaia, and recorded it too as *G. sesamoides*, thus neither it nor *G.* "long column" had been properly classified by 2009. It took Hugh Wilson (1982) with characteristic perspicacity, to spot that *G.* "long column" from Stewart Island was notably different and to tag it as such.

The authors believe than any such misunderstandings arising in this volume will be treated with as much tolerance as have those of the above doyens of N.Z. botany.

ABBREVIATIONS

Symbols, repetitive words, terms and host species classifications.

<	less than
±	more or less
aff.	affinis, or with affinity to
ARC	Auckland Regional Council
a.s.l.	above sea level
beech	*Nothofagus* species
black beech	*Nothofagus solandri*
Blk	Block
bracken fern	*Pteridium aquilinum* var *esculentum*
Ck	Creek
C. macrocarpa	*Cupressus macrocarpa*
DoC	Department of Conservation
ER	DoC Environmental Region
FP	Forest Park
HPA	Heritage Protection Area
Id	Island
J	NZNOG Journal
kahikatea	*Dacrycarpus dacrydioides*
kamahi	*Weinmannia racemosa*
kanuka	*Kunzea ericoides*
kauri	*Agathis australis*
leatherwood	*Olearia colensoi*
mamaku	*Cyathea medullaris*
manuka	*Leptospermum scoparium*
mingimingi	*Leucopogon fasciculata*
mm	millimetre
Ms	manuscript; of incomplete description of a taxon
nikau palm	*Rhopalostylis sapida*
NL	NZNOG Newsletter
NP	National Park
NZNOG	NZ Native Orchid Group
Pen	peninsula
pines	introduced *Pinus* species
Pt	Point
R	River
Ra	Range
Rd	road
red matipo	*Myrsine australis*
Res	reserve
SF	State Forest
SFP	State Forest Park
s.s.	sensu stricto; in the strict sense
Stm	Stream
tea tree	*Kunzea ericoides* and/or *Leptospermum scoparium*
Tk	Track
totara	*Podocarpus totara*
Vly	Valley

DESCRIPTIONS

1. ***Acianthus sinclairii*** Hook. *f. Fl. Nov.-Zel.* 1: 245 (1853) pixie cap, May-Oct.

Image: ER9; 26 July, 1997.

Traits: slender, hairless *plants* 20–100mm tall with heart shaped leaf half way up a squarish stem. *Leaf* dark green, with variable amounts of purple. 1–10 green *flowers* with maroon labellum; forms from all purple to colourless occur. *Dorsal sepal* acuminate, cupped over the column, *lateral sepals* with pointed "tails", *petals* shorter, *labellum* broad, cupped and pointed.

Habitat: damp lowland forest and trackside. ERs 1-16, 18-25, 29, 31, 35-40, 46-48, 72, 73, 79, 80.

Rarity: not threatened.

Notes: strangely rare in the lower S.Id.

2. ***Adelopetalum tuberculatum*** (Colenso) D.L.Jones, M.A.Clem. & Molloy. *Orchadian* 13(11): 498 (2002) bulb-leaf orchid. Late April - May.

Image: Clevedon ER9; 30 April 1997.

Traits: epiphytic; *pseudobulbs* in tight clumps, dried pea size, PEAR SHAPED OR OVAL , smooth at first, wrinkling with age, those bearing flowers having white, wax-like extrusions all over. *Leaf* ± erect, 30 x 3mm, tawny, pale green or purple underneath. *Flowers* 2 OR 3 OFF-WHITE WITH ORANGE *LABELLUM*. Pseudobulb sized *seed capsule,* tawny with 3 red ribs and purple tubercles.

Habitat: native conifer canopy (kahikatea, kauri, matai, rimu, totara), also rewarewa and tawa. Always found with a blue-grey lichen and often with the climbing fern, *Pyrrosia elaeagnifolia.* It occurs sparsely in lowland forest canopies ER 4-6, 9-14, 19, 25, 31, 38, 39, 46.

Rarity: at risk, sparse.

3. ***Adenochilus gracilis*** Hook.*f. Fl. Nov. -Zel.* 1:246 t.56A (1853). slender forest orchid. December.

Image: Iwitahi ER17; 7 Dec 1996.

Traits: like a *Caladenia* but with *leaf* elliptic, sessile, ONE THIRD UP THE STEM. *Flower* solitary white with green, hooded, *dorsal sepal*. *Labellum* red barred inside, red spotted outside, with 2 rows of yellow calli from the tip of the LONG NARROW *MIDLOBE* to base of the disc. *Lateral tepals*, long pointed, white.

Habitat: damp to wet, cool beech/podocarp or exotic pine forest. Montane to subalpine. ERs 16-21, 25, 29, 30, 36, 38, 40, 43, 46-51, 53, 54, 59, 60, 66, 68-70, 72-74, 77, 79, 80.

Rarity: not threatened.

Notes: a rare alba colony was reported from Haast Pass in J53:18.

Anzybas D.L.Jones & M.A.Clem. *Orchadian* 13(10): 443 (2002)

4. ***Anzybas carsei*** (Cheesem.) D.L.Jones & M.A.Clem. *Orchadian* 13(10): 443 (2002). NZ swamp helmet orchid. Aug-Nov.

Image: Te Kauwhata ER11; 21 Sept 2000.

Traits: *Plant* ±30mm tall, *leaf* heart shaped, *labellum,* maroon with white Veed stripes, auricles aiming back, internal cilia, backward facing, confined to swollen tissue close to apex and along raised midrib. *Lateral tepals* like short, pale, threads clinging to labellum. *Dorsal* TIP, DEEPLY CLEFT.

Habitat: Requires occasional fires for survival. Now confined to a Whangamarino *Empodisma* swamp. ER 11 Historical, ER 4

Rarity: nationally critical.

Notes: Close to Australian *A. fordhamii*.


1


2


3


6


4


5

Upright column and short tepals separate *Anzybas* from *Nematoceras.*

5. ***Anzybas rotundifolius*** (Cheeseman.) D.L. Jones & M.A.Clem. *Orchadian* 13(10): 443 (2002).
kauri helmet orchid or tulip orchid.
July (early dark), August (late pale).
Image: Ngunguru ER6; 8 July 1995.
Traits: Like *A. carsei* but the hooded *dorsal sepal* lacks the cleft tip and is packed with off-white to pale pink papillae. A thicket of needle-like calli on the labellum midrib aims back at the column allowing any pollinator in but making exit difficult. The "late pale" form is rare, structurally similar but flowers later. A Kaitaia form has a rose-red labellum and white dorsal sepal.
Habitat: Mostly far north in well lit kauri or one-time kauri areas. Te Paki, Shenstone Blk, Kaitaia, Ngunguru, Bream Tail ("late pale" only), and Warkworth. No kauri by Colenso's holotype near Dannevirke nor Chathams specimens.
ERs 3-6, 9, 33, 80.
Notes: "Late pale" was often dismissed as an albino but it is widespread and was reported from Kaitaia over a century ago by R.H. & H.B. Matthews.

6. ***Aporostylis bifolia*** (Hook. f.) Rüpp & Hatch *Proc. Linn. Soc. New South Wales* 70:60 (1946) odd leaved orchid. Dec-Jan
Image: Iwitahi ER 17; 9 Dec 2005.
Traits: hairy or glabrous plant, to 150mm tall with TWO UNEQUAL, BASAL *LEAVES,* elliptic or linear green with indented, maroon spots. *Flower* usually solitary, white. *Dorsal sepal* 20mm broad, arches over the column. *Labellum* usually broad acute but may be petaloid, narrow acute, or spathulate with variable twin rows of yellow *disc calli*; disc has variable twin yellow patches with or without brown spots. *Tepals* white with maroon outer midribs; *petals* narrower than *sepals*. *Floral bract* tightly sheathes up the *ovary*. *Column* tall, white, ±brown speckled inside with a yellow patch.
Habitat: montane-subalpine mossy scrub, to sea level in the south.
ERs 10, 12, 13, 15, -29, 33, 38-40, 43, 46-51, 53, 54, 59, 61, 63, 65-74, 77-80, 83-84.
Rarity: not threatened.
Notes: ±10% alba forms with unspotted green leaves and no maroon tepal midribs, occur throughout. Spots of brown and yellow still exist on the labellum and in the column. Its reduced anthocyanin may make it more visible to pollinators. Intermediate forms exist without some colour traits but retaining others.

Caladenia R.Br. *Prodr. Fl. Nov Holland* (1810) lady's fingers.

Synonym: *Petalochilus*

Terrestrial *plants*, preferring leached, mossy ground in dappled sunlight; more or less hairy, especially the *peduncles*, possibly to deter browsing larvae. *Leaf* single narrow, lanceolate; *stem* 100-250mm tall with a lanceolate mid, *bract*. 1-2 flowered rarely three to five. *Lateral tepals* array forwards like four fingers and spread from 8-15mm. *Lateral petals* are pointed except for *C.* aff. *pusilla*. *Dorsal sepal* stands erect except for *C.* aff. *pusilla* but may curl forward onto the column in maturity. *Labellum* is elaborate with three lobes. Two rows of yellow topped, club-like calli, red or white legged, on the commonly red barred *disc*, terminate in a cluster of larger calli at the base. The pointed *midlobe* lacks calli on top except for some *C. variegata* but has one to eight definitive marginal calli. The winged *column* curves forward and terminates in a long, acute, *anther connective*. *Pollinia* are in two masses close to the connective, propagation by seed only. 13 taxa herein.

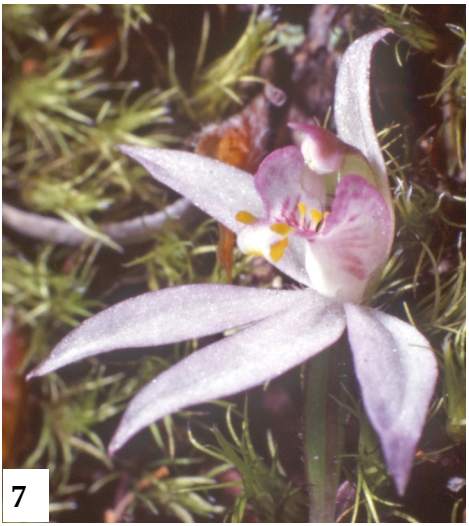
7. ***Caladenia alata*** R.Br. *Prodr. Fl. Nov. Holland:* 324 (1810) Late Aug to Oct

Image: Te Paki ER3; 7 Oct 2000.
Traits: *plants* to ±120mm tall. *Flower* normally solitary, *tepals* acute, white, to pale pink to pale mauve, rarely red. *Labellum disc, side-lobes* and *inner column* with cerise bars. *Disc calli*; twin rows have white legs, golden tops. *Midlobe* golden tip turned under; SINGLE, BASAL *MARGINAL CALLUS*, AT EACH SIDE IS FLAT, GOLDEN (maybe only a green bump or absent).
Habitat: damp tea tree scrub & tracksides.
ERs 3-6, 9-10, 13, 16-17, 31, 38, 46-47
Rarity: not threatened.
Notes: Later flowers tend to be brighter pink. Australian migrant.

8.*Caladenia bartlettii* (Hatch) D.L. Jones, Molloy & M.A. Clem. *Orchadian* 12(5): 227 (1997) pink fingers.
Oct (North) to Nov (South)
Image: Te Paki ER3; 27 Oct 2001.
Traits: *plant* sparsely hairy, *peduncle* red, rarely green, *ovary* green with red sepal ribs on the red stemmed form, *tepals* a dark pink or carmine inside, shading to white at the base; outside, dark red along the midrib, shading to pale green at the margins; *lateral tepals* held in a forward sloping flat plane; *disc calli* tips and the *midlobe* are contrastingly, bright yellow. *SEPALS* ARE ROUNDED; *labellum* white with 2 or 3 red bars under, red-barred inside; *midlobe* a YELLOW CHUTE WITH 2 MARGINAL CALLI each side (occasionally only one). *Anther* dark red, *pollinia* white.
Habitat: dappled shade in damp leached soil, road and track-sides.
ERs 2-12, 17, 20, 35, 37, 39, 47.
Rarity: not threatened.
Notes: Disjunct distribution, suggests that this orchid dislikes the AD 186 Taupo ash carpeting the central North Island.

9. *Caladenia* aff. *bartlettii* D. McCrae, (pers. comm. B.P.J Molloy); J78:**20,** Nov
Image: Te Paki ER3; 5 Nov 2000.
Traits: Like a small, green stemmed *Caladenia bartlettii* but the OBTUSE *SEPALS* recurve instead of lying in a plane with the petals. *Ovary, stem* and *sepals* very hairy. *Labellum midlobe* has only ONE YELLOW, CALLUS on each side of the basal margin.
Habitat: Sweetwater and Te Paki, trackside in scrub on old sand hills. ERs 3-4
Similar taxa
i) *C. bartlettii*; bigger, flowers in October has 2 marginal calli and usually a red stem.
ii) *C.* aff. *pusilla* but flowers in October, has its dorsal sepal curved down over the column, three marginal calli each side of the midlobe and the slightly rounded petals turn up at the tips.
Notes: H.B. Matthews' hairiest-of-all and non-opening (picked too early) were sent to T.F. Cheeseman in October 1912 but were not followed up. Doug McCrae found some at Sweetwater circa 1988 and Dr. Molloy has them in cultivation at Christchurch. More recently, Shenstone Blk and Scott Pt.

10. *C. chlorostyla* D.L. Jones, Molloy & M.A. Clem. *Orchadian* 12(5):223 fl (1997) (Hook.f.) D.L.Jones & M.A.Clem. *Orchadian* 13(9): 410 (2001) commonly green column. October to December.
Image: Te Paki ER3; 28 Oct 2001.
Traits: *plant* green, hairy. 1 or 2, sometimes three *flowers* of very pale green except for the variable red barred *labellum side-lobes, disc* and inner *column*. Two rows of white or yellow topped calli on red based yellow stalks on the disc; *MARGINAL CALLI,* NUMEROUS, SOME HOOKED, on the white to yellow edged *midlobe* which may jut straight out or curl under. *Tepals* acute.
Habitat: Lowland to subalpine scrub, well lit native or pine forest.
ERs 2-14, 17, 18, 20-25, 28, 29, 31, 33, 35-41, 46-50, 55, 57, 70, 72, 73, 77, 79, 80.
Rarity: not threatened.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Notes: Structure close to *C. minor*'s has made old reports difficult to unravel. Where they coincide, *C. chlorostyla* flowers a fortnight ahead. J.B. Irwin's split of *C. minor* (aff. *chlorostyla*) made the distinction quite clear. A late Nov, 3 flowered form (J103:12) at Awhitu (ER9), a non-opening form at Herekino and a Feb form (J104:28) at ER27 need investigation. H.B. Matthews described in Ms. the similar *C.* "chloroleuca" with up to five flowers having three prominent marginal calli and lesser ones to the tip of the midlobe. None answering this complete description has been found recently.

11. *Caladenia* "kauri-mauve" Tricia Aspin, J103:**13,15** November.

Image: Awhitu Central ER9; 17/11/07

Traits: as for *C.* aff. *variegata* but it has bright mauve-pink *anther caps* and the prominent rostellum of the Arapawa Id. *C.* aff. *variegata*. *Flowers* 13-19mm across.

Habitat: lowland, well north of the northern limit of *C.* aff. *variegata* in the Kawekas; grows only with kauri (*Agathis australis*) at Awhitu Central in ancient sandhills, south facing. ER 9.

12. *Caladenia minor* Hook. f. *Fl. Nov.-Zel*. 1:247 t.56b (1853).

Nov (Nth)-Jan (Sth) or Feb subalpine.

Image: Manapouri S arm ER72; 21/1/4

Traits: 1-2 flowered, typical NZ *Caladenia* with acute, creamy tepals. DISC CALLI ARE RED LEGGED, yellow topped. *Labellum* red barred ; white to yellow *midlobe* with coarsely toothed margin. *Column* green back but red barred inside. Definitive RED GLANDS APPRESSED TO THE *SEPAL* OUTERS giving the bud a distinctive bronze, green striped appearance. The red stemmed form has a GREEN *OVARY* WITH RED SEPAL RIBS. The green stemmed form as depicted, with all green ovary, extends into the subalpine.

Habitat: Far north to South Arm Manapouri on track sides in bush and scrub, sea level to subalpine. ERs 3, 4, 9, 10, 18, 25, 29, 38, 46, 48, 50, 72, 77 and elsewhere but 155 years of classification confusion make reports difficult to unravel.

Similar taxa

i) *Caladenia* "red stem" which has 2-4– flowers, a totally red bud and stem.

ii) *C. chlorostyla* always green stemmed with pale green tepals, NO RED GLANDS TO OUTER SEPAL ; flowers ±2 weeks earlier in any one site

iii) a perfumed Dec to Jan form with 3 flowers has been reported from Awhitu Pen and the Kaweka Ra.

Notes: Hooker lumped all the northern *Caladenia* into *C. minor.* H.B. Matthews called it *Caladenia* "Bronze" (letter to Cheeseman of 17 Nov 1912) but it didn't feature in his 15 manuscript descriptions. Clements 1989, designated a type specimen. It was lumped with *C. chlorostyla* as *C.* "green column" for many years until Bruce Irwin published the distinguishing traits as *C.* aff. *chlorostyla* in J79:6 for green stem, and J83:16, for red stem form.

13. *C.* "nitidoa rosea" H.B. Matthews, J62:**9** Oct. Nth to Nov. Sth

Image: Te Paki ER3; 27 Oct 2001.

Traits: 1-3 flowered on reddish stems to 250mm, 2nd and 3rd flowers stemming from bract nodes. *Leaf* has only a few fine hairs on the margins. *Flowers* pale to bright cerise pink, to 14mm across, have acute tepals. Upright *dorsal sepal*, WINE SPECKLED INSIDE. *Labellum* midrib is prominent; two rows of 5-7 stalked, white legged disc calli, terminate with 2-4 club-headed, large calli with sometimes a row of 4 tiny stalked calli ahead of them. White lateral lobes are crossed by three to eight magenta bars. Two to four magenta bars cross under the disc, the ends rising part way up the labellum side-lobes; *midlobe* triangular, yellow

shading back to white with 3-4 SLENDER, BASAL MARGINAL CALLI ON EACH SIDE. *Column* crowned with magenta; 5 irregular magenta bars inside. Wings widest and translucent at the magenta *anther*.

Habitat: Well lit scrub and track-sides especially in old sandhills. N. Id. far north mainly but isolated colonies occur in Coromandels, Uruti and Aorangi Ra.
ERs 3, 4-6, 9, 24, 37.

Similar taxa

i) *Caladenia* "speckles", far north only, is smaller, single flowered; has the speckled dorsal sepal but only one slender, marginal callus to the midlobe base.

ii) *C. bartlettii* which has obtuse sepals and flowers earlier. Hybrids occur at Scott Pt where both grow together.

iii) *C.* aff. *variegata* but with ill defined marginal calli, more robust, lacks the pendant, translucent column wings, has bright green column back, no red bars as a rule under the labellum and peak flowering is a month later, montane to subalpine areas.

iv) *C.* "kauri mauve" like *C.* aff. *variegata* but in lowland kauri at Awhitu.

v) *C. fuscata,* one form of this variable Australian, is similar in appearance.

Notes: H.B. Matthews' non-opening *Caladenia* has re-appeared at Herekino as a form of *C.* "nitidoa rosea". *Thrips* may pollinate this form in protective cover.

14. *Caladenia nothofageti* D.L.Jones, Molloy & M.A.Clem. *Orchadian* 12 (5): 226 f.1 (1997)

the white one.
December Nth to January Sth.

Image: L. Hauroko ER72/77; 20 Jan '04.

Traits: plant ±100mm tall, less hairy than most *Caladenia.* Pale green bud opens to a white *flower* (sometimes with faintly pink barred labellum) with a pale green top to the column and creamy, clubbed calli in 2 rows on the disc and flat *marginal calli* toothing the long, curled-under or straight midlobe.

Habitat: montane, well lit scrub and beech (*Nothofagus*) forest. ERs 12, 35-40, 46-50, 53, 56, 72, 73.

Rarity: not threatened, but sparse in widely scattered small colonies:

Notes: Structurally a replica of *C. minor* but lacks the anthocyanin; this alba-form has found its own evolutionary niche and flourished separately from the putative parent form, thus earning specific status.

15. *C.* aff. *pusilla* Ian St George J82:**15**

Late September to October.

Image: Te Paki ER 3; 11 Oct 2002.

Traits: A single flowered, tiny plant, ±100mm tall. *Leaf* semi erect, ±115 long, 1.8mm wide, linear acute, 3 ribbed, angled at each rib in cross-section mid green, hairy. *Sepals* OBTUSE, *dorsal sepal* magenta glanded, ALWAYS CURVED IN CONTACT WITH THE COLUMN. *Lateral petals* UNIQUELY ROUNDED at the TURNED UP TIPS. *Labellum* white with red bars inside and two under. *Midlobe* is yellow, triangular, margins with THREE PALE, MARGINAL, YELLOW, CALLI AT ITS BASE.

Habitat: Disjunct North Island distribution at Te Paki, Kaimaumau, Awhitu, Rotorua, Uruti, Puffer Tk, Kaitoke and Aorangi Ra, in leached mossy track-sides, scrub and bush. ERs 3, 4, 6, 9, 10, 13, 17, 24, 25, 37, 38, 46.

Similar species: Easily mistaken for bigger *C. bartlettii* which has only two marginal calli, pointed petals lying in a plane with the obtuse lateral sepals.

Notes This taxon is rare and deserves conservation measures which have been lacking due to its non-recognition. Mistaken for a time as J.D. Hooker's *C. minor,* being pink, but his type specimens had the fringed midlobe from base to tip. At Te Paki, where it co-exists with *C. bartlettii,* rare in-betweens indicate some hybridism.


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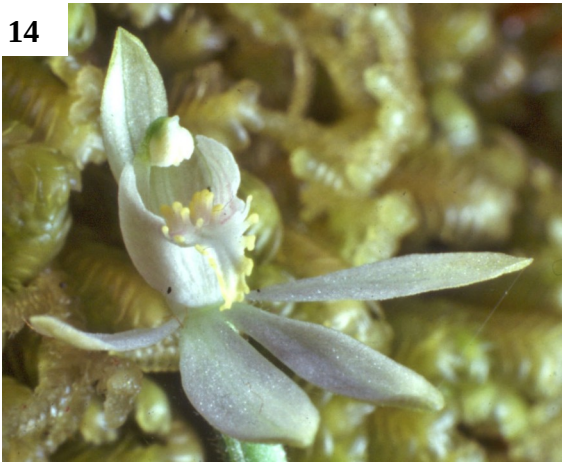
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16. *Caladenia* "red stem" Gordon Sylvester, J39:12; J66:**26.** December.
Image: Puffer Tk ER38; 6 Dec 1997.
Traits: *Plant* ±120mm tall, 2-4 FLOWERS, all MAROON *PEDUNCLE, BUDS, BRACTS* AND *OVARY*. *Leaf* linear, 150-180mm, 3mm wide mid green, glabrous; sparse marginal hairs. *Tepals* all acute, white inside except for maroon veins showing through. *Labellum* red bars carry forward onto the base of the fringed midlobe where the first 2-3 MARGINAL CALLI HAVE RED LEGS like the disc calli which is unique in *Caladenia.*
Habitat: One large colony at Kaitoke. Several others need confirmation. ER 38.
Similar taxa: Closely allied to *C. minor* which has 1-2 flowers not 2-4 and whose red stemmed form has green stripes on the bud and ovary.
Notes: This taxon tends to be neglected as a mere colour form of *C. minor* but the 2-4 flowers set it aside morphologically. Its rarity deserves conservation measures whether or not it is accepted as distinct.

17.*C.* "speckles" Allan Ducker, J58:35; 74:16,18[2] **Fig 9** October-November.
Image: Te Paki ER3; 25 Oct 2001.
Traits: *Plant* ±100mm tall, SINGLE FLOWER, rarely twin. Like *C.* "nitidoa rosea" but smaller and the labellum midlobe has only ONE BASAL, MARGINAL CALLUS (not 3-4) slender, white, yellow topped.
Habitat: Te Paki and Kaimaumau, favouring sandy soils on track-sides in tea tree dappled sun. ERs 3 & 4
Similar taxa: The larger, 1-3 flowered *C.* "nitidoa rosea" in same habitat, far north
Notes: An uncommon taxon, sometimes written off as a feeble *C.* "nitidoa rosea" but sufficiently different to conserve it.

18. *C. variegata* Col. *Trans. & Proc. New Zealand Inst*. 17: 248 (1885)
big pink December.
Image: Aorangis ER37; 27 Nov 2004
Traits: *plant* hairy, to 180mm tall, dark *stem* and green *ovary*. *Flowers,* one or rarely 2 of pale pink with a greenish tinge in the *dorsal sepal*. *COLUMN* BACK AND WINGS BRIGHT GREEN with pink glandular hairs; red barred inside; *anther* pale pink obscuring the *rostellum*. *Labellum* disc and side-lobes striped with red. Two rows of yellow topped disc calli, always with A FEW TO MANY STRAY CALLI; *midlobe* has a central ridge, is white to yellow with yellow crenulate margins; may have 1 or 2 marginal calli. Aorangis stray calli can advance in a chevron, partway down the midlobe top. *Lateral tepals* bluntly acute.
Habitat: montane to subalpine in *Pinus nigra* and native forest. ERs 16, 17, 24, 25, 27-29, 32, 35, 37, 38, 40, 80.
Rarity: not threatened.

19. *C.* aff. *variegata* Eric Scanlen, J78:31 Plate **6.** November to December or February for the Arapawa Id. form.
Image: Iwitahi ER17; 9 Dec 2000.
Traits: Similar to *C. variegata* Col. but LACKS COLENSO'S STRAY DISC CALLI; favours different conditions in different years, from *C. variegata* at Iwitahi. *Tepals* pale pink, acute but with pale green bands ±3mm wide down either side of the outer, reddish midribs. *Labellum* as for *C. variegata* but at Arapawa Id. it has two red bars under. *Midlobe* margins are variable. *COLUMN* BACK AND WINGS BRIGHT GREEN, maroon barred inside; *anther caps* and connective pale pink. Prominent broad *rostellum* at Arapawa Id.
Habitat: Iwitahi to Queenstown and places between such as Omoana, Craigie Lea, Eastern Wairarapa, Whenua Tapu, Arapawa Id. and Shag Pt, Palmerston. Prefers track-sides and *Pinus nigra* debris. ERs 17, 18, 24, 35, 37- 39, 65, 66, 69.

Similar taxa
i) *C. variegata* as previous.
ii) *C.* "nitidoa rosea" N.Id. only, has dark red column back 1-3 flowers 3-4 marginal calli.
iii) *C.* "kauri mauve" lowland kauri only, mauve-pink anther caps; large rostellum.
Notes: This taxon may be the prehistoric original, it is not endangered but gets lumped with its mutated form, *C. variegata* thus has remained unrecognised.

2 photos of over-mature Arapawa specimens indicate a likely, late flowering, new taxon for further investigation.

Calochilus R.Br. *Prodr. Fl. Nov. Holland:* 320 (1810) for beautiful lip.

Traits: Terrestrial *plants,* single *leaved* with bearded *labella*, closely allied to *Thelymitra*. Some species have shiny black glands like eyes, either side of the *column wings*. With *column* above like a nose, these "eyes" may scare off small browsers. The long *labellum tip* gets crumpled in the bud.

20. *Calochilus herbaceus* Lindl. *Gen. & Spec. Orch. Plant*: 459 (1840)

or copper beard October to December
Image: Te Paki ER3; 23 Oct 1998.
Traits: 300–600mm tall, up to 5 greenish yellow flowers with red striped *petals*. *Labellum* disc has two VIOLET BLUE, NAKED, RAISED RIDGES tapering and laciniated towards the tip, *beard* purple, protruding tip green and step shaped: *column wings* wide with two dark, basal, glands like eyes. *Anther* like a green duck's head.
Habitat: well lit tracksides, in gum-land scrub. ERs 3, 4, 5, 8, 9.
Rarity: nationally critical.
Notes: Lindley described only the alba form where the disc is white, not violet. One alba colony was noted on the Earth Wall Tk, Te Paki from 1988 to 1996 but not since; possibly due to overshadowing by kanuka (*Kunzea ericoides*) so the chance to conserve this rarity may have been lost due to lack of recognition.

Similar taxa
i) Australian *C. campestris* has the beard covering the labellum tip and a narrower column base.
ii) *C. paludosus* with a longer labellum tip, stands its mature dorsal sepal erect, has no "eyes" and no violet-blue disc.
iii) *C. robertsonii* a reddish flower, narrower column base and no violet disc.
Notes: Young plants are common enough at Te Paki but only a few e.g. in dried brushwood survive browsers to flower.

21. *Calochilus paludosus* R.Br. *Prodr. Fl. Nov. Holland*: 320 (1810)

or red beard . October to December
Image: Kauaeranga ER10; 3 Dec 1995.
Traits: plant to 350mm tall with narrow fleshy leaf. *Flower* greenish, flaring widely when mature. *Labellum* base with small, ACUTE calli and flap-shaped calli at margins. Beard dull red, column wings WITHOUT "EYES"; LONG STRAP SHAPED TIP, bent from being folded back in the bud. *Dorsal sepal* stands erect with a buckle when fully open.
Habitat: montane to lowland.
ERs 4-6, 10, 11, 13, 15, 38, 46-48.
Rarity: at risk, sparse.

22. *Calochilus robertsonii* Benth. *Flora Austr.* 6:315 (1873).

or purple beard November to December.
Image: Iwitahi ER17; 2 Dec 1994.
Traits: *Leaf* wider than on *C. paludosus. Flower,* ±3, all tepals red striped inside and out, *Labellum* base with short ROUNDED calli; beard red and bouffant; SHORT, TWISTED, STRAP SHAPED TIP. *Column,* eye-like glands close together.
Habitat: Subalpine to lowland (and geothermal) open areas often by *Eucalyptus.*


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ERs 11, 13, 15-17, 22.
Rarity: at risk, sparse.

23. *Chiloglottis cornuta* Hook.f. *Bot. Antarct. Voy.* Vol. 1, *Fl. Antarct:* 69 (1844)
Green bird orchid. October to February.
Image: Iwitahi ER17; 4 Dec 1999.
Traits: small, ground hugging *plants* with 2 elliptic leaves with parallel veins. *FLOWERS* GREEN, rarely reddish, 20–30mm across. *Labellum* upheld with 8-12 DARK BROWN SESSILE OR PALE GREEN CALLI. Fertilised capsule rises on scape <300mm.
Habitat: scrub or well lit native & exotic forest. ERs 3-6, 9, 10, 12-31, 33, 35-40, 42, 43, 45-51, 53, 55-57, 59, 61, 63, 65, 66, 68-70, 72-74, 77-80, 82-84.
Rarity: not threatened.
Notes: a) The alba form has green calli.
b) A Victorian species with hinged labellum is now *Simpliglottis cornuta*.
c) *C. "*KHAKI CALLI", Nelson, Kaitaia and Herekino has the cotyledon to 100mm with a long petiole. ERs 4, 5, 46, 47
d) A rare form has a FLORAL BRACT, ±HALF THE SIZE OF A NORMAL LEAF. ERs 49, 69.

Corunastylis Fitz. *Austral. Orchids* 2(3): t.1 (1888) (synonym *Genoplesium*)
Traits: Small terrestrial *plants* with single terete leaves with the stem rising through the centre. Spike of tiny flowers with labellum uppermost.

24. *C. nuda* (Hook.f.) D.L. Jones & M.A. Clem. *Orchadian* 13(10): 461 (2002)
tiny midge orchid January to June.
Image: Ongarue ER23; 22 Jan 1995.
Traits: spikes up to 30 flowers, ±120mm tall, BREAK THROUGH NEAR THE *LEAF* TIPS. Self pollinating and long lasting, dark red flowers, scatter pollen grains widely. *Labellum* callus is cleft by a pale linear depression, EDGES CILIATE.
Habitat: montane, poor soil, road banks. ERs 6, 9-10, 12-13, 18, 19-25, 29, 31, 35, 37-40, 46-50, 57, 61-62, 65-66, 73, 79-80.
Rarity: at risk, sparse.

25. *Corunastylis pumila* (Hook. f.) D.L. Jones & M.A. Clem. *Orchadian* 13(10): 461 (2002)
green midge orchid March to April.
Image: Waiti ER11; 28 March 1998.
Traits: Generally ±120mm tall (±400mm at Te Paki) *spikes* of up to 30 cream green *flowers* with reddish base uppermost, EMERGE FROM THE SIDE OF THE TUBULAR *LEAF*, leaving the FREE TIP AMONG THE FLOWERS. *LABELLUM* EDGES MINUTELY SERRULATE BUT NOT CILIATE.
Habitat: locally common in gum-land scrub and on clay banks in regenerating kauri forest, light shade.
ERs 3-5, 9-11, 16, 21, 39, 46.
Rarity: at risk, sparse.
Notes: easily overlooked as a result of its small size and autumn flowering. The Te Paki taxon still has the same flower numbers and size on long wiry stems.

26. *Corybas cheesemanii* (Hook. f. ex Kirk) Kuntze *Revis. Gen. Pl.* 2: 657 (1891)
spurred helmet orchid May to August.
Image: Hunua Ra ER9; 11 June 1999.
Traits: the tops of the *dorsal sepals* look like pearls sprinkled in the forest floor litter. *Lateral sepals* reduced to short spikes, *lateral petals* similar in the south but, in the north often like commas hidden behind the TWO CLOSED SPURS ON THE *LABELLUM* making this NZ's only *Corybas.* An egg pocket in the labellum channel is similar to those in *Nematoceras trilobum* & *N. macranthum* aggs. Pellucid flower *stem* rises up to 200mm with ovoid *capsule* symmetrically on top with green *leaf* still below the litter in November to December.
Habitat: Lowland litter of kanuka, *Pinus*


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radiata, taraire, beech. ERs 2-6, 8-13, 16, 17, 20, 24, 25, 31, 35-40, 46-48, 80.
Rarity: not threatened.
Notes: largely fungus-dependent. The egg pocket in the labellum channel suggests that the orchid is mimicking a toadstool to attract fungus gnat pollinators.

27. ***Cryptostylis subulata*** (Labill.) Rchb.f. *Beitr. Syst. Pflanzenk.* 15 (1871)
or cow orchid. October to January.
Image: Mt Eden, in pot; 5 Nov 1986.
Traits: up to 1m tall, supported by surrounding reeds or rushes; *leaves* stalked, <21 *flowers*, each 50mm long, *labellum* uppermost, yellow shading to red at apex.
Habitat: Motutangi, Sweetwater, Kaimaumau swamps. ER 4.
Rarity: naturally uncommon, range restricted.
Notes: this trans-Tasman coloniser is spreading naturally, like its pollinator, an ichneumonid wasp. Odd plants flower at almost any time of the year.

Cyrtostylis R.Br. *Prodr. Fl. Nov. Holland*: 322 (1810). for the curved column. Two terrestrial gnat orchids with identical *flowers* but differing leaf and habitats with little territorial overlap.

28. ***Cyrtostylis oblonga*** Hook.f. *Fl. Nov.-Zel.* 1:246 (1853)
the oblong gnat orchid. August-Oct.
Image: Hunuas ER9; 4 August 2000.
Traits: *Plant* ±70mm tall; 2-4 flowers. *Tuber* a small. white sphere. *Leaf* solitary, oblong, ground hugging. *Flowers* mushroom pink with ±10% alba-form with pale green flowers. *Labellum* is oblong-acute, and twice the width of the tepals. Two pink, basal calli, overhung by the pollinia, attract *Sylvicola neozelandicus,* the outhouse-fly, an efficient pollinator.
Habitat: kauri zone only, scrub and light forest, ERs 2-12, 38.
Rarity: not threatened
Notes: In the far north, it grows in joint colonies with *C. rotundifolia* where kauri has been cleared; intermediate forms here indicate hybridism.

29. ***Cyrtostylis rotundifolia*** Hook. f. *Fl. Nov.-Zel*. 1:246 (1853)
the small gnat orchid. Sept-Oct.
Image: Te Paki ER3; 4 Sept 1998.
Traits: *Plant* ±70mm tall 2-4 flowers. *Leaf* solitary, orbicular cordate, ground hugging. *Flower* as for *C. oblonga* but a pollinator, if different, is not known.
Habitat: Scrub and light forest; seems to avoid present kauri forest. ERs 3, 4, 6, 9-12, 16, 20, 22, 29, 31, 35-40, 46, 47.
Rarity: not threatened.
Similar species: *C. reniformis* R.Br. the Australian form, has minute teeth at the labellum tip which the NZ species lacks.

30. ***Danhatchia australis*** (Hatch) Garay & Christenson. *Orchadian* 11(10): 470 (1995). The Waipoua orchid. Dec-Feb.
Image: McElroys Res ER9; 22 Dec 1999.
Traits: *plant* to 150mm tall, deciduous epiparasite; no green leaves; glandular pubescent, mushroom coloured, darker on *stems*, *ovaries, anther caps* and *buds*. < 7 *flowers* self pollinated, tubular; white edged tepals open at times for <22 days.
Habitat: found with the NZ-wide puffball fungus *Lycoperdon perlatum*. (Campbell 1970) favouring taraire but with nikau in NW Nelson NL30:1, and Little Barrier J82:26, and with *Pseudopanax lessonii* on Fanal Id, J67:13.
ERs 5, 6, 8-12, 20, 30, 39, 45, 46.
Rarity: not threatened.
Notes: rhizomes but no tubers. Can stay dormant for years in poor conditions, sustained chiefly by its mycorrhizal fungus which also infects the short temporary roots

on the *Beilschmedia tarairi.* Why it needs an host species as well as the NZ wide fungus is unclear.

Diplodium (synonym *Pterostylis*)

D.L.Jones, Molloy & M.A.Clem. *Aust. Orch. Res.* 4: 70 (2003).
Four single (rarely twin) flowered NZ greenhood species. Juvenile, flowerless plants have a rosette of short leaves.

31. *Diplodium alobulum* (Hatch) D.L. Jones, Molloy & M.A.Clem. *Austral. Orch. Res*. 4: 70 (2002) April-October.

Image: Omoana ER24; 5 August 1995.
Traits: *plant* 150mm tall, 20mm *flower*; hood top usually level but tip droops in maturity; *LABELLUM* ARCHED, TAPERING TO INVERTED U AT TIP; *lateral sepals* diverge to form a flat V sinus, LACKING THE "JUG-SPOUT" of other *Diplodia.*
Habitat: scrub and well lit damp forest.
ERs 2-17, 20, 22-25, 29, 31, 35-4o. 45-48, 56, 57.
Rarity: not threatened.
Notes: Juvenile rosettes have 3 or 4 stalked, shovel shaped leaves, on short petioles; adult's leaves are narrow, ±evenly spaced up the stem; young adults have juvenile leaves at the base, adult leaves are nearer the flower.

Herekino ER 5 report, 30 Sept 2008 of a close relative, tagged in J77:**15** as ***D.* "brumobulum"** has ROUND NET-VEINED JUVENILE LEAVES, MAROON STEM, PINK PEDICEL AND HAIRY COLUMN ARMS.

32. *Diplodium alveatum* (Garnet) D.L.Jones, Molloy & M.A.Clem. *Austral. Orchid. Res*. 4: 70 (2002).

coastal greenhood February to May.
Image: Tauranga in pot; 23 April 1999.
Traits: Flowerless *plants* have a rosette of round *leaves* (much larger than those of *D. trullifolium* and *D. alobulum*) but flower *stems* have only erect bract-like *leaves*. *Dorsal sepal* with WIRE-LIKE APICULUS can completely obscure the ERECT, DARK BROWN, OBTUSE *LABELLUM*. Jug spout sinus to *lateral sepals*.
Habitat: Poor soils in tea tree and gorse.
NW Nelson and Stokes Vly.
ERs 38, 39, 45, 46.
Rarity: non-resident native, coloniser.
Notes: an Australian migrant.

33. *Diplodium brumale* (L.B.Moore) D.L.Jones, Molloy & M.A.Clem. *Austral. Orchid Res.* 4: 70 (2002).

The cobra hood. April to July.
Image: Te Atatu, in pot; 17 July 1999.
Traits: rarely twin flowered, *dorsal sepal* strongly incurved with petals level across, give the *flower* a COBRA-HOODED APPEARANCE. Prominent jug-spout sinus of *lateral sepals*. *Labellum,* narrow-triangular and protruding. Stem-*leaves* relatively long and broad, tend to be BUNCHED TOWARD THE TOP of the stem. Larger leaved rosettes on juveniles, stand taller than those of *D. alobulum.*
Habitat: confined to shade among kauri. but none seen in ER3. ERs5, 6, 8-12.
Rarity: not threatened.
Notes: Growth is triggered by Autumn rains so flowering time varies. A taxon from ER3 & 5 with a HAIRY COLUMN, cobra hood, V SINUS, pink stems, and NET VEINED ORBICULAR LEAVES, was tagged *D.* "brumobulum" (Scanlen J77:18) but needs more verification.

34. *Diplodium trullifolium* (Hook.f.) D.L.Jones, Molloy & M.A.Clem. *Austral. Orchid Res*. 4: 72 (2002). May-October.

Image: Duder's Bush ER9; 15 Oct 1996.
Traits: Rarely twin flowered; *stems* vary from 60–300mm tall. As for *D. brumale* but slenderer; only a thin strip of petal margin is exposed, so it lacks *D. brumale*'s cobra-


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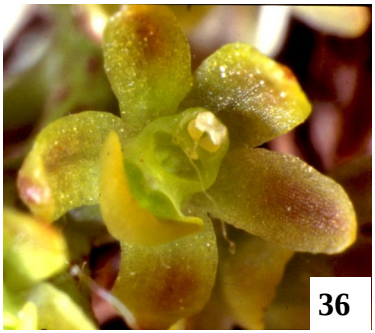
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hood. Narrow from the front. *Labellum* tip lacks inverted U of *D. alobulum*, *lateral sepals*' jug spout sinus shows from the side. JUVENILE ROSETTE HAS EMBOSSED, NET-VEINED LEAVES.

Habitat: lowland to montane, in scrub and native forest. ERs 2-14, 16, 20-24, 29-31, 34-40, 46, 47.

Rarity: not threatened.

Notes: longest season of any NZ orchid.

Drymoanthus Nicholls. *Victorian Naturalist* 59: 173 (1943) for forest flower. Two epiphytic species with spreading white roots and sprays of small *flowers* below; fleshy, elliptic to oblong *leaves.*

35. *Drymoanthus adversus* (Hook.f.) Dockrill *Australasian Sarcanthinae* 32 t3 (1967). October to December.

Image: Langs Beach ER 6; 9 Nov 1999.

Traits: copious pale roots clamp onto well shaded branches. *Leaves*, glossy, not spotted. *Flowers* 4mm across, creamy to green, flecked with red/purple. *Tepals* similar, elliptic. *Labellum* cupped with an UPRIGHT, FLATTENED, CALLUS IN EACH SIDE, OFTEN MEETING AT THE CENTRE TO FORM A VEE.

Habitat: wide range of host trees and on rocky outcrops, from lowland forest to the subalpine zone, it thrives close to streams. ERs 2-14, 16, 17, 19-25, 29, 31, 35-39, 46-48, 50, 61, 65, 70-72, 80.

Rarity: not threatened.

Notes: a tetraploid with 2n=76 chromosomes , double that of *D. flavus*.

36. *Drymoanthus flavus* St George & Molloy *New Zealand J. Bot*. 32:416 f1 (1994). spotted leaf. Oct to Dec.

Image: Minginui ER17; 11 Nov 2005.

Traits: *Plant* producing up to three spikes of ±ten 5mm *flowers*. *LEAVES* PURPLE SPOTTED, DULL GREEN, LEATHERY, flower *stems* and *capsule*, yellow/green, unspotted. *Flowers*, *tepal* mid backs with an orangey patch. The yellow *labellum* LACKS THE UPRIGHT FLATTENED CALLI of *D. adversus*. Twin tear drops of creamy coherent *pollinia* connect at the tips to a 0.2mm stipe and to the rostellum. *Capsules* few and ±10mm long, cigar shaped.

Habitat: a range of host trees, notably totara and kamahi (*Weinmania racemosa*) often coastal. ERs 16, 17, 31, 36-39, 46-48, 50, 69, 70, 72, 78, 79.

Rarity: naturally uncommon, sparse.

Notes: A diploid, 2n=38 chromosomes.

Earina Lindl. *Bot. Reg*. sub t.1699 (1834). for springtime. Three epiphytic species with terminal panicles on canes of alternate leaves.

37. *Earina aestivalis* Cheeseman. *Trans. & Proc. New Zealand Inst.*51:93 (1919). December to January Nth. to April Sth.

Image: Wst'n Heights in pot; 3 Jan 1990.

Traits: like *E. mucronata*, but long slender *leaf* is stiffer, groove is deeper, midrib and veins more prominent; OVARIES TWICE THE LENGTH but similar coloured *flowers,* <9mm across. Short *column* lengthens in maturity. *Sepals* deflect back, *petals* spread radially, to display the *column*; LEMON LEAF PERFUME.

Habitat: Lowland to montane; survives in lower rainfall than *E. mucronata*, such as coastal areas. ERs 5, 6, 8-10, 12, 15, 24, 30, 31, 36, 38, 39, 46, 48, 79, 80.

Rarity: not threatened.

Notes: Lumped with *E. mucronata* 1970-2002 as a variable species. Cheeseman (1925) omitted scent, long ovary and long mature column from his description. Near Auckland and Tauranga, clumps taken to drier suburbia from wet ranges may have had both species. *E. mucronata* flowered in October before succumbing to the dry; *E. aestivalis* survived and flowered on in

Dec/Jan confusing the issue for decades.

38. ***Earina autumnalis*** (G.Forst.) Hook.f. *Fl. Nov.-Zel.* 1: 239 (1853)
raupeka February Nth. to July Sth.
Image: Papakura in pot; 24 Feb 2003.
Traits: HEAVILY PERFUMED. *Stem* to 1m long, hanging in deep shade with *flower panicle* turned upright at the tip. But, only short, erect *stems* in the sun or terrestrial, with stiff, wider, 40–100mm long, pointed, *leaves*; many 5mm WHITE *FLOWERS* on last year's spike with broad oval *tepals*, and a broad yellow-based *labellum*.
Habitat: prefers a branch over a stream in total shade but also on mossy rocks or montane track-sides.
ERs 3, 5-25, 29-31, 33, 35-41, 46-50, 57, 71-72, 77-80.
Rarity: not threatened.
Notes: A few flowers open on a new spike at any time of year, the spike misses a year then flowers in autumn on the same peduncle for ±5 years.

39. ***Earina mucronata*** Lindl. *Bot. Reg.* sub t. 1699 (1834) peka-a-waka; Sept-Dec.
Image: Hunua Ra ER9; 12 Oct 1998.
Traits: *LEAVES* NARROW, with a shallow midrib channel, on long pendant *stems*, forming dense clumps on well lit branches and trunks. SHORT OVARY . Clusters of creamy *flowers*, to 8mm across, OVAL TEPALS CUPPING AROUND AND OBSCURING A 2MM LONG COLUMN. *Labellum* orange, 3 lobed, the midlobe broad and bifid (giving a four lobed appearance) often with a drop of nectar below the labellum base. Light fragrance, especially in the south.
Habitat: matted roots on trees, tree ferns and rock walls, moderate to high rainfall, sea level to subalpine.
ERs 3-25, 27-31, 33-41, 43, 45-50, 57, 66, 69-73, 75, 77-80.
Rarity: not threatened.
Notes: Flowers on elongation of last year's spike. Confused for decades with later flowering *E. aestivalis.*

Gastrodia R.Br. *Prodr. Fl. Nov. Holland.*: 330 (1810) for pot-bellied
Commonly as the potato orchid.
Four taxa of leafless, epiparasites lacking chlorophyll. Sizeable *tubers* are sustained entirely by their mycorrhizal fungi. *Flowers* are a tube of united tepals with the uppermost *labellum* partially free. Several years may pass without a stem showing if conditions do not suit.

40. ***Gastrodia cunninghamii*** Hook.f. *Fl. Nov.-Zel.* 1:251 (1853).
maukuuku. November to February.
Image: Iwitahi ER17; 9 Jan 1997.
Traits: an epiparasite on forest trees via a mycorrhizal fungus *Amillaria* spp (Ella Campbell 1962). *Stems* up to 1m tall with as many as 70 tawny to dark brown to greenish, rather knobbly *flowers* fragrant at times. *Labellum* WITH A DARK BROWN TIP, has the top half free with WISHBONE SHAPED YELLOW RIDGES BELOW. Transverse ridges on the back of the VERY SHORT *COLUMN* expand, forcing the *pollinia* onto the *stigma*, ensuring self pollination as the flowers rise to stand erect in maturity.
Habitat: montane to subalpine, dark shaded places. It thrives in *Pinus radiata*. Records in and north of Auckland are doubtful. ERs 6, 10-18, 20-26, 30, 31, 33, 35-40, 42, 43, 45-51, 53-61, 65, 66, 69, 70, 72-74, 77, 79, 80.
Rarity: not threatened.
Notes: Alba forms, creamy to greenish with orange tipped labella, continually appear in the literature then disappear. Colenso described *G. leucopetala* with twin ridges under the labellum meeting only at the dark tip not as a wishbone. These plants grow and flower with *G. cunninghamii* in


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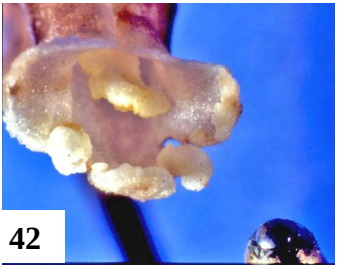
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45a


45b

ERs 13, 18, 28, 32. but are not now considered a separate species.

41. ***Gastrodia*** **"long column"** Hugh Wilson, *Stewart Id. Plants,* 1982. Jan.-Feb.
Image: St Arnaud ER49; 3 Feb 2004.
Traits: *Plant* terrestrial. *Peduncle* to 1.4m with up to 77 flowers (J54:17). *Flowers* scented, brown/olive in shade or tawny in the open, are adorned with irregular golden warts and speckles. *Labellum* has yellow tip and wishbone ridges under. *Buds* are erect and parallel with the *stem*. *Pedicels* then drop to pendant as flowers open then rise again. Scent stops as flowers reach level. Any remaining pollen rolls onto the stigma at the first vibration as *pedicels* rise to vertical for fall-back, self pollination. Plants in the open or too far north, don't set seed, due perhaps to too little chilling.
Habitat; Thrives in copious leaf mould under darkest *Rhododendron* and other introduced or native trees/shrubs in the cool south. Owhango, to Halfmoon Bay, lowland, up to 640m altitude at St Arnaud.
ERs 18, 23, 24, 35, 37, 39-41, 46-47, 49, 51, 55, 56, 61, 65, 66, 69, 73, 77-79.
Similar taxa
i) *G.* aff. *sesamoides* also long columned and insect pollinated but flowers a month or two earlier in any one site, creamy coloured with no golden warts and occurs from the far north to NW Nelson
ii) *Gastrodia cunninghamii* but it has a dark labellum tip and a short column.
Notes: Several taxa have been suggested. Has also been published in mistake for *G.* aff. *sesamoides.*
G. "long column black" is a likely second taxon with under-labellum ridges meeting only at the tip. Evidence is sketchy as yet.

42. ***Gastrodia minor*** Petrie *Trans. & Proc. New Zealand Inst*. 25: 273 t20 f5–7 (1893). small potato orchid, Nov-Jan.
Image: Iwitahi ER17; 9 Jan 1997.
Traits: slender, few flowered plant, LESS THAN 300MM TALL, with tubular brown buds which barely open to show white, conjoined *tepals*. SHORT *COLUMN*.
Habitat: Under tea tree, pines, kamahi or gorse, or amongst Spanish heather (*Erica lusitanica*).
ERs 9, 10, 12, 15-18, 29-31, 38, 40-43, 46, 47, 49, 51, 65, 66, 68, 72, 78-79.
Rarity: not threatened.
Notes: Structural abnormalities of the labellum are common.

43. ***Gastrodia*** **aff.** ***sesamoides*** Brian Molloy, J51:9; 67:**22** NZ potato orchid
Late Nov-Dec; Jan in subalpine.
Image: Matakawau ER9; 13 Dec 1998.
Traits: Straight *stem*, smooth, creamy *flowers* with a long *column*; two yellow ridges under the *labellum* combine in a wishbone form, yellow tipped; *stems* up to 1.28m tall (J63:20) in its adopted *Pinus radiata.* INSECT POLLINATED. Well covered in floras from Cheeseman's in 1906 until 1983 as *G. sesamoides.*
Habitat: in shade, far north to NW Nelson, lowland to subalpine, uncommon in native bush; thrives in *Pinus radiata.* ERs 3-6, 8-11, 13, 15, 17, 18, 25, 26, 29-31, 35, 37, 38, 40, 46, 47, 48.
Similar taxa
i) *G. sesamoides* Australian, self pollinated; in-bud peduncle hooked at the top.
ii) *G. procera* a likely Australian ancestor, cinnamon scented, insect pollinated.
iii) *G.* "long column" flowers later, further south; golden warts on flower; requires chilling to set seed.
iv) *G. cunninghamii* has a short column and dark tipped labellum.
Notes: D. Petrie's 1893 *G. sesamoides* from Kelly's Ck, ER 50, was surely *G.* "long column", being so far south and flowering in January. T.F. Cheeseman later found *G.* aff. *sesamoides* and named that *G.*

sesamoides too. Thus both remain unclassified in 2008.

Hymenochilus D.L.Jones, M.A.Clem. & Molloy. *Austral Orchid Res.* 4: 72 (2002) for flat labellum. Was *Pterostylis.*

Grassland *plants* only 25–100mm tall with a basal rosette of oval *leaves,* 1-7 *flowers* 10mm long.

44. *Hymenochilus tanypodus*

(D.L.Jones, Molloy & M.A.Clem.) D.L.Jones, Molloy & M.A.Clem. *Austral Orchid Res*. 4: 74 (2002)

NZ swan greenhood. Dec-Jan.

Image: Nenthorn ER68; 15 Dec 2003.

Traits: blue-green *leaves*. Green striped *flowers*; *labellum* lies on the synsepalum; distinguished from *P. tristis* by UPWARD PROJECTING KNOB AT LABELLUM BASE and no denticulation on the petal margins.

Habitat: southern montane grassland. ERs 46, 49, 54-61, 63-69, 79.

Rarity: at risk, sparse.

45. *Hymenochilus tristis* (Colenso) D.L.Jones, Molloy & M.A.Clem. *Austral Orchid Res*. 4: 74 (2002).

the midget greenhood. October-January.

Images: Lake Lyndon ER54; 2 Dec 2002.

Traits: Like *P. tanypodus* with ±10 smaller flowers; yellow green leaves, may be mottled; green (45a) brown or brownish (45b); *LABELLUM* APPENDAGE POINTS INWARD, not upwards. MARGINS OF THE *LATERAL PETALS* ARE MINUTELY TOOTHED.

Habitat: grassland montane to subalpine. ERs 41, 43, 49, 54-57, 59, 61, 63, 67, 68.

Rarity: at risk, sparse. Colenso and Druce records only from the North Island

46. *Ichthyostomum pygmaeum* (Smith) D.L.Jones, M.A.Clem. & Molloy. *Orchadian* 13(11): 499 (2002).

piripiri December to January.

Image: Hunuas ER9; 16 Dec 1997.

Traits: Epiphytic *plants*; *PSEUDOBULBS* PEPPER-CORN each topped by a bristly, oval *leaf* ±10mm long. *FLOWERS* SOLITARY, creamy green, 3mm across, arise on a bristly stem from beneath the pseudobulb. Most stay closed and self pollinate but a few open wide for

bristly *capsule* opens like a mouth, to dehisce the seed.

Habitat: matted on trunks and branches, sometimes on rocks. Coastal lowland to

31, 37-40, 46-48, 50, 61, 71, 72, 77, 79.

Rarity: not threatened.

47. *Linguella puberula* (Hook.f.) D.L.Jones & M.A.Clem. *Austral Orchid Res*. 4: 75 (2002)

Image: Kauaeranga ER10; 10 Nov 2000.

Traits: small 70mm slender *plant* with ROSETTE OF STALKED, TROWEL SHAPED *LEAVES*; *STEM* WITH SPARSE WHITE HAIRS. Small greenhood *flower*, *DORSAL SEPAL* VERY SHORT, BLUNT; *lateral sepals* have long erect tips. In their very high sinus, a

LABELLUM IS OBSCURED.

Habitat: seepages in gum-land scrub, often near *Plumatochilos tasmanicum* ERs 2, 3, 4, 10, 31, 38, 39, 46, 47.

Rarity: threatened: critically endangered.

Notes:

what has caused it to dwindle?

Microtis

320 (1810) being “small ear” re ear-like extensions to the column.

The onion orchid.

Five taxa with single terete *leaves*, the *stems* exit from the bases with tiny green, whorled flowers ⅓rd the ovary’s length. Two calli adorn the *labellum* base. Most have lateral sepals curled back 180° and


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dorsal sepal tip upturned.

48. ***Microtis arenaria*** Lindl. *Gen. Sp. Orchid*. Pl. t306 (1840)
The notched onion orchid. Oct-Nov.
Image: Te Paki ER3; 7 Oct 2000.
Traits: *plant* to 250mm tall *flowers* numerous green-yellow. The *LABELLUM* HAS CRISPED MARGINS, A DEEP NOTCH AT ITS EXTREMITY, WITH A TINY BACKTURNED APICULUS. Two rounded, basal calli protrude beyond the labellum turn-down where a complex callus starts and ends at the notch. *Lateral* sepals are cupped, acute and point down. The *OVARY* HAS A HUMP-BACKED LOOK.
Habitat: dry gum-land in scrub. So far found only in the far North and Orewa. ERs 3, 4, 5, 9, 25, 29.
Notes: common Australian species, thrives in drier sites than *M. unifolia.*

49. ***Microtis*** **"B"** Ian St George, J63:**21**; 67:**5** December to January.
Image: I St George, Gladstone ER36; February 2004.
Traits: A common, small, summer flowering *plant,* often mistaken for *M. unifolia*, but flowers later, is less robust, *flowers* are more widely spaced. Oblong *labellum* is ±equal in length to lateral *petals*; margin is minutely crisped; two basal calli form a saddle; no mid callus; small terminal notch**.**
Habitat: grassland, clay banks, wet areas. ERs 9, 12, 36, 39, 50, 56-57.

50. ***Microtis oligantha*** L.B. Moore *New Zealand J. Bot.* 6: 473 f.1 (1969)
the small onion orchid Dec-Feb.
Image: Horopito ER18; 28 Jan 1998.
Traits: *PLANTS* SELDOM MORE THAN 100MM TALL; LESS THAN 10 TINY GREEN *FLOWERS. DORSAL SEPAL* SHORT, EVENLY ROUNDED TIP NOT UPTURNED. *Lateral sepals* usually pointing straight down. *Labellum* oblong, the margins with few shallow indentations; anterior callus often not prominent, PARALLEL BASAL CALLI ARE SQUARISH AND ALMOST FULL WIDTH OF LABELLUM, their tops almost flat.
Habitat: open grass, tussock or boggy areas, stream and lakesides, alpine fields. ERs 12, 13, 16-18, 26, 38, 39, 46, 50, 51, 54, 57, 61-69, 73, 78-80.
Rarity: not threatened.

51. ***Microtis parviflora*** R.Br. *Prodr. Fl. Nov. Holland*: 321 (1810)
The slender onion orchid. Oct-March.
Image: Bream Tail Res ER6; 3/11/1995.
Traits: 100–300mm tall, many flowers crowded on *stem*; *petals* almost hidden under the hood; *LABELLUM* NARROWER AT TIP THAN BASE; TONGUE-LIKE – with smooth margin and no terminal notch. The two elongated calli at the base of the labellum are rounded and parallel. *STIGMA* WIDER THAN *COLUMN* BELOW IT.
Habitat: gum-land scrub, kauri forest, grassland, common roadside species around Auckland. ERs 2-6, 8-13, 15-17, 19, 25, 31, 35, 39, 46, 48.
Rarity: not threatened.
Notes: true *M. parviflora* has a smooth-edged, triangular labellum; a NZ form has triangular labella with undulate or notched margins: it may be a different taxon.

52. ***Microtis unifolia*** (G. Forst.) Rchb.f. *Beitr. Syst. Pflanzenk.* 62 (1871)
maikaika September to December.
Image: Bombay ER9; 18 Nov 1995.
Traits: often a robust *plant*, up to 10mm thick at its base; ±300mm tall *flower* spike rarely to 1m. Numerous close-packed tiny green flowers with pointed, hooded, *dorsal sepals* usually half enclosing the narrow *petals*. *LABELLUM* OBLONG, IRREGULARLY CRENATE, thus often narrowest at mid-length; margins creamy, crisped; apex

notched but less than in *M. arenaria,* with no in-turned apiculus; central callus warty, variable; basal calli oval, converging outwards. *STIGMA* NOT WIDER THAN *COLUMN* BELOW IT.

Habitat: common in a wide range of habitats. Some uncertainty in ERs as a result of confusion with similar taxa.
ERs 2-7, 9-25, 27-29, 31-50, 53-57, 59, 61-68, 70, 72, 73, 74, 77-80.

Rarity: not threatened.

Notes: Colenso named an April-flowering form as *M. longifolia.* Observed pollinators are both red ants and black ants.

53. *Molloybas cryptanthus* (Hatch)

D.L. Jones & M.A. Clem. *Orchadian* 13(10): 448 (2002).
Hidden spider orchid. July-September.

Images: a) Omoana; 16 August 1997.
b) Omoana ER24, 3 Sept 2005.

Traits: Epiparasite LACKING CHLOROPLASTS, even in the bract-like *leaf*. *Flowers* mushroom coloured with tomato dashes. Long filamentous *PETALS* RISE AT THE REAR OF THE FLOWER *SEPALS* AT THE FRONT, in reverse to *Nematoceras*. A notable, translucent alba-form, **53a**, lacks the mushroom shade but still has reddish dashes under the recurved *labellum wings*. Column is erect. Laciniate, large, ornate *labellum* is surprising for a self pollinated *plant*.

Habitat: flowers are submerged under leaf mould of kanuka or beech. But the alba-form flowers on top of moss or leaf mould and, at Omoana, was 10 years between appearances. July 1993 with 16 flowers, to August and Sept 2005 with fewer flowers a few metres away. ERs 2, 3, 6, 9, 18, 24, 25, 38, 39, 47, 48, 55, 68, 72, 77.

Notes: The white scape extends through the leaf mould in Nov Dec with *capsule* doubled over, then rising but staying on a lean. Similar scape on *Corybas cheesemanii* has erect capsule and a green leaf below. R.H. Matthews noted the leafless scapes at Kaitaia in 1898. (Scanlen 2006)

Myrmechila D.L. Jones & M.A. Clem.

Orchadian 15(1) **36-37 (2005)** ant-like lip
Synonym. *Chiloglottis*
Two self introduced Australian terrestrial species to ±150mm tall; twin elliptic *leaves* at the stem base; *labella* mimicking wingless female wasps. In Australia a male wasp pollinates the flower by pseudo-copulation. The wasps do not occur in NZ.

54. *Myrmechila formicifera* (Fitzg.)

D.L. Jones et M.A. Clem. *Orchadian* 15(1): 37 (2005). The ant orchid September

Image: Ellerslie in pot; 11 Sept 1998.

Traits: Reddish or green *flower, peduncle*; to 80mm tall, *leaf* margins entire or wavy. Pale *column* and black, TUBERCULATE CALLI TO THE TIP OF THE *LABELLUM.*

Habitat: Kaitaia, 1900-1915. ER 5.

Rarity: Australian vagrant, may now be extinct in NZ.

Notes: R.H. Matthews noted on 8 October 1900, an Australian grass close by the colony, hinting of possible introduction by Australian visitors. (Scanlen 2006)

55. *Myrmechila trapeziformis* (Fitzg.)

D.L. Jones et M.A. Clem. *Orchadian* 15(1): 37 (2005)
dainty bird orchid. December.

Image: Waitarere ER31; 10 Oct 2001.

Traits: Red/green peduncle and UP-FACING *FLOWER*; to 120mm tall with *leaf* margins smooth and not usually wavy. Pale *column*; *labellum* kite shaped with DARK, TUBERCULATE TO STALKED DISC CALLI, NOT EXTENDING TO THE MARGINS and leaving labellum tip bare; variable small pink calli nearest the *column*.

Habitat: identified near Levin in 2001, over 21 colonies with minute differences indicating seed propagation, under *Pinus radiata*; now transplanted to Iwitahi and


52


53a


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53b


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elsewhere. ER 15, 17, 31.
Rarity: non-resident native, vagrant.
Notes: sets seed in NZ (unknown pollinator), also spreads vegetatively.

***Nematoceras*:** Hook. f. Fl. N. Zel. 1: 249, t.57 (1853) for thread, horn.
Synonym *Corybas*
Commonly called silverbacks referring to the silvery underside to the leaf, or spider orchids. Four groups of terrestrial, single leaved herbs, usually single flowered but, a twin flower can occur in place of the secondary bract. *Leaf* often dotted with maroon, lengthens noticeably in flowering plants. *Petiole* is deeply grooved except in *N. acuminatum* with no groove. *Sheathing bract* at stem base, is a colourless, trumpet-shaped sheath, usually sloping up to a variable apiculus at the rear, whose point is mostly dark but sometimes green. *Peduncle* lengthens as a *scape* after pollination for good seed distribution. *Ovary* has two bracts at its base; *floral bract* behind ±3mm long, truncate, acute, green, *secondary bract* ahead 0-3mm, rarely to 7mm, acicular, colourless, aiming out and up from the base of the ovary, is the incipient second pedicel. *Dorsal sepal* curls over as an hood to the up-folded labellum wings. *Lateral tepals* are filamentous, looped across the bud but straightening out ±erect then take up different attitudes in the mature flower, according to species, with *sepals* crossing behind the *petals* to rise at the back of the flower. The *column* is tiny, lying ±level in the base of the *labellum* with dark maroon surround, especially above the auricles which aerate and light the column chamber.
Four groups as follows**:—**
i) *N. acuminatum* lumped by Hooker (1864) into the *N. rivulare* agg. by inclusion of ACUMINATE *LEAF* in the description, but DNA and structure both show it as distinct.

ii) *N. macranthum* Hook. f. agg. with orbicular, cordate *leaf* like *N. rivulare* agg. but has a GNAT'S EGG POCKET IN THE *LABELLUM* CHANNEL as in *N. trilobum* and *Corybas cheesemanii.* Three to four taxa with debated distinctions.

iii) *N. rivulare* Hook. f. agg. some 14 taxa with long, ACUTE/ACUMINATE *DORSAL SEPALS*. All taxa grow in dense colonies, have an ORBICULAR, CORDATE *LEAF*, (pandurate at times). The *peduncle,* usually housed (partly fused) in the grooved *petiole* thus *ovary* and *flower* show above the leaf. *Peduncle* and *ovary* lengthen as the flower matures. Taxa are mostly identified by the entire, apiculated *labellum* and its midrib profile. This rises with a slight lean back to the first flexure, angles sharply forward along the channel base to a second easier flexure then curves down to an apiculate tip. The channel is shouldered and has no egg pocket unless hybridised. *Auricles* outer rims are colourless. ALL THRIVE IN YEAR-ROUND, SEEPAGE, MOSSY SWAMP OR WATERFALL SPRAY.

iv) *N. trilobum* Hook. *f.* agg. comprises ±20 taxa but only the well documented, stable forms are singled out here. Colenso's lectotype, from northern Wairarapa was identified as the North Island form of *N.* "Trotters", by St George J106:8-15.
Traits: include
a) a reniform, mucronate *leaf* but some few are orbicular cordate,
b) *PEDUNCLE BENDS* OUT OF THE GROOVED *PETIOLE UNLIKE* most *N. rivulare* agg.
c) a ±ragged margin to the *labellum* bib,
d) notched *labellum* bib, often with a central apiculus,
e) maroon and white stripes at the back of the *labellum* converging on the *column*,
f) short, stiff hairs, often inside the *labellum* giving pollinators a good foothold
g) notably, a COMMA SHAPED, BACK-

SLOPING POCKET in the *labellum channel*, formed by side calli meeting. Gnat's eggs have been found in the pocket (J98:34). Fungus gnats may mistake the flowers for toadstools and lay their eggs in this handy recess, pollinating the flowers with their heads in the process. This pocket exits below as a visible slit or drain hole. Analyses of *N. trilobum* agg. by Dawson et al, 2007, showed most N.Id. taxa to be diploids with 2n=36 chromosomes yet similar looking S.Id. forms are tetraploids with 2n=72, for all 3 accessions tested.

56. *Nematoceras acuminatum* (M.A. Clem. & Hatch) Molloy, D.L.Jones & M.A.Clem. *Orchadian* 13(10): 449 (2002)

Sept Nth.-Dec (far south)

Image: Waitakeres ER9; 19 Sept 1998.

Traits: *LEAF* SESSILE, TRIANGULAR, ACCUTE WITH WAVY MARGINS and reddish veins. Juvenile leaves small and orbicular (J58:16). *Flower* with long *tepals* and a VERY LONG *DORSAL SEPAL*. Rarely has a second flower.

Habitat: lowland to subalpine; damp, shaded, mixed forest. ERs 3, 5, 6, 8-13, 15-18, 20-25, 31, 37-40, 43, 46-48, 50, 51, 53, 61, 65, 71, 72, 77, 79, 80, 83.

Rarity: not threatened.

Notes: was included in *Nematoceras rivulare* by Hooker (1864) until Hatch & Clements (1985) reclassified it.

57. *Nematoceras* "craigielea" Ian St George, J77:7; 79:3,**4**

October.

Image: Craigie Lea ER35; 6 Oct 2001

Traits: *N. trilobum* agg. F*lower* small, *leaf* tiny, reniform ±10mm wide and apiculate. *Flower* nutant, 7.6mm tall x 5.0mm wide, above the leaf, and is perfumed, pale maroon outside with a retuse *dorsal sepal*. *Labellum* is white inside, with closely spaced hairs, ±0.2mm long. The bib is notched at the base with a ±1mm apiculus. Prominent colourless *auricles* flare below.

Habitat: Known only from seepage in tea-tree regrowth at Craigie Lea, eastern Wairarapa, ER 35.

Notes: A distinctive taxon pollinated by a female fungus gnat (J79:5) inferred from one that Ian found stuck in the attempt.

58. *N.* "darkie" Graeme Jane, J35:33; 77:**8**

November-December.

Image: Dip Flat ER49; 29 Nov 2002.

Traits: *N. trilobum* agg. with the retuse *dorsal sepal* and all over dark maroon *labellum* and *dorsal sepal*. Typically, *ovary* 4mm, *peduncle* 2mm, so the 11mm *petiole* is at ±90° to it and the *flower* sits back from the trilobate *leaf* whose margin is dotted with maroon glands. *Node* ±4mm above the *sheathing bract*. *Lateral sepals* ±33mm, maroon, pale at the base; *petals* ±12mm, colourless, maroon streaked. *Labellum* ±7mm wide x ±9mm tall, MARGINS ENTIRE, Veed channel; notched bib obscures flared, maroon, *auricles*.

Habitat: Dip Flat, Waiau R, mossy shaded river flat under beech. ERs 41, 46, 47, 49.

Similar taxa

i) *N. trilobum* "round leaf", Horopito in swampy tea tree; its *leaf* is reniform apiculate, node angle is ±60°, not 90° so the maroon flower tucks closer to the leaf. The *labellum* has a wider Vee channel and is green at the centre not maroon.

ii) *N. sulcatum* Macquarie Id. with node in the *sheathing bract* and no labellum bib.

Notes: With no pale centre to the labellum, its kairomones may attract pollinators. No perfume detectable to people.

59. *N. hypogaeum* (Colenso) Molloy, D.L.Jones & M.A.Clem. *Orchadian* 13(10): 449 (2002)

Aug-Sept.

Image: Hunuas ER9; 6 Sept 2001.

Traits: *leaf* flat on the moss, 12-20mm diam, cordate, reniform, 3 lobed at tip silver

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tinged purple beneath. *NODE* WITHIN THE *SHEATHING BRACT*. *Flower* tiny, on short, thread-like *stem*, sunk in moss and beech litter, below the *leaf*, with jagged and incurved edges to the *labellum*. ONLY ±ONE IN TWENTY PLANTS FLOWER.

Habitat: Lowland to montane beech .
ERs 9, 18, 30, 31, 33, 35-37,, 46, 47, 49, 50.

Rarity: not threatened.

Notes: like a small scale *N. trilobum* s.s. but the node-in-sheathing bract and flower under moss in beech, are good identifiers.

60. *N. iridescens* (Irwin & Molloy) Molloy, D.L. Jones & M.A. Clem. *Orchadian* 13(10): 449 (2002)

tagged as big red. August-October.

Image: Makatote ER18; 5 Oct 2001.

Traits: Petiolate, round *leaf*, usually spotted with dull purple. WIDELY FLARING *LABELLUM* OF DARKEST RED, SHARPLY DEFLEXED WITH A SMALL GLAND VISIBLE IN THE CHANNEL. ERs, 11-13, 16, 18, 22-25, 28-31, 35-38, 46, 47, 50, 56, 65, 69, 77, 79.

Habitat: Common in roadside seepages in papa-limestone country from Port Waikato to South Taranaki, and the Ruahines. Montane to lowland.

Rarity: not threatened.

Similar species: DNA matches both
i) *N. dienemum*, Macquarie Id and
ii) *N. longipetalum* (Clements et al 2006.)

Notes: taken as *N. macranthum* until J.B. Irwin tagged it *Corybas* "A", J47:7, 1993

61. *N.* **"Kaimai"** Bruce Irwin, J47:**9**

September-November.

Image: Hunuas ER9; 22 Sept 1996.

Traits: *N. rivulare* agg. *Peduncle* can be plain green or dashed with purple or all purple showing 2-4mm above the *leaf* which is usually purple dotted. *Ovary* lengthens with age so the *flower* stands well above the leaf. Long *sepals* stand slightly spread, shorter *petals* drop to level angling forward. *Dorsal sepal* is pale with purple dashes. Top half is ±straight and level. *Labellum* is acuminate, pale at centre shading to dark maroon wings meeting at the top. *Column chamber* is uniquely white except for dark maroon patches over the *auricle* bases. Midrib first flexure turns sharply through ±135°, 2nd. ±50° and curves back, apiculus touching the *ovary*.

Habitat: on seeping stream banks in native forest. Lowland to montane.
ERs 9, 10, 13, 16, 18, 19, 21, 25, 46, 47.

Similar taxa: *N.* "viridis", more widespread; its dorsal sepal varies from hooked down to turned up at the tip. Labellum has an all-dark column chamber but paler wings, short, dense whiskers covering the pale part. Both taxa grow in different parts of the Waitakeres, ER 9.

Notes: H.B. Matthews sent *Corysanthes rotundifolius* "light purple", from Nihotupu Stm (now dammed) in the Waitakeres to AK Herbarium (108634, 108637) on 25 Sept 1922. *C. rotundifolius* sensu Cheeseman is now *Nematoceras rivulare* so Matthews was on the right track but didn't describe the taxon.

62.. *Nematoceras* **"Kaitarakihi"** E.D. Hatch, N/L1:3; J74;18,**Fig 6**

Late August–early October.

Image: Kaitarakihi Res ER9; 6 Oct 1999.

Traits: *N. rivulare* agg. BUD RISING FROM A CUPPED LEAF. *Peduncle* wholly sheathed in the *petiole* groove. *Leaf* has a few maroon glands at the margin. *Dorsal sepal* has 3 parallel grooves each side, a turned up tip, green at the base with purple dashes starting at half way and becoming denser toward the tip. HEALTHY *PLANTS* STAND THE *DORSAL SEPAL* STRAIGHT UP. (Pers comm. P. de Lange.) *Tepals* colourless with a few purple flecks. *Lateral sepals* spread a little. *Lateral petals* are shorter, spreading and at ±45° from level. *Labellum* very dark with a thin colourless chevron close to the forward

margin.
Habitat: Stream banks and saturated, mossy slip debris on the Manukau Harbour shores of the Waitakeres. ER 9.
Similar taxa
i) *N.* "Veil" has the pale chevron at the labellum margin as does the smaller,
ii) *N.* "Pollok" flowering a month earlier. Neither taxa have the cupped leaf.
iii) *N.* "rest area" has the dorsal sepal erect in robust plants which have a cupped leaf.
Notes: Dan Hatch reported this taxon as *Corybas orbiculatus* (Moore & Edgar's 1970 title for *N. rivulare*) from just above high tide level at Kaitarakihi Res in Dorothy Cooper's N/L 1, March 1982.

63. ***N. longipetalum*** (Hatch), D.L.Jones & M.A.Clem. *Orchadian* 13(10): 449 2002. tagged as Waiouru July to October.
Image: Ohakune ER18; 31 August 1996.
Traits: *leaf* petiolate, *peduncle* mostly fused in the petiole groove; *flower* green with dark maroon at the back; LONG, ±EQUAL LATERAL *TEPALS,* ERECT AT FIRST, LEAN FORWARD ±PARALLEL.
Habitat: wet mossy rocks, windswept coast in Westland to subalpine.
ERs 12, 15, 18, 25-27, 30-33, 35-41, 46-50.
Similar species
i) *N. papa* but its leaf is sessile, flowers 3-8 weeks later and colour pattern within the throat is distinct.
ii) *N. dienemum* Macquarie Id, has the erect tepals when first opened. DNA is a close match. (Clements et al 2006)
Notes: placed by Hatch as a variety of *Corybas macranthus*, but later recognised as part of the *N. rivulare* agg. (and tagged *C.* "Waiouru") by Bruce Irwin. Several like taxa flowering at different times, darker coloured and with tepals unequal, lie uneasily under this title.

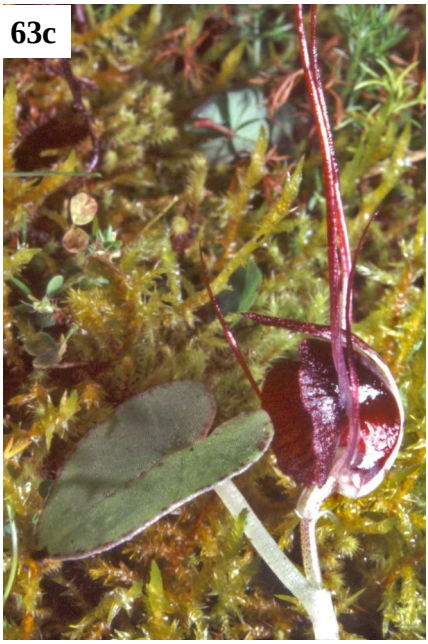
64. ***N. macranthum*** Hook.f. *Fl. Nov.-Zel.* 1: 250 (1853) or silver back. Oct-Jan.
Images: 64a Waitakeres ER9; 1 Nov '97.
64b Takaka Hill; 12 Nov 1998.
64c Kaimango Rd.; 16 Oct 2007.
Traits: LARGE, TRUMPET SHAPED *LABELLUM*, WITH EGG POCKET IN THE CHANNEL, LONG NARROW ACUMINATE *DORSAL SEPAL*, *lateral sepals* much longer than the petals. *Flower under* the large round *leaf* in ER 5-9; above or below the *leaf* in southern forms. ER 5-9 have translucent yellow-green *dorsal sepals* flecked with dark crimson, and a dull green channel in the labellum. A southern form has an all dark red dorsal sepal and *labellum*.
Habitat: damp places, lowland-montane, from stream banks to near ridge tops.
ERs 5, 6, 9-13, 15-26, 28-31, 33, 35-39, 41, 43, 45-51, 55, 57, 61, 63, 65-70, 72-74, 77-80, 84.
Rarity: not threatened.
Notes: 3 taxa are indicated on the family tree of nucleotide differences (Clements et al 2006). Hybrids occur with *N. triloba* agg.Taxon **64b** at Takaka Hill ER 46, had no pale patch in the labellum, flowered above the leaf in the sun and below the leaf in the shade. **64c** at Kaimango Rd. near Otorohanga had a narrow pale strip on the disc and flowers ±level with the leaf. A pollinating fungus gnat had perished inside one with its head stuck to the stigma.

65.*Nematoceras* "mactaipos" Pat Enright, J81:**43** September-October
Image: Newlands in pot; 8 Oct 2001
Traits: *N. trilobum/macranthum* agg. likely to be an hybrid of *N. trilobum* (was *N.* "Trotters") and *N. macranthum. Leaf* is orbicular with a wide sinus, maroon midrib and spots, mainly to margins. *Tepals* are consistent with either purported parent. *Dorsal sepal* is green with purple dashes concentrated toward the obtuse tip, margins are uptilted. *Labellum* is dark maroon with a

64a

64b

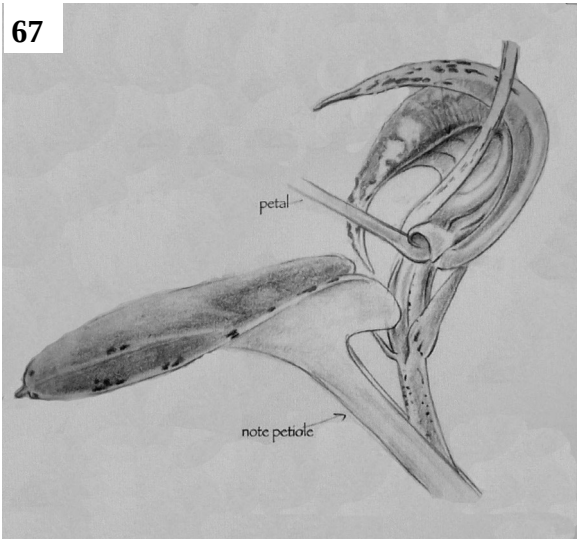
63c



65

66

67



pale centre, circular opening and ragged margin below.

Habitat; Tinui Taipos and Pinnacles Tk, Aorangi Ra, tracksides in elevated scrub and bush ERs 35, 37.

Similar taxa

i). *N. macranthum* Hook. *f.* meaning the northern form with uptilted margins to the dorsal sepal, etc.

ii). *N. trilobum* with its wide leaf sinus and obtuse dorsal sepal plus its proximity with *N. macranthum* and *N.* "mactaipos" at the Pinnacles Tk.

Notes: The evidence for *N.* "mactaipos" being an hybrid is compelling. With both hypothetical parents probably having 2n=36 chromosomes (Dawson et al 2007) such an hybrid could be expected to produce viable seed. Further reports are awaited from molecular studies and/or from sites where either or both putative parents are absent.

66. *Nematoceras* "Mangahuia" Bruce Irwin J44:11 October to November.

Image: Mangahuia Stm ER18; 16 Oct '97.

Traits: *N. rivulare* agg. with a short *peduncle* leaving the flower level with the leaf until the *ovary* extends in maturity. *Sepals* at ±36mm curl back behind the labellum then forward crossing the erect ±27mm *petals* again in youth. *Petals* lower later to a parallel plane with the *sepals*; both spread outwards. *Dorsal sepal* has a level outer half, pale and lightly speckled purple. *Labellum* bib has a broad, translucent chevron from the tip, surrounding a narrow dark centre and narrow Veed channel, wings have ragged veins and blobs of purple on translucent base, midrib profile rises on a backslope, turns 180° on a curve in lieu of the normal two flexures for *Nematoceras* so the lower half of the bib is in contact with the ovary.

Habitat: One persistent colony is known in consolidated, seeping shingle, in dappled shade, on a bank of the Mangahuia Stm, west of Ruapehu. ER 18

Similar taxa

i). *N. longipetalum* with equal length tepals in parallel planes, a similar small dark patch centre labellum but has a longer peduncle and ovary above the leaf; it has a regular, two flexure, labellum midrib profile and it flowers a month or two earlier

ii). *N.* "Sphagnum" flowers at the same time but the labellum has a std. 2 flexure, midrib profile, a larger central dark patch and petals held ±level, not erect.

Notes: Bruce Irwin had concerns that this may be an hybrid of others in the agg. but it has stable enough characters to publish it for others to compare and assess.

67. *N.* "Motutangi" R.H. Matthews J83:19; tagged by Scanlen (2006) as *N.* "Sep" September.

Image: J.B. Irwin ex Motutangi ER4; 4 September 1989.

Traits: *N. rivulare* agg. but differs with earlier flowering than most, the *PEDUNCLE* LEANS OUT OF THE SLOTTED *PETIOLE* more like *N. trilobum* agg. and the *labellum* midrib follows a smooth curve not the normal two flexures (Tyler et al 2007).

Habitat: Probably stream and ditch sides. Kaitaia to Motutangi 1899-1988. ER 4

Similar species: *N.* "Kaimai" flowers later; has clear midrib flexures, etc.

Notes: R.H. Matthews treated this as the common form around Kaitaia and could not accept T.F. Cheeseman's lumping of it with November flowering *N. rivulare* s.s. It has not been reported since 1989. Bruce Irwin drew it from Doug McCrae's specimens.

68. *Nematoceras* "Omoana" Margaret Menzies, J93:**26** August-Sept.

Image: Omoana ER24; 3 Sept 2005.

Traits: Apparent hybrid of *N.* "tricraig" and *N. iridescens*. ORBICULAR *LEAF* sprinkled with inset maroon glands. Short green-

ish *peduncle* with purple speckles stands clear of the long, slotted petiole so the *leaf* is level with mid-flower. *LATERAL SEPALS* ARE VERY LONG ±30° above level. *Lateral sepals* $^{2}/_{3}$rds their length, ±level. Purple spotted, greenish *DORSAL SEPAL* OVERHANGS THE *LABELLUM*, which is cupped and obtuse with a tiny apiculus. *Labellum* is very dark except for clear stripes at the forward, margin. *Midrib* curves back from base to first and only flexure, leaving a singularly narrow, very dark column chamber, then turns through 180° leaving the laciniate bib clear of the ovary. No *N. trilobum* egg pocket; no *N. iridescens* gland in the channel. *Auricles* flare forward, tucked in behind the bib.

Habitat: In tea-tree-mingimingi-bracken scrub near ridge top at Waitiri Tk, Omoana with both *N.* "tricraig" and *N. iridescens* nearby. ER 24.

Similar species

i) *N. iridescens* but peduncle is housed in the petiole groove, dorsal sepal acuminate, labellum midrib profile with two flexures.

ii) *N.* "tricraig" nearby with trilobate leaf, peduncle standing clear of the grooved petiole, very long, erect lateral sepals and drooping lateral petals half their length.

Notes: The proximity of the putative parents and the intermediate traits, make this look like an hybrid. Both parents probably have 36 chromosomes so any seed should be viable, numerous *N.* "Omoana" were seen in 2004 and 2005.

69. ***N. orbiculatum*** (Colenso) Molloy, D.L.Jones & M.A.Clem. *Orchadian* 13(10): 449 (2002)
or short tepals. August–October.

Image: Omoana ER24; 16 August 1997.

Traits: *C. rivularis* agg. Edges of the dark crimson *labellum* are in-rolled to give a pendant, trough-like appearance, *SEPALS* AND *PETALS* VERY SHORT – about as long as the *dorsal sepal*. Apparently self-pollinated. Odd pale ones occur.

Habitat: permanently wet, mossy road banks; locally abundant in Taranaki papa and limestone. Lowland to montane.
ERs 10-13, 18, 19, 21, 22, 24, 25, 27, 30, 31, 37, 38, 40, 42, 43, 46, 47, 49, 51, 53, 57, 58, 60, 65, 66, 72, 77, 79, 80.

Rarity: not threatened.

Notes: Lumped with *N. rivulare* (1906 & 1925) by Cheeseman, and transferred in error to *N. rivulare* (Moore & Edgar 1970) once tagged *Corybas* "short tepals" & *C.* "C" until Molloy (1996) reconnected it with Henry Suter's specimen to Colenso (1891) from Mount Cook village.

70. ***N. papa*** (Molloy & Irwin) Molloy, D.L. Jones & M.A. Clem. *Orchadian* 13(10): 449 (2002). August to September.

Image: Mt Messenger ER24; 6 Aug 1995.

Traits: *leaf* sessile, *FLOWER* GREEN with blackish crimson around the column, but with a NARROW GREEN MARGIN TO REAR LOBES of *labellum*. *Flower* compressed fore and aft compared with *N.* "viridis", *labellum* bib rounded to a small apiculus which drops below the downward facing *auricles*. *Tepals* project forward and outward. *Dorsal sepal* has an upturned, acuminate tip.

Habitat: Sandstone and limestone country from Port Waikato to South Taranaki and the Ruahines; damp roadside seepages. Lowland to montane.
ERs 12, 18, 23-25, 30, 48.

Rarity: not threatened.

Notes: was tagged for a time as *Corybas* "Mt Messenger" and/or *Corybas.* "B".

71. ***N. papillosum*** (Colenso) Molloy, D.L. Jones & M.A. Clem. *Orchadian* 13 (10); 449 (2002). Nov in Nelson.

Image: Miner Stm. ER47; 28 Nov 2002.

Traits: *N. macranthum* agg. *Leaf* more papillose on top than others with short *pedicel*. *Dorsal sepal* pale green, speckled


68


71


69


72


73[1]


70


73[3]


73[3]alba

with purple-red, narrow, acuminate, recurved. *Labellum* PAPILLOSE INSIDE with shallow ragged, apiculated notch to the bib. White disc can extend to the margin.

Habitat: Hackett Tk in Nelson. Colenso's in Hawke's Bay, damp shaded woods, 1850-1880. ERs 15, 29, 47, 65.

Similar taxa: *N. macranthum* agg.

72. *Nematoceras* "Pollok" Tricia Aspin, J93:20,**22,43** August.

Image: Pollok ER9; 10 August 2004**.**

Traits: *N. rivulare* agg.; two known populations. Those at Pollok have red dots on the margin only of the orbicular *leaf* and a purple *peduncle.* Kohekohe specimens have the red dots also sprinkled over the leaf and a pale green *peduncle* dotted with purple. Otherwise both are nearly identical. 2-4mm of *peduncle* shows above the *leaf* standing the *flower* well above on mature ovary. Long *sepals* stand plumb as do almost equal *petals* at first, before dropping forward, splayed and ±level. *Dorsal sepal* is pale green, dotted with purple on uptilted margins and midrib ridge. *Labellum* is very dark at centre with a wide pale green chevron surrounding and leading around the shoulders into the column chamber. Wings do not quite meet above. Midrib rises almost plumb, turns through ±135° at the first flexure, has only a bump to mark the second flexure then curves back, *apiculus* touching the *ovary*.

Habitat: To date, only at Kohekohe and Pollok on the Awhitu Pen, despite determined searches there and further south. Seeping sandstone cliffs, in total shade, in company of moss, bladderwort and glowworm larvae at Kohekohe. ER 9

Similar taxa

i) *N.* "Veil" with similar flexure profile, uptilted dorsal sepal margins and a dark labellum centre with pale chevron, shorter peduncle, shorter lateral petals and larger flowers, open a month later in more light.

ii) *N.* "Kaimai" larger with similar flexure profile but flowers two months later.

Notes: A distinctive but rare taxon wanting recognition and conservation.

73. *N.* "pygmy" Graham Jane & Gael Doherty J73:**11** June-July.

Traits: *N. trilobum* agg. 4-5 forms all FLOWERING IN JUNE–JULY from Queenstown to Tauroa, all with the *NODE* IN THE PURPLE SPOTTED, COLOURLESS *sheathing bract* with thorn-like rear apiculus. Exceptions occur in thick leaf mould where the node can be ±25mm out of the sheathing bract. SMALL *LEAVES* IN JUNE ALMOST ALL PRODUCE FLOWERS. UNFLOWERED, LARGE *LEAVES* ARISE LATER, INTO AUGUST, ON LONG *PETIOLES. Sepals* are short, erect but diverging, *petals* are shorter, angling forward ±level. *Dorsal sepal* is usually green, darkening to purplish in maturity, helmet-like front, flush with labellum opening. *Labellum* has a mucronate, ragged tip, the white centre, may be vertically striped purple, maroon wings meeting above. Midrib ±erect, turns through 180° by the egg-pocket with the down-leg ±parallel to the riser.

Habitat: all four *N.* "pygmy" forms: shady, mossy, tracksides, lowland–montane, native bush.

Form 1a:

Image: Mangawhai ER9, 12 July 2004. Was *Corybas trilobus* as described by Hatch (1959), also *C.* "triju" J76:37,**39.** Common in the Waitakeres. *Leaf* is reniform, mucronate. *Peduncle* ±2mm long is at ±90° with the *petiole* at the node, leaving the *flower* ±level with the leaf. *Dorsal sepal* is retuse. *Labellum* opening, vertical in profile, oval from the front, ±7mm wide, visible margin mostly ragged. An alba form with green leaf has been recorded at Hungry Ck, Puhoi.

From: Turoa Pen, Ahipara, Bream Tail

Res, Hungry Ck Art School, Puhoi, Eaves Res, Orewa, Waitakere Ra and Awhitu Pen. ERs 5, 6, 9.

Form 1b P Aspin, Matakawau Res (no image) has a colourless, translucent *labellum* bib. Dark purple elsewhere as in form 1a. ER 9

Similar taxa: *N.* "trijuly" looks similar as a juvenile but the *labellum* opens wider later, its node is ±6mm out of the *sheathing bract* and peak flowering is a month later although there is an overlap.

Form 2 A Ducker, J89:25,**30**.
From: Mangawhai; (no image) has parallel *sepals*; needs confirmation. ER 9.

Form 3. Geoff Stacey. J69:21.
Image: Wharekawa ER9;16 July 1999. The smallest with the shortest *peduncle*. Fertile *leaf bud* is dished at Wharekawa to conical at Levin, mature *leaf* is rounded, apiculated with no mucro. *Dorsal sepal* is grooved on a slight midrib ridge, pale green with purplish, parallel lines or dashes . *Ovary* leans back at ±30° to the vertical. *Secondary bract* is a notable, colourless spike. *Labellum* opening, in profile, juts outwards at the bib; it has a flat base sitting on the leaf at first but easing back as the *ovary* and *petiole* lengthen in maturity. At Waitarere Forest, *leaf bud* is conical but flattens as the flower opens.
From: eastern slopes of the Hunua Ra, and Rangitoto Id ERs 9, 31.

Form 3 alba;
Image: Brian Tyler, 13 June 2007. (J84:**36**). A successful Waitarere taxon. Pink replaces the usual purplish maroon in *labellum* wings and column chamber. *Dorsal sepal* is pale green; *tepals* are colourless. Produces abundant seed. Mature flowers tend to lift back from the leaf similar to form 1.
From Waitarere Forest.ERs 31.

Form 4 Image: I St George, Queenstown, ER66, July 1988.
Graham Jane & Gael Doherty's, J73:12, first to be tagged *N.* "pygmy", where the *LEAF BUD* IS CONICAL BUT FLATTENS AS FLOWER OPENS. Queenstown specimens (N/L22:2, I. St George 1986) in flower in July among icicles. Similar to Form 3 but has the *flower* standing back from the orbicular, cordate, *leaf. Dorsal sepal*, entire, starts flowering, end of May in Nelson.
From: Cape Farewell, ER 46, 66.
Notes: Mid winter flowering is curious, especially amongst icicles at Queenstown. Later crowds of big leaves, during longer days, nourish the tubers for next year. Presumed to be insect pollinated.

74. *Nematoceras* "rest area" Bruce Irwin, J47:**9** November.

Image: Rangataua ER18; 5 Nov 1997.
Traits: *N. rivulare* agg. *leaf* often cupped, pale green, lightly purple speckled, *DORSAL SEPAL* CAN BE ALMOST ERECT WITH ITS ACUMINATE TIP CURVING BACK BEYOND VERTICAL but more often in a ±level position. *LABELLUM* OPENING TRAPEZOIDAL, WIDER AT THE BASE; pale bib and wings with a wide darker stripe inside the margins, leading right around to the column chamber. *Auricles* are white, narrowing to a small orifice. *Midrib* leans back, turns through a 90°flexure, sloping up through a short channel to a second 90° flexure, the bib curling back to touch the *ovary*.
Habitat: Wetland or year-long seepage; light shade to dappled sunlight. Oturere Rest Area, Paramanawera Wetland, Puffer Tk. ERs 18, 38.
Similar taxa
i) *N. papa* in drier habitat; is not so dark; no erect dorsal sepal; doesn't bud from a


73[4]


74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cupped leaf; flowers ±2 months earlier.
ii) *N.* "viridis" can have the recurved dorsal sepal tip and a similar midlobe flexure; flowers ±1 month earlier
Notes: Is it an hybrid with *N. papa* and *N.* "viridis"? It is similar to both. Disjunct distribution could be due to different crosses? But consistent traits without intermediates at Oturere Rest Area and Puffer Tk, rule against hybrid origin.

75. *N.* "Rimutaka" I St George J58:**9** September.

Image: Rimutakas ER38; 14 Sept 2001.
Traits: *N. trilobum* agg. notable for its SHORT ±2MM *PEDICEL*; THUS ITS TINY ±9MM TALL *FLOWER* IS BELOW THE TINY 8-11MM WIDE *LEAF*. The Nelson, Roding leaves extend in flowering plants to a mucronate arrow head. The ill fitting, pale green *dorsal sepal,* lowers to fit better as it ages and colours to blotchy maroon; it tapers out uniformly to the obtuse tip, with upturned margins in Whangamoa. Darkest *labellum* wings above an opening narrowing to the top, pale centre with short dark hairs at Rimutaka, pale elsewhere. No apiculus in a deeply notched, ragged bib. *Sepals* ±32mm long, erect*, petals* ±8mm ±level*. Sheathing bract* sheathes the stem firmly, its apiculus a brown inverted comma pointing back at the stem.
Habitat: Mossy damp track-side in cool, shaded bush or scrub. St. Arnaud to D'Urville Id in Nelson, Rimutaka Hill, Ahititi, Ongarue, Uruti and Wairoa Loop Tk, Hunua Ra.
ERs 9, 23, 24, 38, 40, 47, 49.
Similar taxa: *N. trilobum* ("Trotters") has a longer petiole a more rounded, darker, and larger, flower angling down. Its in-flower leaf shape is a similar mucronate arrow-head to the Roding form.
Notes: The disjunct distribution may be a lack of reporting of a distinctive form that gets overlooked amongst the numerous *N. trilobum* aggregate. The original Rimutaka flowers had tiny points to the dorsal sepals.

76. *Nematoceras rivulare* (A.Cunn.) Hook.f. *Fl. Nov.-Zel.* 1: 251 (1853)

Syn. *N. panduratum* pandurate leaf form.
A. Cunningham's darling. Oct-Nov
Image: Mangamuka ER5; 28 Oct 2004
Traits: blackish crimson *labellum* and flecks on greenish *dorsal sepal*. THE *LABELLUM MIDRIB* IN THE CHANNEL IS ALMOST LEVEL, ±4MM LONG, HOLDING THE APICULUS WELL CLEAR OF THE OVARY .
Habitat: wet, mossy, shady stream banks. Lowland to montane. ER 5, 6.
Rarity: at risk, sparse.

77. *N. rivulare* "Taranaki" Audrey Eagle J49:14 September-October.

Image: Val. Smith, Te Henui Stm, ER25; 9 September 1993.
Traits: Like *N. rivulare s.s.* but foreshortened; its *labellum* having a shorter level section in the channel at ±3mm. Peak flowering is about a month earlier, despite its more southerly and cooler site.
Habitat: New Plymouth on seeping stream banks. ER 25.
Similar species *N. rivulare* s.s. which prefers to be in the splash zone, in moss at the water's edge and flowers a month later
Notes: The disjunct distribution could have kept these populations apart long enough for small differences to evolve.

78. *N.* "round leaf" Bruce Irwin, J44:**12** Nov. north. to Dec. south.

Image: Whakapapa ER18; 6 Nov 1997.
Traits: *N. trilobum* agg. one of the few with an orbicular, reniform *leaf* but the egg pocket in the *labellum* channel and the short *pedicel* standing clear of the grooved *petiole*, put it firmly in the *N. trilobum* agg. The *dorsal sepal* overhangs the labellum, it is obtuse with a slight central ridge and either a

small notch or a blunt point at the tip. Ruapehu and Paramanawera Wetland flowers are above the leaf, Rainbow Skifield flowers (likely to be tetraploids; Dawson et al 2007) are below the leaf. *Sepals* ±37mm, top half maroon, base pale. *Petals* 15mm coloured the same, angle forward and down. *Labellum* ±10mm tall, very dark maroon with a pale green centre; margin entire at the top but becomes ragged towards the large central notch with a tiny apiculus. Well defined egg pocket in the channel.

Habitat: Subalpine, 710m where first found at Paramanawera Wetland; just inside the tree line at ±1200m on Ruapehu and ±1300m at Rainbow Skifield where they thrive under dense canopy (snow screen) preferring cataracts or banks of tumbling streams, no doubt to temper the frosts. ERs 18, 46.

Notes: Irwin's original find and some at Whakapapa, with a narrower, dorsal sepal, suggested an hybrid of *N. trilobum* with either, *N. macranthum, N.* "rest area" or *N. orbiculatum,* all present at Paramanawera Swamp. But at the 1200-1300m elevation, only *N. trilobum* agg. occurs. It is possible that *N.* "round leaf" does stem from an historic hybrid which has since stabilised in its preferred, high subalpine habitat.

79. *N.* "Sphagnum" Bruce Irwin, J44:11; 63:**10** Oct. N.I. Nov. S.I.

Image: Blue Ck, ER 46; 26 Nov 2002.

Traits: *N. rivulare* agg. *Leaf* liberally sprinkled with maroon dots especially on margins and midrib. *Peduncle* the same length as the grooved *petiole* in which it is housed thus the *ovary* and *flower* stand above the leaf. *Sepals* ±41mm rise diverging slightly but may curl back together. *Petals* ±24mm spread ±level. *Dorsal sepal* is pale, dashed and speckled with purple. *Labellum* dark purple at centre and around the column chamber with ragged purple stripes on translucent to glass-clear wings. Midrib curves back to touch the ovary.

Habitat: In shaded, *Sphagnum* moss at Paramanawera Wetland and in other mosses by Blue Ck. Nelson. ER 18, 46.

Similar taxa: all with similar labellum midrib profiles

i) *N. papa* flowers a month earlier from drier habitat with a much greener flower

ii) *N. longipetalum* flowers a month earlier; its four equal tepals rise almost parallel.

iii) *N.* "Mangahuia" prefers seeping, consolidated shingle, has semi erect petals and a smaller dark centre to the labellum

Notes: Bruce Irwin had concerns that it was an hybrid, but its stable traits over the years make it worthy of publishing so that others may compare it with their own finds.

80. *N.* "Tinline" Brian Molloy J79:16,**19** October.

Image: Tinline R, ER40; 20 Oct 1998.

Traits: *N. rivulare* agg. *Leaf* is cupped and heavily spotted with purple on quite mature flowers. *Pedicel* is purple ±2mm longer than the *petiole* thus *flower* stands above the leaf base. *Sepals* ±32mm erect, *petals* ±22mm semi erect, leaning outwards. *Dorsal sepal* ±level at front, pale with liberal dashes of purple, margin uptilts as in *N.* "Veil". *Labellum* midrib rises 3mm; first flexure is ±105° to ±level for ±2.5mm in a bright green channel, turns ±90° to let *apiculus* touch the curved *ovary*. Bib is pale but a purple band starts near the margin and curves around to the dark column chamber.

Habitat: Tinline R bank, ER 40.

Similar taxa:

i) *N.* "viridis", labellum similarly pale at centre but the channel slopes back, leaf is flat, pale; pedicel is longer, petals ±level, unspotted dorsal sepal and longer ovary.

ii) *N.* "Sphagnum"; similar midrib profile;

leaf is less cupped, dark labellum centre and pale pedicel.

Notes: Some took it as a form of *N.* "viridis" for 7 years but the distinctions seem sufficient to tag it separately.

81. ***Nematoceras*** **"tribrive"** A. Ducker J58:19,22; 89:22-**26** August.

Image: Bridal Veil Falls ER12; 4 Aug '97.

Traits: *N. trilobum* agg. Recognisable from its GREEN, HELMET-LIKE *DORSAL SEPAL* LOOKING DOWN AT 45°, level with or above the leaf. Colourless, purple speckled *sheathing bract* is broad mouthed with a 1.5mm fish-hook like apiculus behind the rim pointing at the *peduncle*. The *pedicel* is at ±90° to the *petiole*. A 3mm *floral bract* is broad, acute, often S shaped. *Leaf* is a mucronate arrow head. *Sepals* ±40mm, erect, *petals* ±18mm snaking below and behind. *Dorsal sepal* is a green, emarginate helmet becoming transparent with age. *Labellum* has an oval opening with a deep ragged notch. Green centre bulge and maroon wings covered in short hairs; wings overlapping above. The egg pocket is well formed and shows only as a slit in the labellum bulge.

Habitat: Bridal Veil Falls, Te Mata, on shady track-sides. Also at the Puka Puka Tk in the Hunuas and Tauherenikau Gorge, Ruahine Ra. Montane, 140-440m altitude.

ERs 9, 12, 38.

Similar taxa: *N.* "tricraig" but its dorsal sepal doesn't angle down, flowers are well below the leaf, labellum margins are incurled and it flowers a month earlier.

82. ***Nematoceras*** **"tricraig"** Tricia Aspin J98:34-**37** August.

Images: 82a Pollok ER9; 11 August 2005.

Traits: *N. trilobum* agg. notable for flower below the leaf on a ±3mm *peduncle* leaning back from an erect *petiole*. *Leaf* varies from ±oblong laterally with sinus and quite large apiculus, to mucronate arrow head with undulate margins. *Sepals* ±40mm, erect diverging somewhat; *petals* ±12mm meandering ±level. *Dorsal sepal* fits the labellum closely; an emarginate, purple spotted, green, helmet, held ±level, can become translucent with purple midrib and parallel veins in maturity. *Labellum* has a short-haired bib, green central bulge but darkest maroon wings, incurved to the ragged and striped lower margins, deep notch: some labella with central apiculus. Shorter bib at Omoana. *Midrib* profile rises 5mm, curls through 180° past a quite deep egg pocket, **82b** (usually outfalling as a drain) then curves back to touch the *ovary*.

Habitat: Craig's farm, Pollok in ancient sand hills, under scrubby bush with access to cattle, facing south near a ridge-top. Blumhardt's bush, near, Onewhero, on spurs and in hollows; greywacke residual soil. Lowry's farm, Glen Murray, cool bush, down-slope. Waitiri Tk, Omoana near ridge top under manuka and mingimingi.

ERs 9, 11, 12, 24.

Similar taxa: *N.* "tribrive" was almost included but the dorsal sepal tilts down at 45° to the front, labellum pocket is much bigger and flower is longer fore and aft.

Notes: A specimen sectioned at Craig's farm, CONTAINED AT LEAST THREE GNAT'S EGGS IN THE *LABELLUM POCKET*, bearing out what Tony Bishop (1996) said, "*Corybas* flowers may mimic small toadstools." If so, the eggs could be those of a fungus gnat deceived by kairomones into laying her eggs in it, head down in the column chamber thus pollinating it. This gives a purpose to the ubiquitous *N. trilobum-macranthum* egg pocket. Gnat's eggs and gnats have been seen in other *N. trilobum* taxa but eggs are visible only under high magnification.

83. ***N.*** **"tridodd"** Ian Dodd, J89:23, 25,**26** August.

Images: Awhitu, ER9; 11 August 2003.


81


82a


83a


83b


82b


84


85a

Traits: *N. trilobum* agg. but unique for its MATURE *LABELLUM MARGINS* TURNING BACK causing the *sepals* to aim ±parallel, back behind the flower **83a**. *Sheathing bract* is colourless as is the 0.9mm apiculus at the rear. *Petiole* leans forward, ±6mm, *peduncle* leans back at ±90° to it with flower just above the leaf. *Leaf* is kidney shaped with a sprinkle of dark dots and/or purple veins and midrib. *Sepals* ±45mm, straight, somewhat divergent from erect, *petals* ±17mm outstretched at first, later forced back by the recurving *labellum* margins to parallel behind. *Dorsal sepal,* a plain green, shallow helmet **83b** with tiny notch at the tip of a slightly raised midrib. *Labellum* has a pale, and mucronate bib spread with short white hairs and a line of maroon on the margin, slightly ragged at the base. Wings are purple with pale stripes converging around on the column chamber. The egg pocket is visible without deforming the flower and drains to only a slit at the front. The mature, lower margins, recurve enclosesing the ovary in the notch, curling back the petals in the process.

Habitat: Wattle Bay to Awhitu Central in private bush reserves. ER 9.

Similar taxa: *N.* "tricraig" & *N.* "tribrive" have similar midrib profiles but neither have the flared back labellum margins.

Notes: The unflowered plants were thought to be *N.* "pygmy" form 1 at first but the node was well clear of the sheathing bract. Larger flowers, a month or two later, showed its individuality.

84. *N.* "trihinetai" Mark Moorhouse

J85:25 Fig. 2. Sept, early Oct.

Image: M Moorhouse, Tapawera ER47; 19 September 2002.

Traits: *N. trilobum* agg. *Leaf* with key-hole, widening to a broad U between the rear lobes in flowering plants. The third lobe is a recessed arrow head. *Petiole* 10-30mm long. Faintly musky scented flower 9-10mm tall is ±level with the leaf and unique with its scoop-like *labellum* with ragged margin and pointed wings visible through the set-back, obtuse and narrow green *dorsal sepal.*

Habitat: Black beech, totara and bracken hosts in a native bush remnant, Hinetai Rd, Tapawera, Nelson. ER 47.

Similar taxa: Nothing quite like it.

85. *N.* "trijuly" A. Ducker, J85:**14**

late June-July.

Images: a) Awhitu ER9; 5 July 2003.
b) Bream Tail Res ER6; 18Jul98.

Traits: *N. trilobum* agg. Two forms. Isolated others have been reported but are not treated here. **85a** *Leaf* ±12mm wide x 11mm deep. *Petiole* 3mm to 19mm depending on habitat. *Pedicel* pale green, 3 to 6mm may lengthen as the flower matures. *Sheathing bract* colourless, 5-7mm below the node, has a 0.9mm acicular and colourless rear apiculus, either erect or curving out and back towards the stem. *Secondary bract* varies from absent to tiny. *Flower* opens usually askew to the leaf; under it, as in **a)** or, in **b)** abreast of it and tucked sideways into the leaf sinus. *Dorsal sepal* helmet-like, green, fading to colourless in maturity. In **a**) it is sparsely maroon speckled with an entire tip, aligning with labellum margins. **b)** has no speckles and a bluntly acute tip exceeding the labellum by ±1.5mm. *Sepals* 16-25mm long, curve upwards; *petals* curved, level to drooping **a**) or outstretched in **b**) 7-13mm long. *Labellum* is flared at the bib; margins entire above but ragged, maroon-tipped below a flattish, pale green bib; has a shallow lower notch with tiny apiculus; wings dark maroon and overlapping above, connected by maroon and colourless stripes curving back to the dark maroon column-surround. Comma shaped egg pocket outfalls to a slit in the bib.

Habitat: Mossy leaf mould on cool south slopes in open tea tree and mamaku (*Cyathea medullaris*) in light shade

a) Awhitu Central. ER 9
b) Bream Tail Res and Hungry Ck Art School, Puhoi, ERs 6, 9
Similar taxa: Traits midway between *N. "*pygmy" 1 or 3 and *N.* "tridodd", (except for the bluntly acute dorsal sepal in **85b**), imply hybridism. Both the putative parents occur at Awhitu Central in the same private bush but the June and August flowering seasons do not overlap and there is no known possible second parent at Bream Tail or Hungry Ck.
Notes: *N.* "trijuly" can be confused, at a glance, with *N.* "pygmy" form 1 or mature form 3 but the node-out-of-sheathing bract is the first clue that they differ. The other differing characters begin to show as the flowers mature. Hybrids may occur at Matakawau Res.

86. *N.* "trileafbract" Mark Moorhouse J87:**7**,11 November.

Image: L. Rotoiti ER49; 29 Nov 2002.
Traits: *Plant* ±26mm tall; *Leaf* kidney shaped, plain green, trilobate ±9mm long, ±9mm wide; *petiole* ±10 mm; *FLORAL BRACT* A REPLICA OF THE LEAF, HALF TO FULL SIZE, with 1mm petiole. *Sheathing bract* a truncated white cone, margin sloping up to the rear with a dark brown hooked apiculus near the top. *Flower* ±9mm tall, above the leaf, ±7mm wide, dark purple. Upwards meandering *lateral tepals, sepals* ±27mm; *petals* ±9mm. Mature *dorsal sepal*, pink at the base darkening to purple at the tip, CRIMPS THE LABELLUM TOP. *Labellum* deep purple, serrulate margin, deeply notched with flat little apiculus mid-notch; centre shades to white. Depicted specimen has an atypical notch chewed out near the dorsal sepal. Pink *auricles* flair to 1.7mm dia. facing forward and down; hidden behind labellum bib. Midrib's first flexure is ±135° with a small knob at the back.
Habitat: mossy, glacial morraine in bush at the source of the Buller R, shore of Lake Rotoiti. One colony, on both a large boulder and on track-side below, covered several square metres. ER 49.
Notes: This taxon almost missed inclusion being only one colony, seen on one visit but by three orchidologists, on 29 Nov 2002. The boulder to track-side spread, indicated viable seed propagation. 3-D colour photos also tend to verify it as separate taxon.

87. *N. trilobum* Hook. f. Fl. Nov.-Zel. 1: 250 (1853)

or Trotters October- November
Image: Te Wharau ER35; 6 Oct 2001
Traits: The late *N.* "Trotters", ±68mm tall; 78mm including lateral sepals; dark maroon S.I. tetraploid(?) to near black (Te Wharau) flower is well below the leaf but *lateral sepals* rise above it. *Leaf* ±25mm long x ±30mm wide, wedge shaped, mucronate with sharply turned down mucro, margins entire. *Petiole* 26-45mm, white to pale magenta with darker stripes. *Pedicel* ±3mm long, curves out at 90° to the *petiole*; pale green, striped with magenta. *Flower,* perfumed (J88:8) fungus gnat pollinated, (J28:13; 52:41), unfolds from a closed, puckered *labellum* where lateral petals initially seal off the *auricles*. *Dorsal sepal* ±7.5mm wide, a papillate helmet, fitting neatly over the labellum wings; emarginate, blackish maroon, N.I. (maroon S.I.) down the middle third but with dark green sides (paler maroon S.I.) marked with darkest maroon at the tip to maroon stripes toward the narrower base, (shading to colourless at the ovary S.I.). *Lateral sepals* ±52mm long, erect, pale magenta to colourless. *Lateral petals* 10-15mm long spreading level and slightly back; translucent, pale magenta to colourless. *Labellum* dark wings overlapping above, an ovate opening widening to pear shaped in maturity; the olive green (tawny S.I.) channel is narrow, parallel at the top, green calli form the egg pocket,


85b


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89

leaving a 0.3mm wide, slotted drain below. Mid-rib rises to a flexure of 170° then describes a gentle S bend to the apiculus, almost touching the *ovary*. The bib around the base of the cleft is ultra-violet reflective (J85:**5**) clothed in stiff 0.2mm hairs. Margins entire except for a ragged and deep basal cleft, widening in maturity with a ½mm long ragged *apiculus*. Remainder of *labellum*, blackish maroon (reddish maroon S.I.) but with very dark stripes down to the *column,* 1.6mm long, lying flat atop the back-slanting *ovary*. *Anther wings* are recessive or absent in the Bald Hill specimen; notable at Trotters Gorge (J28:**12**)

Habitat: Under pines & *C. macrocarpa* but mainly beech in damp leaf mould. Bald Hill, Longwood Ra. to Te Wharau, Eastern Wairarapa, altitude 50m at Trotters Gorge to 1,240m in Kahurangi N.P. (J63:18 alba form).

ERs 25, 31, 35, 37, 46, 47, 65, 72, 77, 78.

Similar taxa: September flowering *N.* "trisept" Hunua Ra., and July flowering *N.* "trijuly", Awhitu, according to molecular studies, (Clements et al 2006) yet there is little visual similarity.

Notes: J.D. Hooker's type sheet 161 depicts this orchid as form (a) and it was designated the lectotype on 16/3/1983 by M.A. Clements. The Te Wharau colonies with their greenish/black flowers opening in October were in sparse colonies in contrast to matted colonies with reddish brown flowers in Trotters Gorge, flowering in November and Bald Hill flowering in January but they are otherwise too similar to separate. Ian St George researched Colenso's doings at the time he collected specimens for Hooker and thus arrived at the type locality and species. J106:8-15.

88. *N.* aff. *trilobum* "round leaf"

Bruce Irwin, J63:9,**10** November.

Image: Horopito ER18; 5 Nov 1997.

Traits: *N. trilobum* agg. not to be confused with *N.* "round leaf" which is quite different. *Plant* ±50mm tall. *Leaf* unusually long at Horopito, orbicular and deeply cordate ±10mm wide x 14 long, apiculate, claret midrib darkening to the apiculus. *Sheathing bract* colourless, slightly flared atypically with margin sloping up to the front, ±8mm below the node. *Flower* dark claret like a ±7mm diameter ball from above, always beneath the leaf. *Peduncles* 5-12mm long, curves back from the stem/petiole at ±60°. *Dorsal sepal* a smooth dark claret helmet fits neatly over the labellum to equal or exceed it, margin entire. *Lateral sepals* ±20mm, erect and divergent. *Lateral petals* ±10mm, inclined to curve back and/or upwards. *Labellum* is dark claret with a green central 60° cleft; facing downwards at 45°. Midrib rises leaning forward at ±20°, turns through ±170° flexure dropping to a second flexure of ±20° then back to an apiculus contacting the ovary. But at Horopito, labellum wings are recurved, margin is entire; unnotched. At Erua, no recurve and lower margin is mucronate as normal.

Habitat: Swampy tea tree and other native scrub at Horopito and Erua Rd by Waimarino Stm. ER 18.

Similar taxa

i) *N.* "darkie" but lacks the pale labellum centre and prefers a drier habitat

ii) *N. sulcatum* Macquarie Id. with node-in-sheathing bract and no labellum bib.

Notes: The emarginate dorsal sepal and labellum egg pocket say *N. trilobum* agg. despite the orbicular leaf and the wet habitat common to both observed colonies.

89. *Nematoceras* "trisept"

Graham Dickson, J76:37,**40** September.

Image: Hunuas ER9; 11 Sept 1999.

Traits: *N. trilobum* agg. ±50mm tall including lateral sepals. *Leaf* ±14mm wide ±14mm long, kidney shaped, margins undulate. *Petiole* 11-16mm grooved, colourless

with maroon flecks, forms a ±80º Y with the stem. *Peduncle* 1-4mm long, starts purple at bud formation, as does the stem below; shades to colourless translucence with purple dashes. *Sheathing bract* ± 4mm below the node, rim slopes back at 5º. ±0.6mm apiculus fish-hook-like, points at the stem. *Ovary* angles back at ±40°, ±4mm long. *Flowers* usually sparse, absent in some years. *DORSAL SEPAL* below or level with the leaf, EXCEEDING THE SLIGHTLY UPWARD FACING LABELLUM BY 3MM, ±5mm wide apiculated helmet, green with maroon specks and maroon leading edge. *Lateral sepals* ±22mm, colourless, maroon striped, erect. *Lateral petals* ±15mm colourless maroon striped, tapering, held level and slightly forward. *Labellum* opening facing upwards at 5°-10° has deep maroon, parallel wings, to the forward margin, ragged around a deep cleft in the bib; NO APICULUS; pale protruding hub around the ±45° channel; *column chamber* deep maroon with translucent stripes leading to the pollinia; *auricles* 1mm diam. well hidden by the bib, green and aiming down.

Habitat: Montane, near Hunuas TV Repeater Stn. and downstream of Mangatangi Dam. Complete shade under regrowth native scrub, greywacke residual soil, from spur tops to flood plain. ER 9.

Similar taxa: very close in nucleotide differences to:—
i) July flowering *N.* "trijuly" form 2 and
ii) Oct-Jan flowering *N. trilobum* ("Trotters") but looks nothing like either.

Notes: First found by Graham Dickson flowering alongside *N. acuminatum* in September 1962 at Mangatawhiri Dam site at 140m altitude, now a grass sward downstream of the dam. Ron Gordon's site below Mangatangi Dam has been lost leaving only Phil Mitchell's ±200m^2 site near a TV repeater station at 250m altitude in ARC Res so should be secure. In one unsuitable season, leaves and flowers were absent but returned in force the following year.

90. *N.* "triwan" Mark Moorhouse J85:**26**,27 September in the Wairarapa, to November in Nelson.

Image: M Moorhouse, ER47, 12 Sept '02

Traits: *N. trilobum* agg. but differs with its large flowers, broad *labellum* bib, flat across and ragged. It prefer heavily shaded areas, so tends to be tall with only ±1 in 100 flowering. *Dorsal sepal* has a full green helmet over-awning the labellum.

Habitat: Wairoa Vly, Richmond Ra to Wairarapa, J85:**16.**
ERs 35, 36, 40, 47.

Notes: Hackett Tk specimens, growing in brighter shade, tend to be stockier. The succinct tag arose from **tri**lobus, **Wa**iroa, **N**elson hence triwan.

91. *N.* "triwhite" Max Gibbs, J24:6; J63:**12.** September to November.

Image: Egmont N. P. ER25; 19 Nov 1997.

Traits: *N. trilobum* agg. Two slightly differing forms included, represent limit parameters of this taxon.
i) is Mark Moorhouse's *N.* "green fuzz" from four, montane, Nelson sites and subalpine in Egmont NP.
ii) is Max's original and rare *N.* "triwhite", subalpine from Iwitahi, Egmont N.P. and Whakapapa; widespread in Nelson ranges. 42-55mm high including *lateral sepals*. *Leaf* 10-18mm wide by 8-11mm long, variable from double rounded parallelogram to reniform, always mucronate; green, sometimes with a maroon stripe on the mid-rib. *Petiole* 8-11mm long, leaning forward, white. *Peduncle* ±5mm long, curled back with the lower ±2mm sheathed by the *petiole*; unusual in *N. triloba* agg. *Flower* head 7mm tall not including tepals. *Tepals*, colourless, translucent. *Lateral sepals* ±23mm long, ±45mm in form 1, almost erect. *Lateral petals* ±11mm, ±level, widely spread.


91


92


93


94


95


96b


96a

Dorsal sepal, helmet-end, sometimes emarginate, ±equalling the labellum which fits neatly inside; outer surface papillate, margins entire, clearly ridged midrib in form 1. *Labellum*, channel, almost closed at the base, margins flared at the bib, recurved above and overlapping under the dorsal sepal; bib is slightly ragged, recessed in a Vee cleft; form 2. has a subulate, 1.5mm apiculus; form 1. has 0.1mm retrorse hairs inside with sparser, short, erect, hairs outside, palest green from the front but a few pale reddish stripes under the dorsal sepal, extend to the maroon column surround. Portions covered by the dorsal sepal can be normally coloured in form 2.

Habitat: Altitude 625m at Mt Robert in Nelson to 1240m at Mt Arthur, Sunshine Hut, Tararua Ra at 1,300m, Whakapapa, North Egmont scrub to the tree line, and Iwitahi. ERs 17, 18, 21, 25, 28, 46. 47. 49

Notes: Two unique forms of *N. trilobum agg.* are pale but not hypochromic, evidenced by the dark column surround, so typical of the whole aggregate. It may have evolved pale for night flying pollinators. Commonly coloured *N. trilobum* taxa coexist to the highest habitats of this taxon.

92. *N.* "veil" A. Ducker J58:19; 1996, 74:**18** Fig 5 August September.

Image: Bridal Veil Falls ER12; 18/8/97.

Traits: *N. rivulare* agg. ±90mm tall. Most plants bear a flower. *Leaf* emerges as a shallow cone with bud inside, ±1 month before opening; ±12mm long, ±11 wide, oval-orbicular, cordate, concave at the petiole, minutely apiculate. *Petiole* ±3mm long sheathing the *peduncle,* also ±3mm long, curving out of the petiole to the base of the ±5mm recurved *ovary*, wholly visible above the leaf. *Dorsal sepal* ±15mm long; last 10mm level or recurved at the tip; margins entire, tilted up at the middle third stiffening the outer half; translucent, greenish, with short maroon streaks. *Lateral sepals* ±30mm long, erect to spreading mutually at 90°, translucent, striped with magenta. *Lateral petals* ±15mm, usually held level, curving forward to be mutually at 90°, occasionally standing out in a parallel plane to the sepals. *Labellum* margins overlap at the top, flare out to 6mm wide. Margins entire, apiculate; 90° Vee cleft, with shoulders level and ±2mm long with no *N. iridescens* type gland in the channel. Midrib rises vertically to the first flexure of ±120°, second flexure is barely perceptible (marked by an inner bump) then recurves either with apiculus touching the ovary or curving outwards. *Labellum* deep maroon with an irregular, translucent chevron to the apiculus on recurved specimens; variable translucent portions and a curved translucent line on each side lead down to the column chamber.

Habitat: standing out from a mossy cliff dripping with ground-water and spray-drift from the 55m high Bridal Veil Falls, in basalt country. The only colony so far located. ER 12.

Similar taxa

i) *N. longipetalum* with tepals ± equal held in parallel planes tilted forward, midrib geometry differs, it is subalpine to coastal; peak flowering is 6 weeks earlier.

i)a Whakapapa Intake form flowering mid October is similar but with distinct geometry to the midrib which rises at ±60° leaning back, first flexure is ±80° and second flexure is ±90°.

ii) *N. iridescens* has similar midrib geometry and flowering time but has a less acute dorsal sepal, longer lateral petals, tepals held in a cross formation, a gland in the labellum channel plus a longer labellum apiculus and drier habitat.

iii) *N.* "Pollok" August flowering. with the chevron to the apiculus but smaller flowered; Awhitu Pen only. Midrib profile similar but begins on a 40° back slope. Its peduncle shows above the leaf.

Notes: The rocky cleft where this taxon grows has been used by abseilers exiting the falls cliff thus all the plants at the base were trodden out of existence until DoC provided an alternative track.

93. *N.* "viridis"

(*N.* "whiskers"), H.B. Matthews J79:**18.**

From late August, North, to Nov in Nelson.

Image: Waiwhiu ER9; 24 Oct 2001.

Traits: Adapted from HBM's 1928 Ms description. *N. rivulare* agg. 45-90mm high to the top of the *lateral sepals*. *Leaf* 10-25mm long, sessile, cordate, orbicular or ovate-oblong, apiculate, light green, the margins and depressed centre-line ±dotted or flecked brown-purple, silvery frosted on the under surface. *Sheathing bract* has a blade like apiculus. *Flower* solitary, shortly pedicellate, perfumed, green outside with a few dark claret stripes or flecks on the back of the *sepals* and *petals* and the upper margins of the *labellum*. The disc of the *labellum* usually greenish yellow with dark claret at and below the orifice. LARGEST AURICLES OF ANY NEMATOCERAS. *Ovary* costate, often bent, subtended by a lanceolate incurved *floral bract* with a spur opposite. *Dorsal sepal* 18-24mm long, curved forward with central costa, concave for about half its length narrow-oblong, the hood and lanceolate end projecting above and over the labellum, often bent down at the tip. *Lateral sepals* filiform 25-50mm long, erect spreading. *Petals* similar but shorter than the sepals. *Labellum* 5-6mm long spread out, [crowded with colourless tomentum] erect near the attachment with a round auricle on each side open horizontally, the sides meeting for about half the length under the dorsal sepal and enclosing the column; spreading and concave in front; the anterior margin more or less repand. Centrally a deep suture [slopes back] into the orifice towards the base. *Column* stout, glandular at the base, 3mm long nearly horizontal, slightly curved and dilated around the stigmatic disc. *Anther* wide, two celled with a short point. *Rostellum* prominent. *Stigma* glandular.

Habitat: on seeping stream banks.
ERs 9, 18, 30, 40, 42, 46-49.

Similar taxa

i) *N. rivulare* a darker flower from the far north, later flowering in November
ii) *N. papa* a shorter flower fore and aft.
iii) *N.* "Kaimai" has a forward sloping labellum channel and darker flowers, dorsal sepal does not hook down at the tip.

Notes: H.B. Matthews sent specimens to AK Herbarium from Nihotupu Stm (now dammed) in 1923. But indisposition prevented publication. Rediscovered by Irwin (J55:24, July 1995) and tag named *N.* "whiskers" for the fine tomentum on the labellum. Variations occur, some with egg pockets in Nelson and at Horopito.

94. *Orthoceras novae-zeelandiae*

(A.Rich.) M.A.Clem., D.L.Jones & Molloy *Austral. Orchid. Res.,* 1: 100 (1989)

The horned orchid Nov-Jan.

Image: Tapuwae ER23; 21 Jan 1995

Traits: up to 70omm tall, with several long, stiff, pointed, channelled, *leaves*, shorter than *stem*; 2–12 green to maroon *flowers*, (with short floral bracts), facing past the *peduncle*, 10mm *dorsal sepal*, with *lateral sepals* like thin horns, upright to diverging horizontally. Broad *labellum* bends forwards, 3-lobed, with a PROMINENT YELLOW NODULE MID DISC; tip rounded.

Habitat: Dry open banks. ERs 3-6, 9-14 16-25, 27-31, 35, 37-41, 46-48.

Rarity: not threatened.

Notes: plants apparently identical to the Australian *O. strictum* (pointed labellum and tall floral bract) have been found in NZ, as have intermediate forms; if there is only one species, it is variable.

95.*Orthoceras strictum* R.Br. *Prodr. Fl. Nov. Holland*.:317 (1810)
or Aussie horned orchid Oct –Nov.
Image: Te Paki ER3; 6 Nov 2000.
Traits: Terrestrial to 700mm tall, several strap-like *leaves* precede the *peduncle* with up to ±6 purple/brown to green or yellow *flowers* looking past the purple to green *peduncle*. *FLORAL BRACTS* PROTRUDE <25MM ABOVE THE *DORSAL SEPAL*, *midlobe* of the *LABELLUM* IS ACUTE otherwise much the same as *O. novae-zeelandiae* but flowers a month earlier.
Habitat: Te Paki, washout in a steep dirt road with tea-tree seedlings in damp conditions. Yellow flowered one at Diggers Vly. ERs 3, 5, 9, 10, 15, 30, 38.
Similar species: *O. novae-zeelandiae* which flowers a month later in sunny, dry road banks, has short floral bracts and ovate labellum midlobe.
Notes: Jones and Clements, 1989, omitted NZ from the distribution of *O. strictum*. But both countries have both types. Many depictions of *O. strictum* in Australian texts show short floral bracts and ovate labellum midlobes. Hybrids are common and occasional varicoloured forms occur.

Petalochilus R.S. Rogers. *J. Bot.* 62: 65 (1924) for petal like lip.
Traits: Hairy herbs with small globular tubers. *Leaf* basal, linear. *Flowers* pedicellate, 1 or 2. *Tepals* sub-equal, similar, rather narrow, not very acute, pubescent-glandular on the outside. *Dorsal sepal* erect or slightly incurved. Other *tepals* flat and spreading. *LABELLUM* PETALOID, slightly shorter than the tepals. *Column* elongated, slightly incurved, widely winged above, narrowly below. *Anther* sub-erect, 2 celled, mucronate; *pollinia* powdery. *Stigma* concave, just below the anther.
Similar genus: *Caladenia* except for their ornate labella.
Habitat: Kaitaia to Scott Pt under manuka. ER 3, 4.
Notes: A misunderstood genus because of its petaloid labellum reminiscent however of *Thelymitra, Glossodia* etc.

96. *Petalochilus calyciformis* R.S. Rogers. *J. Bot.* 62: 66 (1924)
or lipless orchid. 27 Oct to 15 Nov.
Images: K Matthews Kaitaia ER4/5 **a)** 18 Dec 2006; **b)**; 9 Sept 2006.
Traits: 70-270mm tall, then as for the genus with also a linear appendage with SIGMOID FLEXURE, FURNISHED WITH A LITTLE CUP AT THE APEX, ERECT IN FRONT OF THE *COLUMN*. *Flower* a greenish pink. Bud opening in **96a**, UNIQUE SPATHE in **96b.**
Similar species: *Caladenia minor* (was *C.* aff. *chlorostyla*).
Notes: H.B. Matthews (HBM) wrote to Dr. Rogers, in Jan. 1919 that his 3 known Kaitaia colonies under manuka, had been cleared and he could find no others.

However, one likely Kaitaia specimen was photographed just opening by Kevin Matthews on 18 Dec. 2006 (J103:39) then destroyed in a following storm. Kevin, had watched this specimen for months, with its colourless, ovate, *spathe* with green midrib but didn't get to see the flower open.

97. *Petalochilus saccatus* R.S. Rogers. *J.Bot*. 62: 66 t.571, 4-7 (1924)
or pouch orchid. 10-31 October.
Images: a) specimen of HB Matthews' at CHR collected 11 Oct 1912, ER 4 or 5 **b)** drawing, JB Irwin, ER3, 29 Sept. '97.
Traits: *Plant* 70-140mm tall. *Leaf* almost glabrous. *Stem* hairy with an acute bract above the middle. *Flower* pink, solitary ±20mm diameter, its *pedicel* subtended by a narrow acute *bract*. *Tepals* 5 nerved, a pink stripe down the middle, ±10mm long. *Labellum* petaloid, slightly shorter and

wider than the rest. *Column* ±4.75mm high with transverse pink bars, THE *WINGS* UNITING BEHIND THE *ANTHER*, COALESCING THROUGHOUT ANTERIORLY, SO AS TO FORM A WELL MARKED, MEMBRANOUS POUCH BELOW THE *STIGMA*.

Habitat Historically, around Kaitaia but the only recent specimen reported was a bud from Scott Pt. Fig. **93b,** on 29 Sept. 1997, drawn in detail in J65:14 by Bruce Irwin. Fig. **93a** is a pressed specimen of H.B. Matthews' from AK Herbarium.

Notes: H.B. Matthews, wrote to Cheeseman on 28 Oct 1912, likening the plant to *Caladenia chlorostyla* saying, "Casually it might be taken for the green-white" yet Rogers' specimen was "pink" and tepals with "a pink stripe down the middle;" perhaps after a steamer trip to Australia? Checks at the Scott Pt site in subsequent years have found only Matthews's pink *Caladenia* "nitidoa-rosea" in the vicinity.

98. *Plumatochilos tasmanicum*

(D.L.Jones) Szlach. *Polish Bot. J.* 46 (1): 23 (2001) The southern bearded greenhood. Sept to Oct.

Image: Te Paki ER3; 25 Oct 2001.

Traits: flowering plants have a basal rosette of sessile, lanceolate *leaves* and several sheathing bracts. Seedlings form a star, flat to the ground, easily mistaken for dandelions but for the acute leaves. Mobile *labellum* tapers to wire-like with a BRUSH OF YELLOW BRISTLES AND A BROWN CALLUS AT THE TIP. *Lateral sepals,* erect in bud, drop straight down in open flowers then close upwards again in spent flowers. Self-pollinating.

Habitat: at exposed scrub-edges; UNDER GORSE on old sandhills.

ERs 2-4, 9-12, 38, 39, 46.

Rarity: chronically threatened; serious decline.

Prasophyllum R.Br. *Prodr. Fl. Nov. Holland:* 317 (1810)

The leek orchids

Terrestrial herbs, single terete leaved with ±11 nonresupinate *flowers* in a spike. *Floral bract* is truncated and sheathing. *Labellum* has a plate-like callus curving around its sharp bend. Two *pollinia* are attached to the *rostellum* by a threadlike *stipe*. *Rostellum* is a rounded plate with a colourless blunt apiculus of varying length among taxa, separates *pollinia* below from *stigma* above. Two named species in NZ, at least three unclassified.

99. *Prasophyllum* "A" J.B. Irwin J79:9 or mystery. Dec Nth. to Jan Sth.

Image: Horopito ER18; 4 January 2003.

Traits: To 250mm tall. Up to six, well spaced, usually yellow/green *flowers* but often with reddish tinges and at Horopito, a claret peduncle. *Floral bract* ovate, *dorsal sepal* ovate, *LATERAL SEPALS* CONNATE EXCEPT FOR THE TIPS, 20% longer than the labellum; *callus* thickened at the tip, almost to the *labellum* tip. *Rostellum* just shorter than two lobed *column arms* which are just shorter than the *anther cap*.

Habitat: Montane to subalpine in moist soil, dappled sunlight. Bald Hill in Longwood Ra., Jacks Pass near Hanmer Springs, track to Mt Robert Skifield, Middle Rd berm at Horopito, (J87:6,**7**). Waitiri Tk at Omoana, Ohakune Mountain Rd.

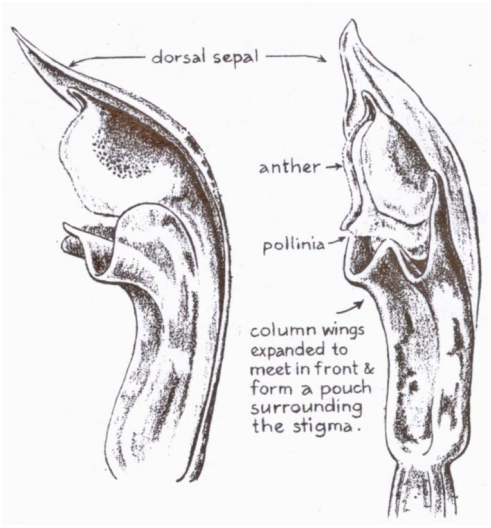
ERs 15, 18, 24, 38, 43, 46, 49, 65, 69, 77.

Similar taxa:

i) *P. colensoi* Flowering later from Dec. (montane N.I.) to early Feb. alpine. Only ±120mm tall, in damp soil, *floral bract* ovate acute to bluntly acute, smaller *flowers* tightly clustered, *lateral sepals* about equal to labellum length, *rostellum* green, plate-like, as long as the anther cap, *column arms* insignificant.

ii) *P.* "debile" wet to swampy soil, ±200mm tall, *labellum* half as long as the slender,

97a



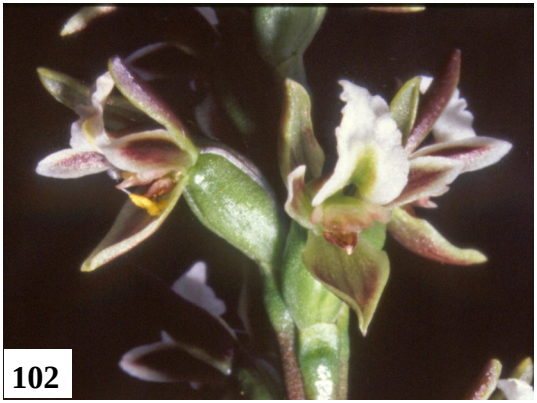
97b

98

100

101

99



102

non-fused lateral sepals, *floral bract* ovate acuminate, *dorsal sepal* acuminate, *rostellum* has a longer apiculus.
iii) *P.* "patentifolium" flowers a month earlier, far north, lowland, 150-300mm tall, up to 10 flowers in a spike, *rostellum* apiculus longer, protruding.
Notes: *P.* "A" was previously called *P. colensoi* by orchidologists uneasy about its greater size and wider spaced flowers. Bruce Irwin took the initiative in J74, March 2000 then tag-named it in J79:8,9 because of its detailed distinctions.

100. *Prasophyllum* "debile" (*P.* "B")

H.B. Matthews, Opunake, 1921 Negative held in Auckland. Museum. Jan-Feb.
Image: Horopito ER18; 28 January, 1997
Traits: Up to 11 *flowers* in a spike, wet to swampy soil, to ±200mm tall, *LABELLUM* HALF AS LONG AS THE SLENDER, NON-FUSED, *LATERAL SEPALS*, *floral bract* ovate acuminate with a raised central part, *dorsal sepal* acuminate, *labellum* callus smooth. A pale brownish to dark purple stripe down each sepal midrib to the base of the ovary can vary flower-colour from mostly green, Lindis Pass to mostly dark purple, Horopito. *Column arms* shorter than the *anther cap*; duck-billed *rostellum* protrudes beyond both.
Habitat: Lindis Pass, Middle Rd. Res, Horopito, National Park Wetland, Kapoors Rd, Pureora SFP near Barryville, wet soils to still water.
ERs 13, 15, 18, 25, 30, 36, 50, 54.
Similar taxa: *P.* "patentifolium" has the same acuminate dorsal sepal and similar extended rostellum but requires warmer habitat and flowers two months earlier.
Notes: a) This taxon had reverted uneasily to *P. colensoi* until Bruce Irwin published the evidence of their differences in J79:9, June 2001 as *Prasophyllum* "B".
b) It was a revelation to uncover H.B. Matthews old photos of it and confirm once again how well he knew his orchids compared with professionals of his time.

101. *Prasophyllum colensoi* Hook. f.

Fl. Nov.-Zel. 1:241 (1853) Oct-Feb.
Image: Comet Tk ER28; 5 Dec 1999.
Traits: 100-300mm tall. *Lateral sepals* (uppermost) unite to some extent. Closely spaced flowers vary from reddish to yellowish green; *labellum* oval, recurved, margins smooth, callus extending almost to the tip. The tubular *leaf* usually exceeds the *flower* spike. The *rostellum* is longer, and the *COLUMN ARMS* SHORTER THAN THE *ANTHER*. BLUNT *FLORAL BRACTS*.
Habitat: sea level to alpine fell fields.
ERs 6, 9, 10, 12, 13, 15-21, 23-31, 37-40, 43, 44, 46-51, 53, 55-57, 59-70, 72-74, 77-80, 82-84.
Rarity: not threatened.
Notes: a widespread, variable species. Some reports may be for other taxa such as *P.* "A", *P.* "debile" & *P.* "patentifolium".

102. *Prasophyllum hectori*

(Buchanan) Molloy, D.L. Jones & M.A. Clem. *Orchadian* 15: 41 (2005).
The NZ scented leek orchid. Dec to Feb.
Image: Pureora ER15; 6 February 1997.
Traits: TALL PLANTS, to 900mm, the *flowers* often green, flushed red/purple. *Labellum* on a very short claw, MARGINS UNDULATE, WHITE, showy; sharply bent at middle, callus smooth, flushed pale green, rather narrow and reaching just beyond the bend. STRONGLY PERFUMED to many people. *Pollinia* withdraw from *anther* on a slender *stipe*.
Habitat: in *Baumea/Schoenus* sedgelands, in flowing or still water, its roots barely touching the peat.
ERs 3, 10, 11, 15, 18, 29, 30, 80.
Rarity: acutely threatened, nationally vulnerable.
Notes: alba forms from Chatham Id and

Opuatia Swamp are yellow where the normal form is purplish.

103. *Prasophyllum* "patentifolium"

H.B. Matthews, J61:17; J89:**42,43**
October-November.

Image: K. Matthews, Kaitaia, 1 Dec 2005.

Traits: Adapted from Matthews' c.1928 manuscript. *Plant* 150-300mm high. *Stem* and leaf usually more or less purple and tapering. *Leaf* sheathing the *stem* from the base for about half its length or less, shorter than or much exceeding it. *Flowers*. 5-10 or more, rather distant, green-brown or bluish-brown outside, and yellowish green with bronze or salmon shadings inside: *ovaries* all green, turbinate, moderately turgid, on short *pedicels* subtended by small ovate-lanceolate *bracts*, decreasing in size up the spike. *Dorsal sepal* ±4 mm. long, ovate-lanceolate, concave and erect or slightly incurved. *Lateral sepals* about the same length, connate for ± a third of their length from the base, then acuminate from the sinus and slightly recurved, the margins towards the tips incurved. *Petals* free, narrow-oblong with acuminate points, about as long as the sepals, recurved and spreading. *Labellum* sessile, wide at the base, ovate-lanceolate, moderately reflexed about one third from the tip, the point just about touching the sinus of the *lateral sepals*, the callus plate, ovate-acuminate, extends nearly to the labellum tip. *Column* short, rather broad with a rounded lobed top, the *anther* obtuse. *Rostellum* an alligator snout, longer than the *anther cap*. *Stigma* an irregular rounded glandular disc. *Column arms* <the *anther cap*, oblong, the ends rounded and nearly as high as the *rostellum*.

Habitat: North only ER 5.

Similar taxa: *P.* "debile" has the same acuminate dorsal sepal and similar extended rostellum but requires cooler habitat and flowers two months later.

Notes: The taxon was little known until Kevin Matthews, a distant cousin of H.B. Matthews, recently photographed plants in flower at Kaitaia. Rüpp (1946) had likened it to the alpine Australian *P. rogersii* with its long rostellum but little else alike.

Pterostylis (or winged column) R.Br.

Prodr. Fl. Nov. Holland: 326 (1810)

Commonly known as the greenhoods for their overarching, green dorsal sepal. 36 taxa (including nine *P.* aff. *montana*) of Australian origin but only one shared, the vagrant *P. nutans*. Most have 2n=44 chromosomes (Dawson et al 2007).

104. *Pterostylis agathicola* D.L. Jones, Molloy & M.A. Clem.

Orchadian 12(6): 266 (1997)
or rubricaulis. July to September.

Image: Hunuas ER9; 4 August 2000.

Traits: 3–4 spreading grassy *leaves*, sometimes horizontal. Raised midrib of *labellum* usually reddish, the tip constricted and twisted somewhat to the right. *FLOWER* HAS A BROAD BASED LOOK. Occasional twin flowers. White alba forms constitute about 10% of the population.

Habitat: ONLY WITH KAURI.
ERs 3-6, 8-13.

Rarity: not threatened.

105. *P. areolata* Petrie

Trans. & Proc. New Zealand Inst. 50:210 (1918) Oct-Nov.

Image: Oxford, ER55 2 Dec 2002.

Traits: *leaves* vary, may be broad, shortly stalked and bunched in a semi-rosette or sessile and scattered up the 150mm stem. *Flower* leans forward, tip of *dorsal sepal* down-turned, *lateral sepals* turned back. Tepal ends reddish, *labellum* dark crimson, elliptic, the tip narrowly obtuse, flat or slightly constricted; slender *stigma*.

Habitat: in grass or light scrub.
ERs 25, 28, 37, 38, 43-45, 47, 49, 51, 55-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106


107


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108


109

57, 61, 63, 69, 73.
Rarity: not threatened.
Notes: seen also on Tararua & Ruahines Ra and Egmont NP in the North Island.

106. *P. auriculata* Colenso. *Trans. & Proc. New Zealand Inst.* 22: 489 (1890). October to November.
Image: Catlins SFP, ER70, 30 Nov 2007.
Traits: it has distinctive, broad, long, arched *leaves* and an arched, tapering and often red *labellum*. *Stems* often red.
Habitat: heavily shaded areas under kamahi & red matipo on Kapiti Id, in dune forest in the Catlins SFP. SE Otago, Stewart Id. ERs 69, 70, 79.
Note: was tagged *P.* "Catlins"

107. *P. australis* Hook.f. *Fl. Nov.-Zel.* 1: 248 (1853) Nov-Dec.
Image: Borland Burn ER72; 21 Jan 2004.
Traits: somewhat resembling *P. banksii* and *P. areolata*, but *leaves* shorter and broader (especially at the base) than *P. banksii*, *dorsal sepal* much; *lateral sepals* long and spreading; *labellum* tip arched. Intermediate forms common.
Habitat: lowland to montane scrub and beech forest. ERs 21, 26, 28, 30, 37-41, 43, 45-51, 66, 69-74, 77-80.
Rarity: not threatened.

108. *Pterostylis banksii* A.Cunn. *Companion Bot. Mag.* 2: 376 (1837)
The tutukiwi October N to December S
Image: Kauaeranga ER10; 10 Nov 2000
Traits: NZ's largest orchid *flower*. Similar to *P. australis* but: *leaves* are narrower, longer, often rising above the flower, LONG *DORSAL SEPAL*, APEX TURNED UP, exceeds the lateral petals by ±25mm; long pink *lateral sepals* sweep back, *labellum* tip is flat or arched. Rarely has 2 flowers.
Habitat: lowland to montane, damp scrub or well lit forest.
ERs 3-31, 33, 35-41, 43, 45-51, 54-57, 61, 65, 66, 69, 70, 72-74, 77-78, 80.
Rarity: not threatened.
Notes: The s.s. form occurs to the far south but smaller flowers, ER9 and south, with straight or dipping dorsal sepals are possible hybrids with *P. australis* or etc.

109. *P.* "media" (*P.* aff. banksii) H.B. Matthews negative Auck. Museum Nov
Image: I St George, Plimmerton ER39; November 2004.
Traits: Has the long upturned *dorsal sepal* of *P. banksii* on a smaller plant with proportionately shorter, yellow-green *leaves*.
Habitat: Damp ground around Whenuatapu, north of Wellington, Waitakere Ra, Birkdale in 1923. ERs 9, 39, 49
Similar species: *P. banksii, P. graminea*
Notes: see I St George J80:14,**19**

110. *P. cardiostigma* D.A. Cooper *New Zealand J. Bot.* 21: 97, f.1,2 (1983). Tagged as *P.* "Days Bay" Oct to Dec.
Image: Iwitahi ER17; 7 Dec 1996.
Traits: grass-*leaved*. Named for its LOBED, HEART SHAPED *STIGMA*. The *plant* is very erect and compact, and has been mistaken for *P. banksii* in bud. The upright *flower*, with the tapering reddish *labellum* peeping through a V sinus, is unmistakable. *OVARY*, GREEN WITH ORANGE LATERAL SEPAL-RIBS for good identification before, after and during flowering.
Habitat: lowland to subalpine, damp scrub, forest and *Pinus nigra*. ERs 5, 9-13, 15-22, 24, 25, 31, 33, 35, 37-39, 46-48.
Rarity: not threatened.

111. *Pterostylis cernua* D.L. Jones, Molloy & M.A. Clem. *Orchadian* 12(6): 267 f.2 (1997) Nov to Jan.
Image: SH6 Kumara ER50; 12 Dec 2000.
Traits: similar to the short-tepalled form of *P. graminea* found in sphagnum moss

in several sites. Non-flowering *plants* to 60mm tall with 3–5 lanceolate *leaves*. Flowering plants to 120mm with 4–5 sheathing, grass-like *leaves*. *Labellum* dark green with central blackish green callus, leans through the V sinus of the *lateral sepals*. *OVARY* HAS SIX ORANGE TEPAL RIBS that carry right up sepal midribs to the tips but stop at petal and labellum bases.

Habitat: in grass and *Sphagnum* moss, montane road verge. ERs 48, 50.

Rarity: listed as threatened, critically endangered, but widespread in Westland.

112. *P. foliata* Hook.f. *Fl. Nov.-Zel.* 1: 249 (1853)

or slender greenhood. Oct-Dec.

Images

a) Rotokura Lakes ER; 18 Nov 1995.
b) Browning Tk ER47, 11 Nov 1998.

Traits: ELLIPTIC *LEAVES* IN A SEMI-ROSETTE; *stem* with one or two leafy *sheathing bracts*. *Plant* to 300mm tall, the *stem* elongating after fertilisation. ERECT *FLOWER* with SHORT *DORSAL SEPAL* STOPPING LEVEL WITH THE *PETALS*. *Labellum*, pale under, dark green on top, tapers gradually to its apex.

Habitat: Grassland, scrub, tracksides and well lit pine forest.
ERs 12, 15-18, 23, 35-40, 46-48, 57, 65.

Rarity: not threatened.

113. *P. graminea* Hook.f. *Fl. Nov.-Zel.* 1: 248 (1853) Aug Nth to Jan Sth.

Image: St Arnaud ER49; 20 Dec 2002.

Traits: several slender taxa usually with very long narrow grassy *leaves* that overtop the small *flower*. *Labellum* tip blunt, flat. FEW, WIDELY SPACED NERVES IN THE *DORSAL SEPAL* LEAVING WIDE WHITE WINDOWS NEAR THE *ANTHER*. *Dorsal sepal* may extend 0-9mm, with erect *lateral sepals* rising 0-9mm above the galea. *Labellum* red or steely blue, oblong with a raised midrib.

Habitat: light forest and scrub.
ERs 3-6, 9-14, 16-19, 21, 23-25, 29-31, 35-40, 46-50, 53, 56, 57, 61, 65, 69, 72, 78-80.

Rarity: not threatened.

Similar taxa

i) *P.* "Sphagnum" at Opuatia has swept back lateral sepals, a steel blue labellum and grows on *Sphagnum* moss islands.
ii) *P.* "Peninsula" from St Arnaud has a nutant galea, level *synsepalum,* tips of *lateral petals* and *dorsal sepal* coincident.

Notes: described by Hooker (1853) as, "like a miniature *P. Banksii* but without the long tails to the perianth" other forms with tips of tepals coincident or with steel blue labella, may yet be separate taxa.

114. *Pterostylis graminea* "red-curl"

J88:14,**16** Mark Moorhouse Nov-Dec.

Image: Top House Res ER49. 29 Nov '02.

Traits: Grassy, erect *leaves*, *P. graminea* sized *plant* with red *tepal* tips. *Dorsal sepal* exceeds the *lateral petal* tips by ±4mm. *LATERAL SEPALS* ARE FLAT ACROSS BUT CURL ±360° AT THEIR RED TIPS. *LABELLUM* TWISTS TO THE RIGHT ±15°, MIDRIB RIDGE IS DARK RED, PROTRUDES ±1MM AT THE TIP. *Column wing* prongs are below the anther top.

Habitat: Shady leaf litter, native bush, Top-House Res, Nelson ER 49.

Similar taxa

i) *Pterostylis graminea* but for the straight lateral sepals and non-twisted labellum
ii) *P.* "pulchragalea" a possibly related, northern form but a bigger plant with less curled lateral sepal tips, less colour in the tepal tips, longer dorsal sepal and longer finger-like extension of the labellum.
iii) *P. montana* sensu Moore; a rather bigger relation with shorter, wider, spreading leaves, a more boxy galea, blackish labellum twisted four times as much, a bulbous stigma and lacking the tip extension.

Notes: There were numerous plants in the


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112b


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Top-House Res on 29 Nov. 2002 with various degrees of curl in the lateral sepals, possibly related to maturity as in *P. montana* sensu Moore.

115. *Pterostylis humilis* R.S. Rogers *Trans. & Proc. Roy. Soc. South. Australia.* 46:151 (1922) December-January.
Image: Whakapapa ER18; 6 Dec 1998.
Traits: 45-50mm tall *plant* with a rosette of 3 (rarely 2 or 4) elliptic, bluntly acute, bluish green *leaves,* the top one usually overtopping the flower. *Lateral sepals* stand erect, overtopping the galea. *Labellum* red to dark red. *STIGMA* HEART SHAPED, UPWARD FACING. *Scape* lengthens after flowering.
Habitat: montane track sides to high subalpine scrub. ERs 16, 18, 25, 30, 46-48.
Similar species
i) *P. venosa;* its peak flowering is six weeks earlier in adjacent sites such as Mt Egmont. Hybrids occur with intermediate traits.
ii) *P. trifolia* with short stem and broader obtuse leaves. Ruahine Ra.
Rarity: not threatened.

116. *Pterostylis irsoniana* Hatch *Trans. & Proc. Roy. Soc. New Zealand* 78: 104, t.18 (1950) November to January.
Image: Blue Ck ER 46; 26 Nov 2002.
Traits: grass *leaved* species; pale *LABELLUM* TAPERS GRADUALLY AND CURLS BACK AT THE TIP to a miniature drainer's scoop, it has a PROMINENT DARK CALLUS AT THE BASE and sometimes smaller calli up the dark midrib. Quite reddish *flower* parts and midrib of the *leaves* at times.
Habitat: subalpine scrub.
ERs 18-20, 25, 30, 31, 35, 37-42, 46-50, 55, 56, 71.
Rarity: not threatened.

117. *P. irwinii* D.L. Jones, Molloy & M.A. Clem. *Orchadian* 12(6): 269 (1997) November to December.
Image: Erua ER18; 12 December 1996.
Traits: a large, slender-*leaved plant* sometimes with reddish *tepal* ends. *Lateral sepals* incurved, CAUSING *SEPALS* TO LEAN FORWARD of the upright flower forming an inward turning jug spout at the sinus; *Labellum* is dark and tapered.
Habitat: in light scrub or forest.
ERs 18, 41, 46-49.
Rarity: not threatened.
Notes: Discovered by Bruce Irwin by the Waimarino Stm. at Erua. Seed may have blown in from Nelson, where it is widespread, after the AD186 Taupo eruption.

118. *P. micromega* Hook.f. *Fl. Nov.-Zel.* 1:248 (1853) Nov to Feb.
Image: Tangiwai bog ER18; 3 Jan 2003.
Traits: ELLIPTIC *LEAVES* OFTEN WITH WAVY EDGES, RARELY IN A BASAL ROSETTE; USUALLY SCATTERED UP THE STEM, upper *leaves* sometimes bract-like. A pale green, almost white *flower* with tapered green *labellum*, its upper third STRONGLY ARCHED FORWARD through the V sinus of the *lateral sepals*, which do not spread widely. *Dorsal sepal* smoothly and evenly curved throughout its length, apex not always down-pointing.
Habitat: stream edges and bogs in montane to lowland wetlands. ERs 4, 11, 16, 18, 27, 29, 31, 36, 38, 46, 80.
Rarity: threatened: endangered.
Notes: DoC instituted surveys in 2000-2003 found good populations in the ER18 swamps; where field parties rarely go.

119. *P. montana* Hatch. *Trans. & Proc. Roy. Soc. New Zealand* 77: 239 t.22 (1949) September to December.
Image: St Arnaud ER49; 21 Dec 2002
Traits: *plant* to 200mm, grass-like, coppery green *leaves, flower* leaning forward,

with FLAT, PINK, LAID-BACK *LATERAL SEPALS* stiffened by a stout midrib, green *labellum* with a black mid-ridge, twisted ±45° to the right; the *STIGMA* ELONGATED AND ±FLAT.

Habitat: track-sides, under scrub.
ERs 18, 21, 24-25, 29-31, 39, 41, 46-50, 55-57, 61, 65, 66, 69, 70, 72, 77-79.

Notes: Hatch described *P. montana* in 1949, from Stewart Id plants. His holotype is the basis of this description. N.I. and some S.I. reports are suspect after 38 years of *P. montana* sensu Moore being taken as the *sensu stricto* plant.

120. *Pterostylis montana* sensu Moore

L.B. Moore & E. Edgar (1970). Tagged as curly. November December.

Image: Horopito ER18; 5 December 1998.

Traits: ±150mm tall with ±5 grass-like *leaves*, some easily exceeding the galea. A handsome *flower* with the *dorsal sepal* slightly exceeding or equalling the lateral petals, all with reddish tips. *LATERAL SEPALS* IN YOUNG PLANTS, PINK TIPPED AND CURVING FORWARDS; IN OLDER PLANTS, RECURVED INTO A COMPLETE CIRCLE AND DARKEST BROWN. *Labellum* blackish on top and TWISTED ±90° TO THE RIGHT. *STIGMA* PROMINENT AND BROAD suggesting self pollination.

Habitat: Wet ground in dappled shade; open pasture in the south.
ERs 18, 21, 24, 25, 29, 31, 37, 39, 41, 46-50, 55-57, 61, 65, 69, 70, 72, 78, 79.

Similar species
i) *P. silvicultrix*, almost indistinguishable
ii) *P. montana* Hatch; has flat, straight lateral sepals, has also a green *labellum* unevenly constricted at the tip, a slender stigma suggesting insect pollination.

Notes: Hatch described *P. montana* in part as being "not uncommon about the *Nothofagus* forests of Mt Ruapehu" where it is rarely reported.

121. *Pterostylis* aff. *montana* ±9 taxa, J17:1, Max Gibbs, J88:9 Ian St George.

Traits: A number of grass-leaved *Pterostylis* taxa around the Central Plateau, hybridise easily making it difficult to separate parents and hybrids. Most forms have the *Pterostylis* norm 2n=44 chromosomes, but others tested (Dawson et al 2007) have 40 or 43. Some of the most stable forms are presented here trusting that they are close to parent or other viable taxa.

Two groups, depending if *labellum* is:— **A.** twisted to the right or **B.** not twisted.

A.i. *P.* aff *montana* "too big" 14 Dec '97 in mossy shade, *dorsal* sepal exceeds lateral petals by ±4mm, lateral *sepals* straight, erect to back-sloping, *labellum* pink to black on top, tip twist varies from 10°-90°. Variability implies hybridism in a scattered colony at Pokaka. ER 18.

A.ii. *P.* aff. *montana* "Whakapapa" from Whakapapa Walk 5 Jan 03 (J87:6,7) track side in dappled shade, like *P. montana* (labellum tip unevenly constricted) except for short leaves, drooping *dorsal sepal* tip and forward curving *lateral sepals.* Several other colonies at the end of Hepi Tce. looked like various hybrids between A.ii & *P.* "pulchragalea". Similar to Irwin's (Tyler & St George 2008) from Viaduct Rest Area S of Taihape, 14 Oct 95 ER 18.

A.iii *P.* aff. *montana* "Iwitahi" from the Iwitahi HPA, 3 Dec 1994, *tepal* tips all orange/red, *dorsal sepal* exceeds *lateral petals* by ±4mm, *lateral sepals* erect, flat, tip twisted, *labellum* near black on top, white under, twisted ±80°. At least one colony of ±35 plants with consistent characters in *Pinus nigra*. ER17.

B.i *P.* aff. *montana* "Mt Messenger" from a healthy colony, trackside near SH3, at the saddle, very early, 17 Sept 1993. *Labellum* is straight with a shallow ridge to the midrib. *Flowers* too big, *leaves* too short and broad for *P. graminea*. ER 24.


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121Ai


121Aii


121Aiii

B.ii *P.* aff. *montana* "Erua" from wet bush by Erua Rd. on the flood plain of the Waimarino Stm. 9 Nov 1996. Too early for *P. montana*, has only three leaves, *lateral sepals* don't overtop the galea and it has a straight, acute *labellum*. ER 18

B.iii *P.* aff. *montana* "Horopito" from native bush at the end of old SH4 north of Horopito, 13 Dec 1996, a tall taxon with grass-like leaves, pink *peduncle*, leaf midribs and *tepal* filament tips. *Dorsal sepal* exceeds *lateral petals* by ±5mm, *lateral sepals* erect, flat straight, evenly tapered. *Labellum* straight, top black. Plants with red tepal tips had a twisted labellum. There may be 2 taxa here. ER 18.

B.iv *P.* aff. *montana* "Taupo" from a large colony at Taupo Botanical Gardens, 16 Oct 1999. Larger *flowers* than most, like *P. banksii* but the filamentous part of the *sepals* are too short by half. ER 16.

B.v *P.* aff. *montana* "Makomiko" from a mini island at the edge of the Makomiko Swamp, National Park 4 Jan 2001 in dappled shade. Smaller than *P. banksii* with shorter leaves; *labellum* is darker red. Tepal ends bright pink. ER 18.

B.vi *P.* aff. *montana* "Pukeiti" numerous at Pukeiti Rhododendron Park, 1 Nov 2007 with erect grassy *leaves* overtopping the *flower*. Pale, erect, *lateral sepals* overtopping the galea like *P. paludosa* but the labellum has a red mid-ridge, not black, and flowers a month earlier in the dry. ER 25.

122. *Pterostylis nutans* R,Br. Prodr. *Fl. Nov. Holland:* 327 (1810)

the parrot's beak. October.

Image: Te Puna ex Aussie; 26 June 2003.

Traits: ROSETTE OF CRINKLE-EDGED *LEAVES*, *ovary* bent over ±180° so *FLOWER* IS INVERTED. Glassy clear windows at the back of the galea. *Lateral sepals* droop, BRISTLY *LABELLUM* curls ±180° from claw to tip. No pollinator in New Zealand.

Habitat: clay track-sides in light scrub. Historical ER **5** (Okahu, HB Matthews Oct 1910), ER **9** (Castor Bay L.M. Cranwell Oct. 1942), ER **16** (600m a.s.l. Waihaha Tk, J.B. Irwin Oct. 1991).

Rarity: naturally uncommon, vagrant.

Similar species: Australian *P. hispidula*; nods less, lateral sepals jut horizontally.

123. *Pterostylis oliveri* Petrie *Trans. & Proc. New Zealand Inst*. 26: 270 (1894).

December-January.

Image: Arthurs Pass ER53; 7 Dec 2002

Traits: *DORSAL SEPAL* DEFLEXED AS IN *P. PATENS*, BUT *LATERAL SEPAL* TIPS LONG AND ERECT, DIVERGING AT A NARROW ANGLE; *labellum* narrow triangular, can hook back past the galea or describe an S bend.

Habitat: montane to sub-alpine open scrub and low bush. ERs 46-47, 49-50, 53.

Rarity: not threatened.

Notes: has 2n=46 chromosomes not the usual 2n=44 so is unlikely to hybridise.

124. *P. paludosa* D.L.Jones, Molloy & M.A. Clem. *Orchadian* 12(6): 271 f (1997)

or linearis. October to January.

Image: Whakapapa bog ER18; 12 Dec 96.

Traits: *plant* slender, bog loving, *leaves* grassy, erect, pale-green; *flower* well above the leaf-tips. *Sepals* pale, *lateral sepals* stand erect but are curved in cross-section, overtopping the galea. *lateral petals* cross their tips. *Labellum* bluntly acute, has a prominent, black central ridge; HEART SHAPED *STIGMA*.

Habitat: lowland to montane swamps. ERs 6, 10-12, 15-16, 18, 46, 48, 79.

Rarity: declining.

125. *P. patens* Colenso *Trans. & Proc. New Zealand Inst.* 18: 270 (1886). Dec-Jan.

Image: Karioi, ER 18; 7 Jan 2002.

Traits: wide grassy *leaves*, usually wider and shorter than those of *P. banksii.* Mature


121Bi


121Bii


121Biii


121Biv


121Bvi


123


121Bv


122

pink *LATERAL SEPAL* TIPS ARE TURNED BACK AND DOWN, sometimes meeting behind the *ovary*. *DORSAL SEPAL* TURNED DOWN ±vertically. Prominent pink *labellum*

Habitat: montane to high subalpine. ERs 10-12, 16-23, 25-29, 31, 35, 37, 38, 43, 47, 49-51, 72, 80.

Rarity: not threatened.

126. *Pterostylis* "Peninsula" Gordon Sylvester, J86:29,**31.** December.

Image: St Arnaud ER49; 20 Dec 2002.

Traits: Spreading grass-like leaves, *P. graminea* sized plant with nutant galea, the *synsepalum* being ±level, *lateral sepal* ends are pink, straight, tapered, with margins in-rolled, standing in an erect plane at ±35°. *Lateral petals* and *dorsal sepal* tips coincide. *Labellum* is blackish red on top with mid ridge and a white appendage.

Habitat: South Island, montane to lowland, in dappled shade, damp, vegetated track-sides. Plentiful on Brunner Pen, Lake Rotoiti, occurs at Kumara and places between. ERs 46, 49, 50.

Similar species: *P. graminea* whose leaves are more upright, dorsal sepal exceeds the lateral petals and is less nutant.

Notes: Population on Brunner Peninsula's glacial moraine exceeds that of *P. graminea*.

127. *P. porrecta* D.L.Jones, Molloy & M.A.Clem. *Orchadian* 12(6): 272 (1997) December

Image: Elsthorpe ER34; 5 December 1999

Traits: slender 100mm *plant* with grassy, arched *leaves*, like a small *P. irwinii* with *SYNSEPALUM* LEANING OUT. and showing the inward looking jug spout at the sinus. PALE ORANGE TINGE ON *TEPAL* TIPS AND THE LABELLUM MID-RIDGE. *Labellum* triggers at the least touch, frustrating photographers and indicating a small pollinator.

Habitat: shaded forest floor, typically in areas of base-rich rocks. ERs 12, 34, 35, 38, 39, 47.

Rarity: insufficiently known.

128. *Pterostylis* "pulchragalea" H.B. Matthews 1920 Ms. Oct to Dec.

Image: Littles Clearing, ER27; 6 Dec 1999

Traits: *Plant* 130mm tall. *Dorsal sepal* exceeds *lateral petals* by ±5mm, *lateral sepals* erect and straight for the first ¾ then curl forwards 180°-360°, *labellum* strongly arched at $^2/_3$ rds height, twists ±15° to the right beyond the arch and notably, its RED *MIDRIB RIDGE*, EXTENDS ±2MM FINGER-LIKE AT THE TIP. *Stigma* narrow, erect.

Habitat: Subalpine ±1,060m a.s.l. from Waimarino Forest 1922, Blyth Tk, 11 Dec 68; Ruapehu Dec. 83; Littles Clearing, Kaweka Ra (J74:21 Fig. 22), 6 Dec 99 and Hepi Tce. Whakapapa (J87:6) 5 Jan 03 on mossy, track-sides. ERs 18, 24, 27, 29.

Similar taxa: *P.* aff. *montana* for the twisted labellum and *P. graminea* for the narrow, grass-like leaves and dorsal sepal venation. A similar taxon in Big Bush S.F. Nelson with stripy leaves and shorter red labellum extension, also had an heart shaped stigma.

Notes: An uncommon taxon which occurs in ones and twos in widely spaced sites. It was lumped with *P.* aff. *montana* for 39 years in the writer's files before the above specimens were again recognised as one distinctive taxon. Tagged "late" (Irwin), & "Blyth" (Scanlen) prior to corelation with H.B. Matthews' Ms description from the Waimarino Forest 1920.

129. *P. silvicultrix* (F.Muell.) D.L.Jones, Molloy & M.A.Clem. *Austral. Orchid Res.* 4: 66 (2003) Nov to Dec.

Image: BPJ Molloy, Chathams; 26 Oct '01

Traits: Juvenile *plants* have broadly-ovate, to broadly-elliptic *leaves*; flowering specimens have a basal set of broadly-ovate-

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elliptic *leaves* 25-60mm long by 20-25mm broad, and then narrow lanceolate leaves; *galea* with very short, often curled, somewhat truncate *sepals*, overall coloured dark to dull green, pale striping not as pronounced as in *P. banksii*.

Habitat: usually in shaded forest, often under (or as an epiphyte on the trunks of *Dicksonia fibrosa*). Recently plants have been observed in restiad peat, and around sedges near lake edges. Endemic to Chathams. ER 80.

Rarity: at risk, range restricted.

Notes: sympatric with *P. banksii* which is less common on the Chathams, and usually grows in more open forest; *P. silvicultrix* has been confused with *P. montana* and *P. australis*. A recent drawing of a live specimen by Bruce Irwin (J107:15) has an extended *dorsal sepal*, *lateral sepals* curled forwards 180° and labellum twisted 90° to the right.

Similar taxon: *P.* aff. *montana* sensu Moore. almost indistinguishable.

130. *Pterostylis* "sphagnum" Peter de Lange, J74:12; 80:5 October.

Image: Opuatia bog ER11; 10 Oct 1999.

Traits: Grassy *leaves*, *P. graminea* sized *plant* with *dorsal* sepal just exceeding the *lateral petal* tips. *Lateral sepals*, straight, ±flat, back-swept and almost level. *Labellum* is not twisted, has a blackish green central ridge; it would not trigger, on the illustrated plant at Opuatia and may have been in the insensitive stage after resetting. *Column wing prongs*, overtop the pollinia.

Habitat: IN *SPHAGNUM* MOSS, IN SCRUB, FLOATING ON SWAMP WATER, Opuatia, Taranaki, Hinehopu. ERs 11, 13, 25.

Similar species

i) *P. graminea* but for its drier habitat, erect lateral sepals and column arm prongs don't overtop the top pollinia. Bruce Irwin's *P. graminea* from Hinehopu bog appears to be the *P.* "sphagnum.

ii) *P. montana* but for its drier, more southerly habitat and twisted labellum tip.

Notes: The swamp habitat may be responsible for very few reports.

131. *Pterostylis trifolia* Colenso *Trans. and Proc New Zealand Inst.* 31: 281 (1899) November-December.

Image: M. Lusk, Maharahara ER32; 8 November 2007.

Traits: *Plant* ±62mm tall, 3 obtuse *leaves* ±27mm long, ±25mm wide, one sheathing *ovary* and *galea*. *Stem* ±25mm. *Flower* single, green with tawny shades, 31mm tall with *lateral sepals* erect, overtopping the *dorsal sepal* whose tip coincides with tips of the *lateral petals. Labellum* with 90° bend, sub-acute, brown, appendage large.

Habitat: trackside under leatherwood, 1,000-1,200m altitude, Ruahine Ra from Maharahara to Rangiwahia. ER 28, 32.

Notes: mistaken for short stemmed, either *P. venosa* or *P. humilis* for 119 years. Redescribed as *P. confertifolia,* Cockayne & Allan, 1926. 1995 photos in ER18 Horopito of a colony in scrub at only 720m, seem to be the same taxon but at a lower altitude.

132. *Pterostylis venosa* Colenso *Trans. & Proc. New Zealand Inst*. 28: 610 (1896) November to January.

Image: Egmont N.P. ER25, 19 Nov 1997.

Traits: 50-100mm tall with a rosette of 3 (rarely 2 or 4) broad, oval, obtuse yellow/green *leaves* lengthening in maturity. *Lateral sepals* slope back and rarely overtop the galea. *Labellum* is acute and brown. *STIGMA* IS NARROW, NOT FACING UP.

Habitat: high rainfall montane forest sites. ERs 15, 18, 21, 25-26, 28, 30, 37-38, 45-46, 48, 50-51, 66, 69-70, 72, 74, 77-80.

Similar species

i) *P. humilis* but its lateral sepals stand erect, the top leaf overtops the flower and the stigma is heart shaped, facing upwards.


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Hybrids occur with intermediate traits.
ii) *P. trifolia* with a very short stem and lateral sepals erect, overtopping the galea.
Rarity: not threatened.

133. *Simpliglottis valida* (D.L. Jones) Szlach. *Polish Bot. J.* 46(1): 14 (2001)

The large bird orchid. Oct-Dec.
Image: Iwitahi ER 17; 12 December 1998.
Traits: *plant* much larger than *Chiloglottis cornuta, leaves* wider and longer. Greenish flowers darken to purple/brown. *Labellum* has ONE STALKED, BLACK TOPPED CALLUS WITH ONE TO SEVERAL SESSILE CALLI either side and in front, sometimes on short stalks.
Habitat: in *Pinus nigra* debris at Iwitahi and Hanmer; under beech, Richmond Ra, Marlborough and Te Anau. Montane to subalpine. ERs 17, 40, 43, 44, 47, 72.
Rarity: non-resident native, vagrant.
Notes: said not to set seed in NZ but rare seed capsules do arise; spreads vegetatively very successfully at Iwitahi. Patterns of labellum calli vary with the clone.

Singularybas or singular *Corybas,*

Molloy, D.L. Jones & M.A. Clem. *Orchadian* 13(10): 449 (2002)
Four taxa, three as yet undescribed.
Traits: lateral *tepals* filiform but, unlike *Nematoceras,* petals rise at the rear and sepals at the front; column is upright with a swollen ventral pad below, *labellum* margin is deeply laciniate.

134. *Singularybas* "aestivalis" H.B. Matthews, J61:16; 77:**15** Sept N.-Nov S.

Image: Te Paki ER3; 5 October 2000.
Traits: *Plant* 20-40mm high. *LEAF* SESSILE OVATE , CORDATE OR ORBICULAR, pink-lavender, silvery frosted beneath. *Flower* maroon, solitary but rarely has another in lieu of the secondary bract. *Pedicel* ribbed, either maroon or green with maroon ribs *Peduncle* white. *Dorsal sepal* 9-13mm long, with three port wine, longitudinal ribs projecting over the labellum. *Tepals* with serrulate margins. *Lateral sepals* 15-25cm long, spreading, filiform and hollow with a half turn towards the tops. *Petals* similar and shorter. *Labellum* ±9mm long, tubular with round opening, dark maroon and ±level, with an irregular border of flat fimbriae, colourless but purple speckled, the sides meeting under the dorsal sepal; *auricles* colourless, wedged between dorsal sepal and lateral petal; ±50 *DENTIFORM PAPILLAE*, CONICAL, 0.2MM LONG, X 0.07MM BASE DIAM, PORT WINE COLOURED IN A CLUSTER MID LABELLUM. Erect *column* white with maroon top and stout base.
Similar species:
i) *S. oblongus* is smaller, leaf is oblong , it lacks the dentiform papillae, labellum opening is ovate, fimbriae have rolled margins and thus appear more regular.
ii) *S.* "white top" with palest green dorsal sepal and no dentiform papillae, grows at Diggers Vly and Pukepoto in ER 5.
Habitat: Shenstone Blk, Te Paki, Webbs Tk, Coromandels, Waimarino, Browning Tk, Nelson. Prefers stream-side loam in kanuka. ERs 4, 10, 18, 47.
Notes: It is unusual to find *S oblongus* and *S.* "aestivalis" non-hybridised. Thus historic descriptions of *S. oblongus* have included both taxa in differing degrees and the existence of *S.* "aestivalis" has been ignored despite H.B. Matthews' 1928 description.

135. *Singularybas* "Greymouth"

Eric Scanlen, J87:**8**, Nov-Dec.
Image: Greymouth ER48; 1 Dec 2002.
Traits: *Plant* 24mm tall, *leaf* is mid-green, cordate with slightly undulate margin and down-turned apiculus. *Pedicel* leans back at ±30° to the vertical with the ovary erect. *Floral bract* elliptic, apiculate ±flat and level. *Flower* is pale green, *dorsal sepal* and *lateral tepals* shaped as for *S. oblongus.* *LABELLUM* OPENING IS ROUND, FIMBRIAE

HAVE IN-ROLLED MARGINS AND THERE IS NO BED OF DENTIFORM PAPILLAE.

Habitat: One extensive colony behind the substation at Greymouth. Regrowth native bush in a damp hollow on track-side. Also at Auckland Islands (J103:**27**) ERs 48, 83.

Similar taxa

i) *S. oblongus,* but leaf is more oblong, purple leaf veins even in alba-form; oval labellum opening. Floral bract is Veed, stands ±erect, and margins are undulate.

ii) *S.* "aestivalis" but it has purple colouring, ragged flat fimbriae to the labellum mouth, a bed of dentiform papillae on the disc and an orbicular leaf. Dorsal sepal is ridged.

iii) *S.* "white top" flowers a month earlier; dorsal sepal, in late bud, closes the labellum like a car boot lid; purple labellum.

Notes: The large size of colony, say 20m x 10m, in regenerating bush, indicates viable seed dispersal from this robust white form.

136. *Singularybas oblongus* (Hook. f.) Molloy, D.L. Jones & M.A. Clem. *Orchadian* 13(10): 449 (2002) Sept N-Dec S.

Image: Puffer Tk ER39; 6 Dec 1997.

Traits: Single flowered but some colonies have second flowers in lieu of the secondary bract. *Leaf* oblong, purple veined, rarely all purple, undulate margins. *Floral* bract large, Veed, margins undulate. *Dorsal sepal* pale with maroon ridges. *LABELLUM* MAROON, WITH PALE FRINGED, OVAL MOUTH, WHITE AURICLES AIMING DOWN AND BACK, NO DENTIFORM PAPILLAE INSIDE. *Column* is erect unlike *Nematoceras*. A form with white flowers occurs, whose leaf, stems and floral bract, have normal purple colouring in robust plants. Duder's Bush colony has spread ±9m in 22 years.

Habitat: Moderate shade in bush or scrub in damp leaf litter. ERs (magenta flower): 2-25, 30, 31, 33, 37-40, 42 46-51, 59, 69-72, 77-80, 83, 84.
ERs (white flower): 9, 39, 48, 49.

Similar taxa: *S.* "Greymouth" but has no anthocyanin and a round mouth to the labellum; closely related but grows in a larger, denser colony.

Notes: The alba plants survive in healthy colonies despite the survival struggle. Their whiteness may improve their chances of pollination at night like many other New Zealand natives such as violets and gentians. Intermediate *S.* "aestivalis"-*oblongus* forms indicate common hybridism.

137. *Singularybas* "white top" Gary Little J107:**39,40.** August September.

Image: G. Little, Diggers Vly; 16 September 2007.

Traits: Similar in most respects to *S. oblongus* but flowers a month earlier and its *DORSAL SEPAL* IS PALEST GREEN without any maroon lines and in late bud THE TIP FLAP, CLOSES OFF THE LABELLUM TUBE. JUVENILE, UNFLOWERED PLANTS HAVE ONLY ONE LEAF. *Labellum* lacks the dentiform papillae of *S.* "aestivalis".

Habitat: tracksides in native forest. Diggers Vly and Pukepoto ERs 4, 5.

Notes: The early flowering and white dorsal sepal indicate that this taxon as distinct.

138. *Spiranthes* "Motutangi" B.P.J. Molloy ex D. McCrae, N/L22:8, 1987. December-February

Image: K. Matthews; Motutangi ER4, 28 January 2008.

Traits: lanceolate *leaves* clustered around the base of the multi-bracteate *stem*. *Flowers* small, numerous, in a left or right helix, pale cerise. WHITE *LABELLUM* WITH OUTER MARGINS INFOLDED TO FORM A SLIPPER-LIKE TOE which usually unfolds eventually.

Habitat: wetlands north of Kaitaia ER 4.

Notes: ORANGE THRIPS FREQUENT THE FLOWERS AND ARE LIKELY POLLINATORS.

139. *Spiranthes novae zelandiae*

Hook. f. *Fl. Nov.-Zel.* 1: 243 (1853)
Ladies tresses January to April
Image: Horopito ER18; 18 February 1995
Traits: lanceolate *leaves* clustered around the base of the multi-bracteate *stem. FLOWERS* SMALL, NUMEROUS, IN A LEFT OR RIGHT HELIX, PINK TO RED, rarely white. *Labellum* white, fringed, tubular.
Habitat: in boggy areas or wet compacted shingle among grasses. ERs 10, 11, 13, 15-18, 21, 28, 31, 46, 48, 56, 71, 80.
Rarity: not threatened.
Notes: Thought to be self pollinated but thrips may cross pollinate. Often perennial.

Stegostyla D.L. Jones & M.A. Clem.

Orchadian (13)9: 411 (2001)
(roofed column)
Traits: Differs from *Caladenia*, with ROWS OF CALLI ON TOP OF THE *LABELLUM MIDLOBE,* TO THE TIP, a broader and hooded *dorsal sepal, labellum calli* separate, not on a plate-like structure and a STUMPY, PAPILLATE, *ANTHER CONNECTIVE.* Yellow topped, white legged, *disc calli* (except for darkest red in *S. atradenia*) in two rows for *S. atradenia, S.* "minor" and *S. lyallii.* The other *S. lyallii* aggregate usually have 4 rows but sometimes 6 or rarely 8. *S. lyallii* agg. and *S.* "minor" prefer a cooler habitat; white flowers with strong red bars to the interior of *labellum disc*, side lobes and inner *column* although ±10% of most taxa lack the red bars and are termed "alba forms" herein. Tiny stipitate red glands adorn insides of the lateral tepals for the lower half, including alba forms.

140. *Stegostyla alpina* (R.S. Rogers) D.L. Jones & M.A. Clem. *Orchadian* (13) 9: 411 (2001) November to December.

Images: G. Upson; Mt Arthur ER46; 23 December 2007.
Traits: *Plant* 60-250mm tall, *peduncle* and *pedicel* maroon, hirsute, *bracts* olive to maroon, *ovary* green with red sepal ridges. *Leaf base* dark red, shading to a green tip. *FLOWERS*, ONE TO THREE, 20-30MM WIDE, WHITE INSIDE, CARMINE OR CARMINE STRIPED OUTSIDE. *Tepals* broad, 5 veined, acute to acuminate. *Labellum* white with variable and isolated red blobs under, red barred inner side-lobes, four rows of white *disc calli*, yellow clubbed, continuing down the recurved *midlobe* with 3-5 short *marginal calli* each side at the base. *Column* varies from solid dark red inside including wings to red-white patches. *Anther* and *pollinia* creamy.
Habitat: Subalpine to ALPINE, UP TO 200M ALTITUDE ABOVE THE TREE-LINE, Rock & Pillar Ra, Arthur Ra and Aorangi Ra, poor soils in *Hieracium,* moss or other low growth. ERs 37, 46, 67.
Similar species, *S.* aff. *alpina* with 1-2 white flowers at lower altitude.

141. *S.* aff. *alpina* Ian St George, J76:**25**, or Swampy December

Image: Arthurs Pass ER53; 7 Dec 2002.
Traits: *Plant* to 300mm tall, 1-2 *flowers,* 19-27mm wide . *Leaf* solitary, triple V section, a sprinkling of ¼ mm, stiff white hairs inside and out, each with a ±3mm, gossamer-like hair from its top. *Peduncle* hairy, reddish brown, *pedicel, ovary* and *bracts* green. *Dorsal sepal* is broad, hooded and bluntly acute with short stiff hairs sprinkled atop, sometimes with an area of sessile pink glands on the peak. *Lateral tepals* are broad elliptic. *Labellum* lowers to allow an inner view, *midlobe* is strongly recurved sometimes with red bars beneath. WHITE *DISC CALLI*, YELLOW TOPPED, FOUR ROWS IN TOP *FLOWER*, SIX IN THE LOWER, continue out onto the midlobe in diminishing size. Two and four double sized *calli*, occur in rows


140a


140b


143b

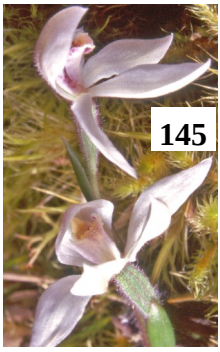

141

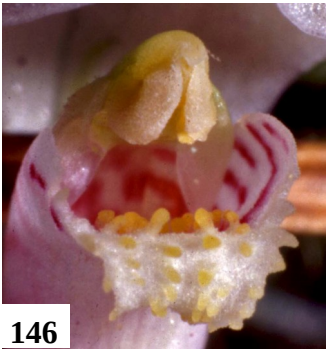

143a


142


144a


144b


145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across, by the *column*. *Midlobe* has ±four, stalked, white calli on each basal margin.

Habitat: South Island, montane to subalpine, in track-side scrub, dappled sun. ERs 46, 49, 50, 53, 63, 69, 72.

Notes: All to date have red barred labella.

Similar taxa

i) *S. alpina* but habitat is alpine, sepal outers are cerise, bracts and pedicels green.

ii) *S.* "subalpine", smaller N.I. form with 1-2 flowers, mostly lacking labellum red bars.

iii) *S. lyallii* "four row" a smaller, common, N.Id & S.Id taxon with only 4 rows of disc calli and serrulate margin (no stipitate calli) at the base of the midlobe.

142. ***S. atradenia*** (D.L.Jones, Molloy & M.A.Clem.) D.L.Jones & M.A.Clem. *Orchadian* 13(9): 414 (2001)
or calliniger September-December.

Image: Iwitahi ER17; 8 December.

Traits: *plant* to 300mm tall, wiry *stem* with short, radial hairs. *Flowers* greenish yellow with maroon papillae on outside of *tepals*; *dorsal sepal* narrow for *Stegostyla*. Red bars inside the *labellum* side lobes, disc and *column* interior. Transparent hairs on *ovary*, inside *lateral sepals* and scattered on exterior. Triangular *MIDLOBE* OF *LABELLUM* ALL *CALLI*, GLANDULAR AND DEEP MAROON. Two irregular rows of *calli* (not 4 as in the Australian *C. iridescens*) from tip of midlobe to base of labellum. *Midlobe* toothed with long marginal *calli*. *Tepals* sub-acute.

Habitat: usually as widely scattered, small colonies, often in moderately dappled shade under second-growth forest. ERs 3-6, 9-13, 16-18, 21, 28, 35, 38-40, 46-49.

Rarity: at risk, sparse.

143. ***S.*** **"Iwitahi"** Max Gibbs, J35:**20**; 37:12; 46:2, December

Images: 143a Iwitahi ER17; 2 Dec 1994.
143b Baton Vly, G. Upson 6 Jan 2007.

Traits: The smallest of our *S. lyallii* agg. distinguished by the hooded *dorsal sepal* having a gable-end opening and the *LABELLUM MIDLOBE* PROTRUDING LEVEL, DUE TO BUCKLES DOWN ON EACH SIDE BUT THE ACUTE TIP THEN DROPS STRAIGHT DOWN. *Lateral tepals* are narrow elliptic. *Labellum* allows only a small view of the interior, with four rows of disc calli which continue onto the midlobe as tiny and yellow. Three marginal white calli to each side of the midlobe base.

Habitat: Needle duff under *Pinus nigra* in complete shade at Iwitahi and an alba form, Baton Vly, Nelson. ERs 17, 46.

Similar taxa: All the *S. lyallii* agg. but they are larger, have broader more umbrella-like dorsal sepals and the labellum midlobe recurved 180°-360°.

Notes: This least showy and commonest of the Iwitahi *S. lyallii* agg. has often been neglected in favour of the rarer, bigger flowers there thus it is less well known.

144. ***Stegostyla lyallii*** (Hook. f.) D.L. Jones & M.A. Clem. *Orchadian* 13(9): 413 (2001) or white fingers December

Images: a) Iwitahi ER17; 8 Dec 2000.
b) Ketetahi ER18; 4 Dec 1978.

Traits: *Plant* ±120mm tall, very hairy, deterring larval browsers, 1-2 flowers. *Leaf* linear ±6mm wide. *Peduncle* red-brown. *Flowers* white with a cap of pink glands on the *dorsal sepal*, a sprinkling of red glands atop white hairs to the inner base of *lateral tepals* and atop the *dorsal sepal*. TWO ROWS OF *LABELLUM* DISC CALLI. Recurved *midlobe* has 4 rows of smaller calli atop and sometimes, two yellow bumps to each basal margin. The alba form, lacks the inner red bars but retains the red glands, red brown stem and yellow calli tops.

Habitat: Montane tussock scrub or pines. N.I. Central Plateau to Invercargill, Chatham Ids. ERs 16-18, 24-26, 37-40, 43, 47-51, 53-60, 65, 67-70, 72-74, 77, 79, 80. N.B. Taxa with 4 rows of disc calli may be included in reports from these areas.

Similar taxa; All the *S. lyallii* agg. except *S.* "Iwitahi" look similar but have a more hooded dorsal sepal.

Notes J.D. Hooker, in 1864, implied two rows of disc calli by linking "Other characters as in *Caladenia minor*" yet his flower diam. from ½-1 in. had to include the whole *S. lyallii* agg. Thus the above two-row definition, harks back to the original description but includes only a small proportion of the *S. lyallii* agg.

145. *S. lyallii* "4 row" Eric Scanlen, J88:18,19,**21** November-December

Image: St Arnaud; ER49 29 Nov 2002

Traits: Looks like *S.* aff. *alpina* with wide, five veined *lateral sepals*, 1-2 *flowers*, red-brown *peduncle* and green *pedicels* but has smaller flowers at ±21mm across, keeps only a small opening between *labellum* and *dorsal sepal*, has ONLY 4 ROWS OF DISC CALLI with eight rows of tiny calli on the midlobe which has SERRULATE MARGINS WITH NO STALKED CALLI.

Habitat: In moss under scrub
ERs 16-18, 24-26, 37-40, 43, 46-51, 53, 56-60, 65, 67, 69, 70, 72-74, 77, 79, 80. Other taxa may be included in this historic record.

Similar taxa:
i) *S.* aff. *alpina* as above,
ii) *S. lyallii* "subalpine" with marginal calli
iii) *S.* "lytuck" with the tucked in column wings and with marginal calli.

Notes: Hooker's 1864 description implied two rows of calli so the commoner four row form has been reported here separately.

146. *S.* "lytuck" Eric Scanlen, J78:Pl. 10, p35, late November, early December

Image: Iwitahi ER17; 8 December 2000

Traits: Single flowered and no alba forms, to date; has narrower *lateral tepals* than most *S. lyallii* agg. with only three veins each. *Flower* ±19mm across, *Dorsal sepal* obovate acuminate, umbrella-like with only a small aperture for viewing inside. *Labellum* has 4 rows of disc calli continuing down the recurved *midlobe* and 2 or 3 marginal calli to each side of its base. THE *COLUMN* HAS WINGS BENT AT 90° ACROSS THE FRONT OF THE COLUMN, TO ALMOST MEET.

Habitat: Subalpine at Iwitahi in *Pinus nigra* needle duff and Aorangi Ra., trackside in mossy scrub. ERs 17, 37.

Similar taxa: *S. lyallii* agg. but is smaller than most with differences as above.

Notes: the in-folded column wings were once assumed to be a deformity from possible constriction in the bud but the folds are always consistent on both wings and other characters differ.

147. *Stegostyla* "minor" J6:3, 95:**15** Mark Moorhouse, Mid to late November

Image: G. Upson, Baton Vly ER46; 9 Nov 2005.

Traits: *Plants* robust to 250mm tall with *Caladenia* type *leaf*, linear ±120 by ±4mm. No tip burn typical of other *S. lyallii* agg. *Stems* green to reddish covered in white hairs with red glands atop. *Pedicels* ±15mm. *Ovary* ±20mm long, hairy with red vein markings. 1-2 fertile *flowers* 18-23mm across, white to pale pink. Few set seed indicating insect pollination. *Tepals* are white inside but have a red midrib from base to tip outside, with a scattering of red glands. *Lateral petals* can have a red blob at the inner base. *Dorsal sepal* is narrow for *Stegostyla*, acute, and packed with red glands outside. *Labellum* is red barred on the disc and in side-lobes, has two rows of red or white, yellow-topped disc calli and a

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white *midlobe* with TWO ROWS OF SMALL, PALE YELLOW CALLI TO THE 360° RECURVED TIP AND FIVE STALKED, YELLOW TOPPED, CALLI TO EACH BASAL MARGIN.
Habitat: Uncommon in Baton Vly and Big Bush SF, Nelson, in kanuka leaf litter. ERs 46, 49.

Similar taxa
i) *Caladenia minor* (aff *chlorostyla*) also with red legs to the disc calli, but only half the size, and no calli atop the midlobe.
ii) *S. lyallii* agg. with generally wider dorsal sepals lacking the packed red glands.
iii) *S. atradenia* with the packed red glands on a narrow dorsal sepal (for *Stegostyla*) but only half the size, northern habitat and, darkest red midlobe and calli.
Notes: *S. "*minor"'s rarity has precluded specimen collection for molecular analysis.

148. *S.* "subalpine" Mark Moorhouse, J6:3; late November-early December.
Image: Aorangi Ra ER37; 27 Nov 2004.
Traits: Like *S. lyallii* "4 row" 1-2 flowered but with 2-3 WHITE MARGINAL CALLI EACH SIDE OF THE *MIDLOBE*, alba forms at Iwitahi, J78:26[3] plate 9, have red stipitate glands outside the *sepals*, inside and out of *lateral tepals* and on *column* back. *Labellum* almost closes the view into *flower* but drops down slightly in maturity. 4 rows of disc calli with 6-8 ROWS IN A JUMBLE ON THE *MIDLOBE*.
Habitat: Subalpine, Big Bush SF, Nelson and Iwitahi, some lacking red bars, in *Pinus nigra* needle duff. ERs 17, 37, 49.

Similar taxa
i) *S. alpina* but it grows 4-6, rows of disc calli, is up to 35mm across; all red bud.
ii) *S. lyallii* "4 row" as above.
Notes: Mark Moorhouse's full description of this, the common one in Big Bush S.F. in 1982, (pers. comm.) is available on request.

Sullivania F. Muell. *J. Proc. Roy. Soc.* new South Wales 15: 229 (1882)

149. *Sullivania minor* (R.Br.) D.L.Jones & M.A.Clem. *Orchadian* 15:36 (2005) November-January.
Image: Whakarewarewa ER13.
Traits: *Flower* resembles a flying duck with a black head, which is the nodular *labellum*. The *ovary* is the duck's body. 150mm, tall, slender, red stemmed with single, long, narrow *leaf* and 1–7 *flowers,* non-resupinate, narrow *tepals* all exceeded in width by the cupped, green, column hanging below. The *labellum* resembles a female wasp but any mating male wasp, in Australia, gets flicked down onto the *pollinia* and *stigma*, with an audible click, by the sensitive claw.
Habitat: Widespread in NSW and western Victoria; sandy loams in dry sites. Once found in Northland and Bay of Plenty, now known in NZ from a single small colony at Whakarewarewa. ER 13.
Rarity: naturally uncommon, vagrant.
Notes: Was *Paracaleana minor*. NZ plants match the Australian species. Seed arrived without the pollinating wasp so colonies in NZ disappear unless hand pollinated.

Thelymitra J.R. Forst. & G.R. Forst. Pl. 97 t.49 (1776) (woman's cap)
Traits: the sun orchids, thrive in full or dappled sun. 31 taxa, of Australian origin, 5 shared. Leaves usually single but rare twin leaves have shown at Kaitaia since at least 1903. *Stems* 150mm to ±1m, 1-20 FLOWERS IN A SPIKE WITH PETALOID *LABELLA*, white, yellow, pink, mauve, blue, and violet.
Habitat: standing water to swamps to dry road-sides to sun-baked sand, usually in poor or disturbed soil from near sea level to high subalpine. Diminishing as exotic pasture species take over habitat and as conservation measures for other native plants,

controversially close off favoured track–side habitats.

Notes: Several amphidiploid hybrids are established as distinct species. (Molloy & Dawson, 1995). The parents are mostly shy to open with friable pollen having adapted from wide opening, insect pollinated Australian species with pollinia. Recent photos by Kevin Matthews, of a black *Thrips* species in the flowers, with pollen grains attached, have led to hypotheses of adaptation to *Thrips* pollination with fall-back self pollination to account for **a)** widely distributed amphidiploids from species once thought to be obligate self pollinators and **b)** spikes commonly, of full seed capsules.

150. *Thelymitra aemula* Cheeseman

Trans. & Proc. New Zealand Inst. 51: 94 (1919) October to December.

Image: Coromandel Ra; 3 Dec 1995.

Traits: slender to robust *plant*, long, thick, ridged *leaf*, 3–10 flowers. *Flowers* plain deep blue, opening on hot muggy days. *Column* pale violet with a narrow, brown-violet band underlying the yellow top; consisting of a non-hooded *post-anther lobe* with toothed margins and forward pointing side lobules less prominent than on *T.* aff. *ixioides.* The tip of a long green *anther* can be seen between the yellow *side lobules*. Thin white cilia tufts on LONG, OUT-STRETCHED COLUMN ARMS.

Habitat: damp or dry ground in open kauri and scrub. ERs 3-6, 8-13, 46.

Rarity: not threatened.

Note: As in many *Thelymitra,* the column lengthens as the bud matures, leaving the pollinia attached to the viscid disc, behind the stigma. A long tepalled form with orange post anther lobe occurs in Herekino.

151. *Thelymitra* "Ahipara" B.P.J. Molloy & D. McCrae J67:**24** November

Image: G. Crowcroft; October 1990.

Traits: Fleshy short *leaf* like an *Ixia*, pale purple *stem*, with three pale green *bracts*, 2-3 plain blue *flowers* which have never been reported open of their own accord, only in a hot car boot during a DoC rescue operation in Nov. 1990 (de Lange et al. 1991) *Column* is pale violet, has a yellow Vee top with dark saddle behind and sparse, crinkled, white cilia plus a few mauve ones at the base, along white column arms.

Habitat: In standing water near Ahipara, around Rangaunu Harbour and Sykes Rd, Silverdale. ERs 4, 9.

Similar taxa: *T.* "darkie" whose peduncle is a darker purple, bracts are a brighter green, darker blue flowers do open rarely a month earlier; prefers a less wet habitat.

Notes: Plants observed at Albany Scenic Res and on a nearby road batter were too few to collect but were unmistakeable in appearance. The drier habitat makes it possible that these plants are pale *T.* "darkie".

152. *Thelymitra* "scaphifolia" (*T.* aff. *brevifolia*) A Ducker, J92:**14**,17; 94:12. November

Image: Silverdale, ER9; 19 Nov 2003.

Traits: A robust *plant* with 4-32 FLORETS tagged briefly as *T. pauciflora* "orange top" because of its orange *post anther lobe*. otherwise difficult to separate from *T. pauciflora*. They grow and flower together.

Habitat: Sandstone residual soils holding water at Sykes Rd Silverdale, Rangitoto Id, Ahipara, Lake Ohia and Levin. Possibly more widespread but mistaken for *T. pauciflora*. ERs 4, 9, 31.

Similar species: *T. pauciflora* but it has far fewer flowers, smaller plants and a yellow post anther lobe.

153. *Thelymitra caesia* Petrie. *Trans. & Proc. New Zealand Inst*. 51: 107 (1919) Late November early December.

Image: Albany Scenic Reserve ER9;


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154a


154b


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21 Nov 2001.

Traits: *T. pulchella* agg. with up to 5 unscented *flowers,* lavender blue with blue-purple stripes. *Column*, pale violet. *Post anther lobe* is brown, bifid, and in-rolled. *COLUMN ARMS*, HOLLOWED PLATES, TAWNY, PECTINATE, STANDING ABOVE THE ANTHER, SHORT FIMBRIA ABOVE, SOME BIFID. *Anther* is broad and white with a prominent connective. *Pollinia* are white, friable and if not taken, will drop onto the *rostellum,* wide *stigma* and *labellum*.

Habitat: Trackside at Albany Scenic Res and at Campbells Bay Centennial Park. Historically at Birkdale-Glenfield Res. ER9

Similar species: other *T. pulchella* agg. A Kaitaia blue/mauve form has pectinations under and over flat column arms with two violet, diagonal stripes, down the column.

Notes: H.B. Matthews gave D. Petrie type specimens from Birkdale-Glenfield Res. Moore and Edgar included it with *T. pulchella* in the 1970 Flora.

154. a) *T. carnea* R.Br. Prodr. *Fl. Nov. Holland*; 314 (1810)

pink sun orchid. September to November.

Image: Lake Ohia ER4; 21 October 1998.

Traits: *plant* small, reddish with THIN FLEXUOUS *STEM*. *LEAF* VERY NARROW, ALMOST CYLINDRICAL, INNER FACE GROOVED. 1-5 *flowers*, salmon pink. Apex of *column* bright yellow, *post-anther lobe* fleshy, unevenly crimped, *COLUMN ARMS* FLESHY, WITH NO CILIA, margins toothed. *Anther cap* prominent, blunt, yellow.

Habitat: open scrubland and freshly disturbed subsoil.

ERs 3-6, 9-13, 16, 17, 20, 21, 24, 37-40, 46-49, 55, 56, 77, 80.

Rarity: not threatened.

154 b) *T. imberbis* Hook.f. Fl. Nov.-Zel. 1: 244 (1853) See J73:**24** early Oct.

Image: Te Paki ER3; 5 October 2000

Traits: A lemon yellow form of *T. carnea,* less robust, to 150mm tall with 2-4 *flowers* which open wider than the commoner pink form. For bee pollination? No intermediate forms occur although they flower together. *Floral bracts* and *peduncles* are pink.

ERs 3, 4, 48 (J83:31)

Habitat: In consistent colonies or singly from the far north to Katikati. Sandy soil or infertile subsoil in open tracks or roadsides but may stay dormant for several years.

Similar taxon: Pink *T carnea* s.s. has to have a hotter day to open but sprouts annually. Both have 2n=62 chromosomes.

Notes: Hooker was confident, in his 1853 description, less so in 1864. Cheeseman accepted it in 1906 and 1925 but saying it was usually flesh coloured and might be allied to *T. carnea*.

This amphidiploid hybrid between Australian blue *T. pauciflora* and yellow *T. flexuosa,* arrived in NZ already hybridised as *T. imberbis*. (Molloy & Dawson 1995) The yellow colour has remained dominant but structure remains remarkably constant for an amphidiploid. Perhaps only one or two clones arrived in New Zealand?

Rarity: much rarer than *T. carnea* s.s.

155. *Thelymitra* "Comet" Bill Liddy, J67:32; 71:**4** November December.

Image: Blowhard Res ER29; 5 Dec 1999.

Traits: Robust *plant* with ±7 fragrant *flowers*. Colour in the field, pale blue-mauve but may be pink in some potting mixes. *Column* similar to *T. malvina* but the forward yellow margin is Veed as in *T. longifolia* and has white cilia on the column arms.

Habitat: Poor subsoil, trackside near a ridge-top, Kaweka Ra ER 29.

Similar species: *T. malvina* has the extended post anther lobe but the margin is not Veed, it has mauve cilia and prefers wet ground in the far north.

Notes: Spreads vegetatively but will not set seed. Possibly a sterile back cross be-

tween amphidiploid *T. decora* and *T. longifolia,* one of *T. decora*'s parents. All three were flowering together at the Kaweka site.

156. *Thelymitra cyanea* (Lindl.) Benth. *Fl. Austral.* 6:323 (1873)

Striped sun orchid. November to March

Image: Karioi ER18; 7 January 2002

Traits: *LEAF* NARROW, FLESHY, 3 ANGLED in section. 1–6 *flowers*, dark blue, rarely pink or white. *Tepals* conspicuously striped; narrow in one form wide in another. *LABELLUM* LARGER AND WIDER THAN THE TEPALS, sometimes non-striped, the blunt apex sometimes wavy. The column LACKS A *POST-ANTHER LOBE*; a few bubble-like calli may be present between the upper lobes of the *column wings*, which are yellow, sometimes white, flattened, and turned or corkscrewed inwards LACKING CILIA, may have apices unequally bifid. *Anther* is exposed, its APEX CLEARLY BIFID.

Habitat: gregarious species, in gum-land scrub to lowland, common in montane bogs.

ERs 4, 5, 10, 11, 15-18, 21-23, 25, 27, 29-31, 38, 39, 43, 46-51, 54, 55, 57, 61, 65, 66, 68-74, 77-80, 83, 84.

Rarity: not threatened.

Notes: a white form with off-white stripes but yellow column arms occurs at Opuatia Swamp ER 11. (J100:**27**)

157. *Thelymitra* "darkie" D. McCrae, J24:10; 35:33; 62:**10.**

Oct far north, Nov at Albany.

Image: Surville Cliffs ER3, 19 Oct 1996.

Traits: A robust sun orchid with a VEE SECTION *LEAF*, opens only on the hottest days. A dark purple *stem* has three bright green *bracts*. Four or more purple/violet *flowers*; mid sepals have a darker patch of violet. A pink form occurs. (Pers. comm. B. Molloy). *Column* is mauve with a bright yellow, horseshoe shaped post anther lobe from above and a near black saddle behind. White *column arms* converge with sparse, crinkled, white cilia; often with a few mauve cilia at the rear.

Habitat: Damp to wet ground in the far north, Lake Ohia to the Surville Cliffs. Also at Albany Heights and one reliable report from each of Kaitarakihi Bay, Manukau Harbour and Iwitahi. ERs 3, 4, 9, 17.

Similar taxa: *T.* "Ahipara" with the same 2n=60 chromosome count, and general appearance but is paler coloured in all features, has that *Ixia*-like fleshy leaf, flowers mature a month later but haven't been reported to open in nature and it prefers a standing-water habitat.

Notes: A few sightings south of Kaitaia indicate that the taxon is widespread but needs a particularly warm spot before putting up a stem. Albany plants have pale stem and bracts like *T.* "Ahipara"

158. *T. decora* Cheeseman. *Man. New Zealand Fl.* 1151 (1906) Oct to Jan.

Image: Iwitahi ER17; 13 December 2003.

Traits: wide channelled, keeled *leaf*, up to ten, 15mm *flowers*, dark blue to mauve/pink or rarely white, with DARK BLUE SPOTTED *PETALS*, rarely unspotted. *Tepals* cupped. BACK OF THE *COLUMN* STUDDED WITH VERY DARK, CONSPICUOUS WARTS. *Column* normally pale pink; dark purple on the hooded *post-anther lobe*, usually with a horseshoe of bright yellow around the opening. Mutated forms are common in the subalpine.

Habitat: dappled or full sun; scrub or forest margins. Montane to subalpine.

ERs 10, 13, 16-18, 29, 38, 39, 43, 47, 65.

Rarity: not threatened.

Notes: An amphidiploid hybrid of *T. longifolia* and *T.* aff. *ixioides,* (Molloy & Dawson 1995) and thus variable. Features of each parent show to varying degrees in different specimens.


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159a


159b


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Similar species: Unspotted blue *T. nervosa* with lightly channelled post anther lobe.

159. *T.* x *dentata* (Moore) sterile back-cross, (Molloy & Dawson 1995) Nov-Jan.

Images: J Rolfe; Dobson Tk ER39; 23 December 2007.

Traits: a sterile back-cross between *T. longifolia* and one of the forms of *T. pulchella*, robust; up to six 15mm *flowers*, pink to blue to white, HEAVILY STRIPED; *COLUMN ARMS* BENT INWARD WITH TOOTH-LIKE LOBES TOWARDS THE BASE, grading to yellow cilia above; *post-anther lobe* warty, reddish, yellow edged.

Habitat: gum-land scrub, pakihi, damp clay banks. ERs 11, 12, 17, 38, 39, 46, 48.

Rarity: not threatened.

Notes: the various colour forms in this sterile hybrid imply several crosses between varying forms of the parent species.

160. *Thelymitra fimbriata* Colenso. *Trans. & Proc. New Zealand Inst*. 22: 490 (1890) October Nth.- January Sth.

Image: Roadside, Kaeo ER6; 21 Oct 1998.

Traits: *T. pulchella* agg. but with FIMBRIA ON THE *COLUMN ARMS*. *Leaf* linear acuminate ±160 x 12mm. *Peduncle* ±650mm, two sheathing *bracts*, up to five, well spaced flowers which can all open together. Unscented *flowers* ±30mm broad, blue to blue-mauve with darker stripes which may be few to zero on the *sepals*. White flowers with blue stripes at Karamea J68:25. *Column's post anther lobe* is very dark with warts at the back, yellow to red-brown at the front rolled under in mature flowers and somewhat cleft at centre. Two *column arms* per side, usually; top ones inward cupped with yellow fimbria, white at Cave Ck, Westport J104:28,**32**, lower ones short to long, acute, naked but some near National Park have a few fimbria. *Anther connective* is white, protruding between column arms. *Pollinia* off white, often crumbles onto its own *stigma*.

Habitat: Lake Ohia, far north to at least Fortrose in the far south.
ERs 4-6, 9, 18, 38, 46, 48, 50, 68, 70, 72, 78.

Similar species:
i) *T. pulchella* s.s. which lacks the cilia on the column arms in the 1864 Hooker and 1906 Cheeseman descriptions.
ii) *T.* "sansfimbria" perfumed and lacking fimbria and stripes.
iii) *T caesia* with flattish column arms pectinate (comb-like) at the top.

Notes: One of the various amphidiploid hybrids of *T. cyanea* and *T. longifolia* (Molloy & Dawson 1995) usually lumped under *T. pulchella.* Cheeseman denied this species of Colenso's then described *T. pachyphylla* for plants with fimbria.

161. *T. formosa* Colenso *Trans. & Proc. New Zealand Inst*. 16:338 (1884) November to February.

Image: Erua ER18, 6 January 2001.

Traits: robust tall *plant* with WIDE, FLESHY, UPRIGHT, SHEATHING *LEAF*. Up to twelve 15mm *flowers*, blue or mauve with long narrow tepals often with yellowish tips. *Column* white, shading through a magenta band, to a yellow, salmon pink or red, fleshy, toothed, margin of a wide cleft and vestigial *post-anther lobe*; prominent toothed, *side lobules* and LONG TAPERED *COLUMN ARMS*, CILIA ABOVE, sometimes forked yellow to bright orange. *Anther* pale green; tip level with, but shorter than, the *column arms*.

Habitat: lowland to subalpine wetlands, scrub, open forest. Gt. Barrier to Stewart Id. ERs 9-11, 13, 16-18, 24-26, 28, 29, 35, 37-39, 46, 47, 49, 51, 55, 61, 65, 66, 69, 79, 80.

Rarity: not threatened.

Notes: column often has a triangular lobe (staminode) in front.

162. *T.* aff. *formosa* "Opuatia"

Ian Reid J100:41 December.

Image: I. Reid, Opuatia ER11, Dec 1994.

Traits: *Plant* similar to *T. formosa* s.s. but is notable for growing near sea level, in the warm north, has BRIGHT RED CILIA ON THE *COLUMN ARMS* AND EXTRA RED CILIA ON THE *POST ANTHER LOBE*.

Habitat: Opuatia Swamp. ER 11.

Similar species: *T. formosa* s.s. which prefers subalpine habitat, has yellow cilia as a rule (orange at Ngaere) and no cilia on the post anther lobe of the column.

Notes: Has been lumped with *T. formosa* but varies somewhat from that.

163. *Thelymitra hatchii* L.B. Moore

New Zealand J. Bot. 6:477 f2 (1969) November to February.

Image: Erua ER18; 6 January 2001.

Traits: stiff upright *plant* like *T. formosa* but usually smaller; up to six 15mm *flowers*, pale to deep mauve. *COLUMN MIDLOBE* DARK REDDISH BROWN TOWARDS THE YELLOWISH, RATHER RAGGED, TRUNCATE APEX. Cilia on *column arms* usually yellow, sometimes white or pink. The column may have a triangular process at the front of the base.

Habitat: lowland to subalpine, dry clay banks, in gravel, under scrub or in bogs. ERs 9, 11-13, 16-18, 20, 21, 24-26, 28, 29, 31, 33, 35, 36, 38-40, 46-50, 53-58, 61, 65-67, 69-73, 77-79.

Rarity: not threatened.

Notes: *T. hatchii* is an endemic amphidiploid hybrid (Molloy & Dawson 1995) of *T. formosa* and *T. longifolia*. Both parents being variable explains why *T. hatchii* is likewise.

164. *Thelymitra intermedia* Berggren

Minneskr. fisiog. Sallsk. Lund 8: 21, t.5, 21 f (1878) October to November.

Image: Hatfields Beach ER9; 31 Oct 1999.

Traits: base of *stem* red-stained; *leaf* broad, arching, V shaped in section, not ribbed. Up to seven dusky pink to bluish *flowers*. Upper *column* bronze/brown, occasionally red, the apex blunt (not in-turned as in *T. pauciflora* and not tapered), yellow. BACK OF *COLUMN* FORMS ONE CONTINUOUS CURVE, LACKING THE SHOULDERS USUAL IN *T. PAUCIFLORA*. CILIA SPARSE white.

Habitat: Lowland to montane, the typical *Thelymitra* of the northern offshore islands, common in peat-bogs, gum-land scrub and clay banks, forests. ERs 2-6, 8-13, 16, 17, 20, 21, 25-27, 29, 35, 37-40, 46, 47, 56-58, 61, 62, 65, 66, 69, 70, 73, 77-79.

Rarity: not threatened.

Notes: close to *T. pauciflora*, with similar distribution, column arms turned up and adjacent at the tip but has more flowers and lacks the split post anther lobe, its near black saddle and the darker blue tepals.

165. *Thelymitra* aff. *ixioides* M. A. Clements, J34:3; 86:**10.**

or NZ spotted sun orchid Oct. to Nov.

Image: Hewetts Res ER5; 9 October 2002.

Traits: Self/*Thrips* pollinated, blue spotted sun orchid, endemic to NZ. 2-8 *flowers* on a *stem* 230-450mm tall, opens only on warm sunny mornings. Up to 20 spots on each *lateral petal* are each slightly raised and indigo; a few may show on the *dorsal sepal*. *Sepals* have a wide brown stripe outside camouflaging the unopened buds. The *column* is broad and bluish at the base. A purple band above with red-orange *side lobules* and a yellow to orange *post anther lobe* surrounded by near black, stout needle tips. Near straight *column arms* with pale mauve to white cilia, converged at the tips.

Habitat: scrubby tracksides often on ridges sloping south. ERs 3-6, 8-13, 15-18, 30, 35, 38, 39, 46, 48, 50, 56, 60.

Similar species: *T. ixioides* the Australian ancestor, arrived in NZ with no pollinator

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so had to adapt to self/*Thrips* pollination.
Notes: *T. decora* & *T. nervosa* are amphidiploid hybrids with *T.* aff. *ixioides* as one parent. (Molloy and Dawson, 1995) so cross pollination has occurred.

166. *Thelymitra longifolia* J.R. Forst. & G. Forst. *Char. Gen. Pl*. 98 t.49 (1776).

maikuku October to December.
Image: Lee's, Awhitu ER9, 17 Dec 1998.
Traits: mature *plant* with BROAD, RIBBED, VERY LONG *LEAF* which often lies flat on the ground. Young plants have more erect concave leaves. *Flowers* usually white, sometimes pink. *POST-ANTHER* LOBE DARK, HOODED, WITH A YELLOW (ALL BLACK AT TIMES) EMARGINATE MARGIN. *COLUMN* ARMS WITH SHORT, DENSE, TANGLED, WHITE (SOMETIMES CREAMY) CILIA, LIKE COTTON WOOL, tightly pressed against (but shorter than) apex of *column*. Pollinia remain behind the stigma as the anther extends. Thrips/self pollination follows as thrips carry off pollen grains stuck to them and pollinia crumble over the top of the stigma.
Habitat: widespread in forest, including Norfolk Id, possibly introduced from NZ, sunny banks, scrub, and tracksides.
ERs 2-31, 33-43, 46-51, 55-58, 61-67, 69, 70, 72-74, 77-80, 83.
Rarity: not threatened.
Notes: Thrips, known pollinators, appear to feed on the friable pollen. Self pollination is only a successful fall-back system. An alba form occurs in the Kaweka Ra, ER29, with an all-yellow post anther lobe with faint green on sepal backs, instead of the usual purplish brown.

167. *Thelymitra* aff. *longifolia* "norm"

Beryl & Bob Goodger, J15:3, late September-December.
Image: Surville Cliffs ER3; 19 Oct 1996.
Traits: A sun orchid apparently adapted to insect pollination from the endemic, self-*Thrips* pollinated *T. longifolia* which it is supplanting in the far north. The *leaf* can be even broader and longer than on its namesake's. It opens up to 20 *flowers* at once on warm to hot days, is perfumed to some noses and has several forms, coloured from white to orchid pink with purple-brown sepal backs. Alba forms at Scott Pt and Comet Tk, have sienna *post anther lobes* (not the usual black) and pale green *sepal backs*. Another form has pale blue lines across mid *tepals* giving a blue halo appearance. Mostly the column is much the same as *T. longifolia* but there are variants. One white flower has a deeply notched post anther lobe, another darkens the yellow post anther lobe to orange in maturity.
Habitat: Far north trackside and well lit scrub, tailing off southwards in the N.I.
ERs 3-6, 9, 10, 21, 28, 38.
Similar species: *T. longifolia* but it only opens 1-3 flowers at a time in full sun, is self/*Thrips* pollinated and non-perfumed.
Notes: Young native bees are said to be the pollinators, mistaking the flowers for manuka. They get no nectar and cannot pack the pollinia into leg pockets so get no reward and anecdotally, soon learn their mistake after 2 or 3 tries. That trickery must contribute to the success of these taxa.

168. *T.* aff. *longifolia* "stunted"

E. Scanlen J86:10,**12**, Oct. Nov.
Image: Te Paki ER3; 10 October 2002.
Traits: 50-100mm green/purple *stem* with three or more white *flowers* ±17mm across. The *leaf* is helical, only ±4mm wide, Vee section and variable greenish purple. *Column* is longifolia-like but the post anther back is a bright reddish brown.
Habitat: Numerous on sandy track-sides at Scott Pt. ER 3.
Similar species: *T.* aff. *longifolia* "norm" except for its size, leaf form and post anther

lobe of the column.

Notes: This short taxon is common but was earlier take to be malnourished-in-the-sand, until healthy flowers were found open on a warm sunny day. Stem length may vary with available nutrients. R.H. Matthews sent short stemmed forms to Cheeseman on 19 Sept. 1899 from Kaitaia but gave only brief details in his letters such as 1″-2″ tall, pale pink. His Jan 1903 specimens had twin leaves. He got no evident response from Cheeseman as Matthews wrote in his letter to him of 5 Oct. 1903. (Scanlen 2006)

169. ***T. malvina*** M.A. Clem., D.L. Jones & Molloy. *Austral. Orchid. Res.* 1:141 (1989) pink whiskers. Oct to Nov.

Image: Lake Ohia ER4; 25 October 1998.

Traits: *Plant* tall slender, often solitary. *Flowers* mauve to blue, perfumed, *tepals* large, narrow, open wide on still, sunny, days. *Post-anther lobe* of column hooded, narrow, SHAPED LIKE AN INVERTED SCOOP, purplish brown, apex yellow. Pale mauve cilia on *column arms*.

Habitat: in wetlands, many on ancient rotting kauri stumps at Lake Ohia.

Rarity: naturally uncommon, range restricted. ERs3-6.

Notes: seems to thrive in anaerobic substrate like rice.

170. ***T. matthewsii*** Cheeseman *Trans. & Proc. New Zealand Inst*. 43: 177 (1911) the spiral sun orchid. August-September.

Image: Te Paki ER3; 4 September 2000.

Traits: *LEAF* DARK GREEN, STIFF, HELICAL, EXPANDED AT THE SHEATHING BASE. Single *flowered*, rarely twin, purple and veined inside, buds green. *Column* mauve with NO POST-ANTHER LOBE. BULBOUS, NAKED YELLOW *COLUMN ARMS* REACH OVER A LARGE YELLOW *ANTHER*. Unlike most *Thelymitra*, the pollinia remain in the anther as the column lengthens while in bud. When the flower opens, the pollinia, still attached to the viscid disc, drop out at the first puff of wind onto the stigma below.

Habitat: found in bare alluvium of sandy silt, protected from the wind, north facing and remote from browsers. ERs 3 & 4.

Rarity: naturally uncommon, sparse.

171. ***Thelymitra nervosa***. Colenso *Trans. & Proc. New Zealand Inst.* 20: 207 (1888) October to early November.

Image: Hatfields Beach ER9; 30 Oct 1999.

Traits: A typically robust *plant* with three or four violet blue *flowers*. *Tepals* are deep violet at the tips shading to almost white at the base. The column's *post-anther lobe* has a yellow horseshoe rim and a dark shoulder traversed by several shallow grooves.

Habitat: damp to swampy areas, Motutangi, Hatfields Beach, Tongariro lower slopes, Horopito, Mt Herbert, Jollies Pass, Banks Pen and Shag Pt Dunedin. ERs 4, 9, 18, 43, 46, 65, 67.

Similar species *T. decora* Cheesem. with dark blue spots, dark warts on the back of the column, colour varies from deep blue to mauve to pink.

Notes: A colony at Hatfields Beach was visited by a frustrated native bee mistaking it for the similar looking wild irises nearby. A black thrips, stuck to the stigma, matches one seen at Shag Pt. in another flower. These same thrips have been caught with pollen adhering in other *Thelymitra* with friable pollen. The Hatfields, site was inspected for several years without the plants reappearing above ground.

172. ***T. pauciflora*** R.Br. *Prodr. Fl. Nov. Holland;* 314 (1810) Nov Dec.

Image: Bombay ER9; 8 November 1995.

Traits: A sun orchid with up to six flowers. opening on warm, sunny days only. If opening has been delayed by cool wet weather, it self pollinates before opening.


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Flowers are deep blue to blue/mauve with some mauve/pink ones in the south. *COLUMN* HAS A SPLIT YELLOW *POST ANTHER LOBE* with a near black shoulder behind. *Column arms* have upstanding white cilia at the tips. Pollen is white and friable.

Habitat: Upper N.I. mainly also south to Mavora and in the Chathams. Damp soil on road batters, tracksides, in scrub and well lit bush, swamp edges to ridge tops, in moderate rainfall areas. ERs 2-13, 16-18, 20-21, 23-26, 28, 31, 35-36, 38-39, 46-50, 56-57, 61, 63, 65-66, 68-69, 72-73, 77, 80.

Similar species

i) *T.* "scaphifolia" with orange post anther lobe and up to 32 flowers,

ii) *T. intermedia* is a paler, lilac blue with a Vee notch, not a split to the red/brown post anther saddle; flowering in Oct. Nov.

iii) *T. nervosa* with no split in the post anther lobe, flowering in Oct. Nov.

Notes: Australia also has forms with many more larger flowers, opening readily for insect pollination. A November flowering, scented form is at Waipapakauri.

173. *T. pulchella* Hook.f. *Fl. Nov.-Zel.* 1:244 (1853) or maikaika Nov-Dec.

Image: Lake Ohia ER4; 5 Nov. 1995.

Traits: *plants* may be solitary or growing in clumps; wide, keeled *leaf*. Two to ten heavily striped, unscented *flowers*, mostly blue; pink in the Kauaeranga. *COLUMN ARMS* PAIRED, FLAT, POINTED, TOOTHED BLADES, QUITE LACKING FIMBRIA OR CILIA, upper arms longer than the lower. White *anther* and connective about level with the yellow, in-rolled margin to the bifid *post anther lobe* with a warty dark shoulder behind.

Habitat: sea level to montane, wetland to damp scrub on ridge tops. ERs 3, 4, 5, 10.

Rarity: not threatened.

Notes: amphidiploid hybrid of *T. cyanea* and *T. longifolia* whose variabilities are heightened in the progeny.

Similar taxa: *T. caesia, T. fimbriata* both with fimbria and scented *T*. "sansfimbria" with neither fimbria nor stripes but all are said to be in the same amphidiploid aggregate (Molloy and Dawson, 1995).

174. *T. purpureo-fusca* Colenso. *Trans. & Proc. New Zealand Inst.* 1885, 17: 249 December.

Image: Tarawera ER27; 4 Dec. 1999.

Traits: *T. longifolia* agg. *Plant* late flowering, slender, purplish-red, 200-250mm tall, *leaf* 4-8mm wide to 250mm long, 3-5 white *flowers* 13mm broad. *Sepals* purple-brown edged with green and with a yellow midrib but white margins. *Petals* white or pale pink. *Labellum* smaller than the tepals. *Column,* pink, dashed with blue. *Post anther lobe* emarginate, in-curved, edged with yellow; may be below the *column arms* and their felted white cilia.

Habitat: In clumps in beech forest, scarified roadside at Tarawera or dry hills. ERs 9, 27, 37, 39, 68.

Similar taxa

i) *T. longifolia* is a larger plant with a longer, wider leaf and cilia below the post-anther lobe.

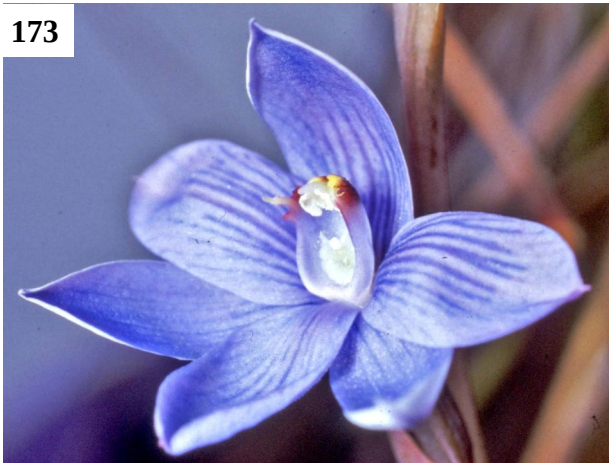
ii) *T.* "Whakapapa", of equal size with cilia edging above the post-anther lobe in some fresh flowers.

Notes: A variation of *T. longifolia* which Colenso thought worthy of specific rank. It must be more widespread but will undoubtedly have been reported as *T. longifolia.*

175. *Thelymitra* "rough leaf" Doug McCrae, J24:11; 77:**22** October.

Image: Te Paki; 6 October 2000.

Traits: Up to five orchid pink *flowers* open only in hot sun. *Leaf* feels like 100 sand-paper for the first rub or two. Purplish, acuminate *floral bracts* clasp the *ovaries*. *Sepal* backs have a central wide brown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stripe with whitish margins. *Column* is white with white cilia on *columns arms*. *Post anther lobe,* yellow helmet with two blunt teeth on each side and a pale red-brown patch on the back. *Anther cap*, creamy, recessed. *Pollinia,* white friable, as in most self/*Thrips* pollinated sun orchids.
Habitat: North of Whangarei at Hewetts Res, Te Paki and the Surville Cliffs in sandy or silty tracksides. ERs 2-5.
Similar species: *T.* "sky" with fewer, sky blue flowers, similar column but with less red/brown on the back.
Notes: Highest *Thelymitra* chromosome count in NZ of 2n=84 (Dawson et al 2007)

176. *Thelymitra sanscilia* Irwin ex Hatch. *Trans. & Proc. New Zealand Inst*. 79: 397 plate 81 B-E (1952) October

Image: K, Matthews, Peria ER5; 3 Nov 07
Traits: generally resembles *T. pauciflora* but the SICKLE-SHAPED *COLUMN ARMS* HAVE FEW OR NO CILIA. Tall, multi-flowered plant with rusty red stems and an erect green leaf. The *POST-ANTHER LOBE* IS SPLIT FRONT TO BACK and edged with yellow.
Habitat: lowland, damp tea tree scrub on sunny tracksides. ERs 3-5, 9.
Rarity: naturally uncommon, sparse.
Notes: close to *T. pauciflora.* Both have 2n=26 chromosomes.

177. *Thelymitra* "sansfimbria" Kevin Matthews, J98:**36.** November December

Image: K Matthews, Kaitaia, 30 Nov 2005
Traits: *T. pulchella* agg. Slender sun orchid with up to five PLAIN BLUE TO BLUE-MAUVE, PERFUMED *FLOWERS. Column* is pale blue shading up red, to dark red, warty collar behind the bifid, yellow *post anther lobe*. White or yellow tipped, bifid red *column arms*, devoid of fimbria/cilia, extend ±level with the white *anther connective*.
Habitat Kaitaia, Warkworth, Oxford, dappled shade in marshy areas. ERs 4, 5.
Similar species:
i) *T. pulchella* also lacking fimbria but has unscented striped flowers;
ii) *T. fimbriata* with cilia and/or fimbria but unscented, violet striped flowers.
Notes: Scented to attract pollinators but friable pollen drops onto its own stigma in fall-back self-*Thrips* pollination. R.H. Matthews' 12/12/04, specimens to Cheeseman got no response. T Pendrigh reported a stripeless *T. pulchella* from Oxford in N/L 25:10. Bruce Irwin (Tyler, p707) drew one from Warkworth in November 1985.

178. *Thelymitra* "sky" Allan Ducker, J58:36; 70:**33,34** October

Image: Te Paki ER3; 24 October 1998
Traits: Slender sun orchid with up to 3 or more sky blue *flowers*. Blue *tepals* shade to white at the bases. *Floral bracts* are purplish, acuminate, apiculate, clasping the ovaries. *Column* is white to pale mauve with SIENNA DOTS BEHIND and a YELLOW HELMET-LIKE *POST ANTHER LOBE WITH* TWO BLUNT TEETH ON EACH SIDE. *Column arms* have white cilia fanned around their tips and above. Pale yellow *anther* is well back in the flower; *pollinia* are white and friable.
Habitat: Lake Ohia, Motutangi north to Cape Reinga, dappled shade on track-sides in poor sandy to silty soils. ERs 3-5.
Similar species: *T.* "rough leaf" with its rough leaf and a like column but with a red/brown saddle. Flowers are orchid pink, larger and more numerous.
Notes: One white colony by the Shenstone Tk, diminished year by year as kanuka shade became too much for this sun orchid. Another white specimen at Cable Bay had pollinating black *Thrips* inside.

179. *Thelymitra tholiformis* Molloy & Hatch *New Zealand J. Bot.* 28: 111 f.6 (1990) November-December

Image: Albany Scenic Res ER9; 2 Dec 96

Traits: slender *plant*, strap-like narrow, concave *leaf*, slender blue green stem; 1–8 plain blue to mauve (often pale) *flowers*. Similar to *T. aemula* in colour, habitat, self pollination and shy flowering but differs in having 2n=66 chromosomes (not 40) a broader, almost closed, tall yellow, DOMED *COLUMN TOP* with obscurely toothed margins, but LACKING SIDE LOBULES. *COLUMN ARMS* ARE BENT SHARPLY INWARD jamming the dense bunches of cilia together.

Habitat: scrub land . ERs 3, 5, 6, 8-11, 17.

Rarity: declining.

Notes: Amphidiploid hybrid of *T. aemula* & *T. pauciflora*. (Molloy & Dawson 1995).

180. *Thelymitra* "tholinigra" E. Dan Hatch, J85:10,**15** October.

Image: Te Paki ER3; 2 October 2002.

Traits: Robust *plant* ±430mm tall with dark purple *peduncle* and blue-grey *ovary*; ±12 perfumed *flowers* with up to three open at once. *Lower bract* green, *upper bract* purple. *Leaf*, ±300 x 10mm, three angled cross section; olive green with three purplish ribs, linear lanceolate. Ribbed *ovary* is blue-purple to brown-purple, clasped by acute, dark purple, *floral bracts* some with a narrow white margin. *Flowers* white, largest in NZ *Thelymitra*, to 42mm diam. *Sepal* outers have a blue-purple centre shading from brown to green to white at the margin. *Petals* and *labellum* can have a band of streaky violet $^{1}/_{3}$rd. from the bases, making a notable purple halo around the column. *Column* is pale mauve with a pom-pom of tangled white *cilia* on short *column arms*. Black, tuberculate bonnet-like *post anther lobe*, the tuberculate brown margin, drawn in as if by a draw-string. *Rostellum* like a jug spout. *Anther cap* creamy not prominent. *Pollinia*, off-white drops in a mass onto its own stigma.

Habitat: Rare at Rubbish Dump Hill, Te Paki; Kaitarakihi Res, Huia; lowland, manuka scrub, dappled sun. ERs 3 & 9.

Similar species

i) *T.* aff. *longifolia* for perfumed flowers but columns etc differ considerably.

ii) *T. purpureo-fusca* but it is paler, smaller and has a *T. longifolia* form of column.

Notes: Rüpp & Hatch (1946) confused Australia's blue to pink *T. aristata* with its similar column, with *T.* "tholinigra" in the Waitakere Ra. Putative hybrids with *T. longifolia* are also at Kaitarakihi Res.

181. *Thelymitra* "Whakapapa" J.B.Irwin, J54:2, 83:**16** January.

Image: Waitonga Falls ER18; 30 Jan 1999.

Traits: Small, subalpine *plant* ±150 tall with ±five relatively large, white *flowers,* sprinkled with purple specks, open mostly singly. *Leaf*, narrow, arching V-section. *Flowers* ±20mm diam. *sepals* narrower than *petals*, pale mauve shading to white margins. *Petals* can have a band of streaky mauve $^{1}/_{3}$ rd up from base making a mauve ring around the column. *Column* white speckled with purple near the base, column arms short and bent up, with tangled white cilia obscuring the post anther lobe. *Post anther lobe* has a very dark shoulder behind a bright yellow, rounded and Veed forward margin

Habitat: N. Ruapehu, Mt Taranaki, track and roadsides in poor soil. ERs 18, 25, 38.

Similar species: *T. longifolia* for the column and *T. tholinigra* for the violet halo.

Notes: The first Whakapapa colony Irwin found had 90° spurs at the upper corners of the column. These show less to zero in other specimens. Some retain pollinia in the anther cap, others have pollinia dropped behind the stigma in *T. longifolia* fashion.

182. *Townsonia deflexa* Cheeseman *Manual New Zealand Fl.* 692 (1906) The creeping forest orchid. December.


179


180


181


182


183


184a


184b

Image: Mangawhero Falls ER18; 4 December 1998.

Traits: Up to 100mm tall. Was called *Acianthus viridis*, but, unlike *Acianthus,* it has a creeping rhizome which also bears tubers. *Leaves* of two types; a petiolate round leaf with crenate margins rising from the *rhizome* and an elliptic, sessile *bract* about half way up the *peduncle*. 1–4 horizontal, greenish, 5mm flowers. *Dorsal sepal* and *labellum* broad, *lateral sepals* longer and keeled, *petals* short and upright.

Habitat: in deep, mossy, montane to high subalpine beech forest. In *Pinus nigra* plantation at Karioi, ER 18.
ERs 10, 18, 26, 38, 39, 46, 48, 49, 51, 53, 66, 73, 77, 79, 83, 84.

Rarity: at risk, sparse.

183. *Waireia stenopetala* (Hook.f.)

D.L.Jones, M.A.Clem. & Molloy *Orchadian* 12(6): 282 (1997)
The yellow beak. December- February

Image: Longwood Ra ER77; 18 Jan 2004

Traits: *plants* usually 100–200mm tall with 2 stiff *leaves* and 2–3 green, conspicuously hooded *flowers*, often marked with red or brown, 10–20mm long.

Habitat: in damp alpine/montane scrub and herb-fields.
ERs 18, 36, 38, 43, 46, 48, 50, 51, 53, 56, 61, 66-70, 72, 74, 77, 79, 83.

Rarity: not threatened.

Notes: It was *Lyperanthus antarcticus* from 1847 to 1997.

184. *Winika cunninghamii* (Lindl.)

M.A.Clem. D.L.Jones & Molloy. *Orchadian* 12(5): 214 (1997)
or Winika. Dec-Jan.

Images: a) Hunuas ER9, 4 January 1999.
b) A. Ducker's, Te Atatu 21/1/97

Traits: BRANCHING, yellowish canes can grow to 2m from matted roots with no pseudobulbs. Lady slipper *buds*, in pairs, open to 30mm white *flowers* with 4-5 yellow/green, purple topped ribs mid *labellum*, side lobes and *column* usually purple but green may replace the purple in varying degrees.

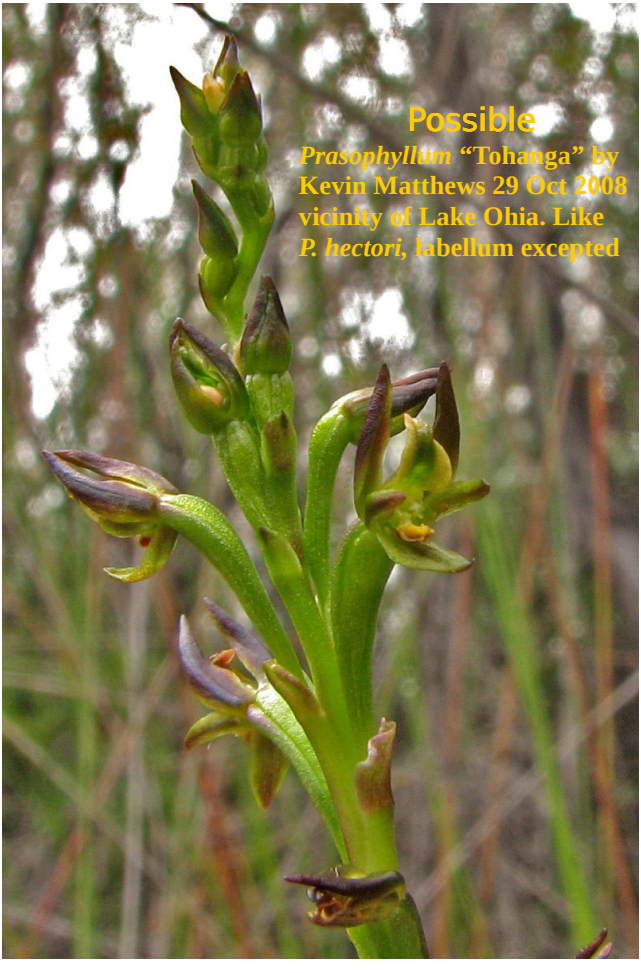
Habitat: high rainfall areas , on many trees and rocks. ERs 3, 5-17, 19-25, 28, 31, 33, 35-41, 46-50, 69-72, 77, 79, 80.

Rarity: not threatened.

Notes: *Dendrobium cunninghamii* from 1835-1997. *D. lessonii* Col. a lowland lithophytic form with short stems and strictly four yellow/green labellum ribs, is still being assessed.


Could be
Pterostylis subsimilis Col
by Mike Lusk from Sunrise track,
Ruahine Range 6 Dec 2007


Maybe
Thelymitra caesia
alternative
by Kevin Matthews
18 November 2005


Possible
Prasophyllum "Tohanga" by
Kevin Matthews 29 Oct 2008
vicinity of Lake Ohia. Like
P. hectori, labellum excepted

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GLOSSARY

acicular: needle shaped.
alpine: zone above the forest and scrub line
amphidiploid: hybrid with chromosomes equal to the sum of the diploid parents'
anthocyanin: plant colouring imparting red, violet, blue-green or green
apiculus: a short, slender ±flexible point
ciliate: fringed with hairs along the margin.
connate: where related parts are united
cordate: heart shaped, notched at the base
costa: a rib hence **costate** = ribbed
crenate: with margin in rounded notches
crenulate: with shallow, rounded teeth
diploid: a plant with twice the base number of chromosomes
disc: centre of the labellum, between lobes, usually termed **lamina** in Australian texts
emarginate: shallowly notched at the apex
entire: continuous margin, lacking teeth.
epiparasite: plant deriving nutrient from fungus, parasitic on the host plant
filiform: threadlike, very slender
fimbriae: fringe members
flexure: a bent part; turn; curve; fold
galea: helmet shaped portion of flower
glabrous: without hairs
hirsute: hairy with distinct hairs
hypochromic: lacking in anthocyanin
kairomones: plant scent to deceive and lure pollinating insects
laciniated: deeply divided into narrow pointed segments
lanceolate: lance-like
montane; lush mountain zone with some snowfalls in some winter
morphology: study of biological form and structure of plants and animals
mucronate: having a mucro or short, sharp tip to the midrib
mycorrhizal: symbiosis of fungus with higher plant
node: where a leaf is attached to a stem
non-resupinate: with labellum uppermost
nutant: nodding; drooping
orbicular: rounded outline; length = width
pandurate: waisted or violin shaped
papa: sandstone/mudstone
pectinate: like teeth of a comb
pakihi: poorly drained shrubby flat-land
pandurate: violin shaped with central waist
papilla: minute pimple-like process
pectinate: like the teeth of a comb
pedicel: the stalk of a single flower in a multiple flower head
peduncle: stalk of a solitary flower or of a head of flowers
petiole: leaf stalk
pheromone: animal sex attractant scent
pollinia: clumped pollen masses
pubescent: clad in short soft hairs
reniform: kidney shaped
repand: shallowly sinuate
retrorse: of hairs abruptly bent
retuse: apex rounded with a small notch
rostellum: column structure between pollinia and stigma
scape: a naked ±elongate peduncle
serrulate: minutely serrate
sessile: without a stalk
sigmoid: shaped like the letter "S"
sinuate: with shallow waves to the margin
sinus: recess between 2 lobes or segments
spathe: decorative bract at base of stem
stipe: in some orchids, a slender stem connecting pollinia to the rostellum
stipitate: on a slender stem like a stipe
subalpine: uppermost zone of forest and scrub, has regular winter snowfalls
subulate: awl shaped
sympatric: in coexisting areas
synsepalum: plate of connate sepals
taxon (plural **taxa)** species, variety or form
terete: circular section, onion leaf-like
tetraploid: a plant with 4 times the base number "x" of chromosomes
tomentum: a dense covering of soft hairs
tubercle: wart-like growth
turbinate: top shaped
turgid: swollen or distended
undulate: waved at 90° to the surface.

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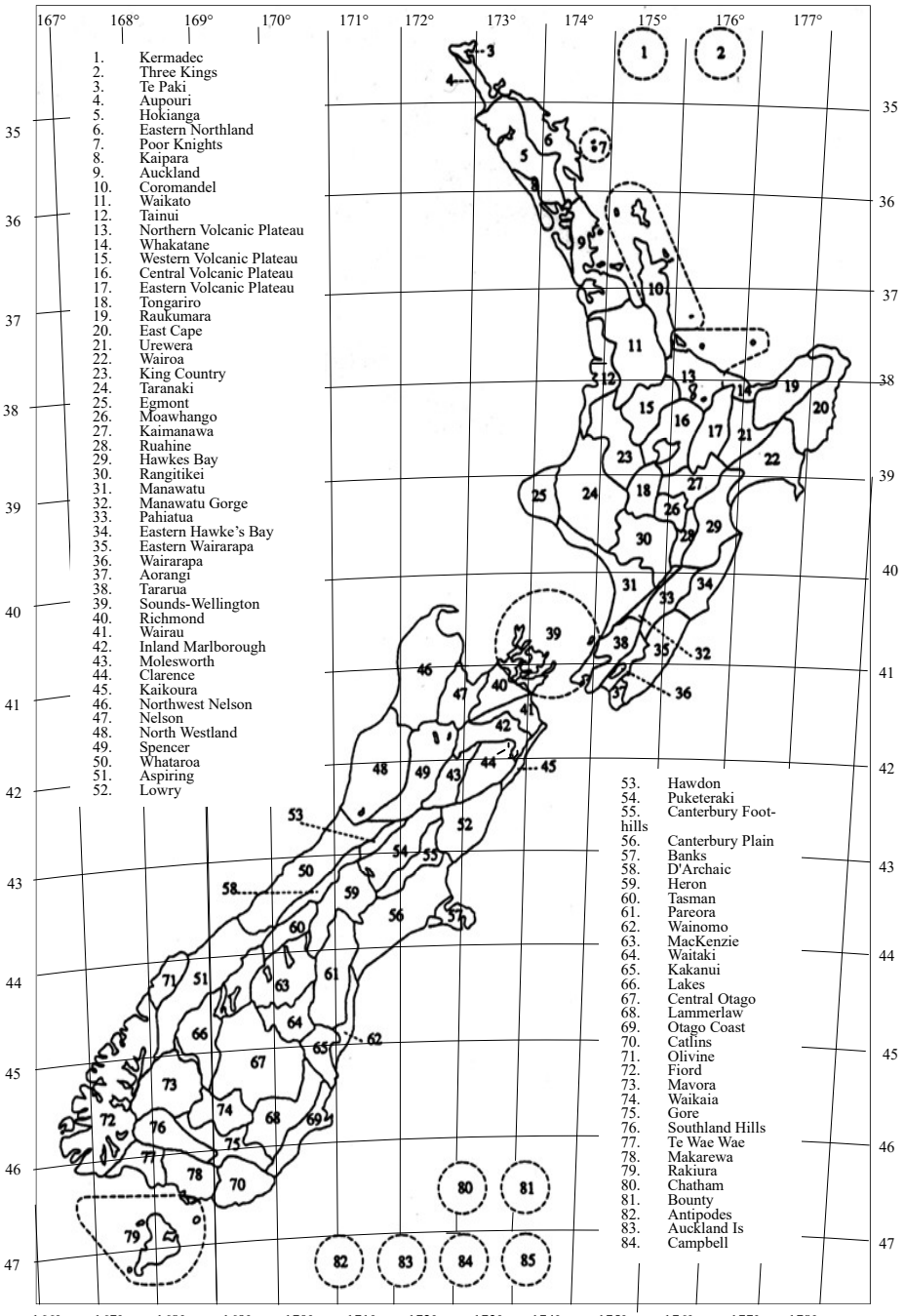
New Zealand Ecological Regions (ERs)



How many times have you seen a greenhood or spider orchid by a bush trackside or stream bank and wondered what it was? Or perhaps you saw blue sun orchids in some scrubby tea-tree? Greenhoods, spider orchids, sun orchids and many others are featured in this colour field guide: 113 classified species are included, but in addition 71 yet to be named and another 15 distinct forms are explained. An additional 3 possibles close the colour section, so that a total of 202 orchids are covered. Among these are some names that have been rejected in the past, but which we think warrant further consideration. Other mysteries are touched on briefly but the main aim of this field guide is for you to identify your orchids in the field.

The authors

Eric Scanlen started photographing native orchids as a hobby in 1965 with help from the late Dan Hatch and notably from Bruce Irwin. Then as a civil engineer, now retired, Eric kept running into orchids in Auckland's water supply headworks in the Hunua & Waitakere Ranges. Joining the NZNOG in 1993 broadened his interest to all NZ orchids including their close-up 3-D photography. Debates with experts and investigation of others new finds, continually sharpen this interest.

Ian St George is a practising medical doctor, editor of the New Zealand Native Orchid Journal since March 1987, specialising in the history of the orchids, their finders, describers and artists. He was the driving force behind the four successive field guides needed as classification changes and new finds made revisions necessary. Ian has written or co-authored two landmark books on NZ orchids and has assembled several historic monographs dealing with them.