



*The
New Zealand
Native
Orchid
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A range of colours and forms of *Orthoceras novae zelandiae*, photographed by Mark Moorhouse at the Astrolabe Roadstead (see "The Type Locality" in this issue)

The type locality

Ian St George

Orthoceras Novae-Zelandiae and the Astrolabe Roadstead

René Primavère Lesson (1794–1849) and his younger brother Pierre-Adolphe Lesson (1805–88) were born at Rochefort, on the coast north of the great French cabernet sauvignon region of Bordeaux. Some of their work relating to New Zealand is stored there at the Bibliothèque Municipale.

Historians have often muddled the two. RP Lesson was a French surgeon naturalist who served on the round-the-world voyage of Duperrey in *La Coquille* (1822–25), when he collected natural history specimens with his fellow surgeon Prosper Garnot and officer Jules Sebastian César Dumont d’Urville.

When they returned to France, d’Urville urged the authorities to make further explorations in the South Seas. As a result, the *Coquille* was renamed the *Astrolabe* and d’Urville was commissioned to command her. The *Astrolabe* sailed from Toulon in April 1826. On board were P-A Lesson, surgeon naturalist, who collected plants everywhere the vessel stopped, and the zoologists, Quoy and Gaimard.

The *Astrolabe* in New Zealand

D’Urville sighted the coast of the South Island in January 1827. He dropped anchor in the west side of Tasman Bay, in the stretch of water now known as the Astrolabe Roadstead and he named the sheltering Adèle Island after his wife (Figs 1, 8).

Ashore their artist de Sainson painted a charming scene of sailors washing their clothes (Fig.2)—and they collected a lot of plants. Later several new species were founded on the material obtained—but although new in the sense of being validly named for the first time, a number had been found earlier by Banks and Solander.



Fig. 1: The Astrolabe Roadstead

The orchids

Among these were three orchids: *Diuris* (*Orthoceras*) *novae-zeelandiae*, *Dendrobium biflorum* (*Winika cunninghamii*) and *Thelymitra Forsterii* (*longifolia*).

Among the works of the older brother RP Lesson at Rochefort, are watercolours of the first two of these orchids.¹ The *Orthoceras* drawing (Fig.3) is annotated “Nouvelle Zelande. D’Eroit de Cook. Janvier 1827” and the *Winika*, “Grandeur naturelle. Trouvee par M. D’Urville. Ile Tavai Poenamou. Anse de l’Astrolabe. (Baie Tasman. D’Eroit de Cook.) Nouvelle Zelande.” And in pencil in another hand, “Janvier, 1827”. (Natural glory. Found



Fig.3 Above: Pierre-Adolphe Lesson's watercolour of a rather scruffy *Diuris Novae-Zeelandiae*.

Fig.4 Right: Frederick Polydore Nodder's print of a plant found by Banks and Solander.

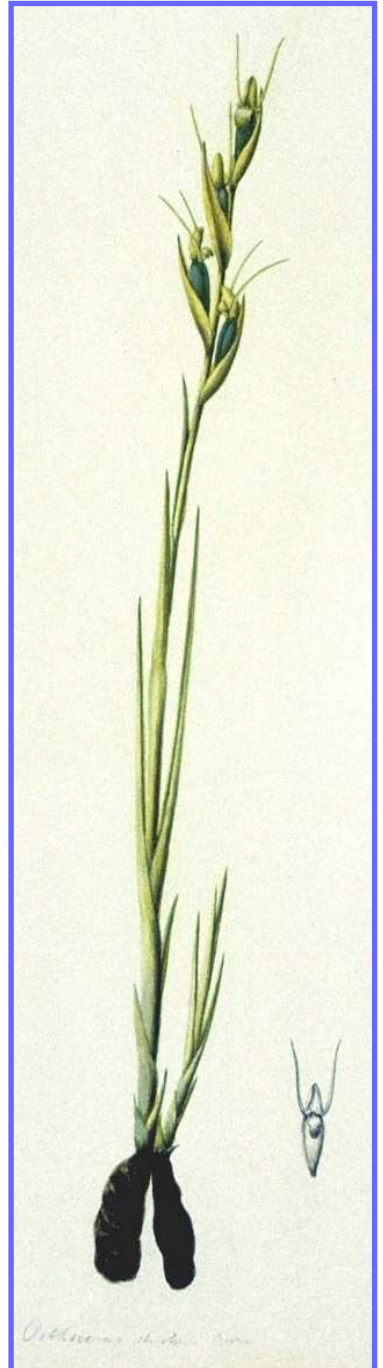




Fig.2: “Watering-place in Astrolabe Bight, New Zealand”

cialised more in butterflies and insects than in botanical subjects.⁸

But what was it A-P Lesson found?

The Astrolabe Roadstead today

Today the Abel Tasman National Park walkway runs along above the shores of the Astrolabe Roadstead. Mark Moorhouse walked that part of the track in January 2013 and sent the photographs shown on the cover and inside front cover

I have written before this [J92: 2–6] on *Orthoceras*, with the opinion that we have both *O. novae-zeelandiae* (with its short bracts and rounded labellum) and *O. strictum* (with long bracts and pointed labellum) in New Zealand, and that plants very similar to *O. novae-zeelandiae* also grow in Australia.

I am now more inclined to retreat to the reasoned and intelligent refuge of the lumper and to think we have one very variable species in New Zealand.

References

1. Fonds Lesson, Ms 8168 Res 1-C, ffo 211

by Monsieur D’Urville. Isle Te Wai Pounamu. Astrolabe Bay. [Tasman Bay. Of Cook’s Strait]. NZ).

Though they are with his papers, these are unlikely to be the work of RP Lesson, for it was Pierre-Adolphe Lesson who visited the South Island (Te Wai Pounamu) in the *Astrolabe* in January 1827.

Indeed, D’Urville recorded finding *Winika* in his diary entry for 16 January, when P-A Lesson accompanied him ashore on the third day of their visit—“Among the parasitic plants, I noticed some fine Epidendrum or Dendrobium.”² I can find no similar entry in his diary for the *Orthoceras*. Lesson’s diaries have not yet been published, but Isobel Ollivier’s translation is in the Turnbull Library: he wrote, “I found one orchid there” (on “hilltops and ridges”), “though it was not very abundant” and, of his plants numbered 82 to 84, “Found only on the mountains. At least Maïka that is the only place where I saw it. I later found two specimens on the shores of French Pass. A foot high at the most. See drawing.”³

Orthoceras was known to Māori as Maika or Maikaika.

Dan Hatch translated the Latin description of the plant (written by Achille Richard) some years ago (Figs 5, 6).⁴

Several artists and engravers were involved with the herbarium specimens in Paris to produce the Atlas plates;⁵ under the plate showing *O. novae-zeelandiae* and *T. longifolia* is the attribution “Vauthier pinx. Rebel sc. J. Tastu edit. Dumenil imp.” (Vauthier painted, Rebel engraved, J. Tastu published, Dumenil pressed it) (Fig.7). Antoine-Charles Vauthier was a natural history painter, born in Paris in 1790.⁶ Eleonore Sophie Rebel was a burin engraver of plants.⁷ Paul-Chretien-Romain-Constant Dumenil was a natural history painter who seems to have spe-

ORCHIDÆ.

DIURIS, Smith.

219. DIURIS NOVÆ-ZEELANDIÆ, Nob.

(Tab. 25, f. 1.)

D. foliis linearibus, basi vaginantibus, scapo dimidiò brevioribus; floribus 2-4 subsessilibus, spicatis; calycis laciniis lateralibus exterioribus linearibus erectis, superiore fornicatà acutà duplò longioribus; labello tripartito; lobo medio ovali lanceolato, lateribus conflexis basi uncarinato. Nob.

Crescit in Novæ-Zeelandiæ locis montosis.

DESCRPTIO.

RADIX : tubercula duo oblonga, carnosà, inæqualia, altero minore.

FOLIA radicalia linearia scapo dimidiò breviora, acuta, vix duas lineas lata, striata, glabra, basi vaginantia, vaginà membranacè laxà. Ad basin culmi, circa folia vaginæ adsunt 2-3, laxæ, acutæ, limbo foliaceo destitutæ.

SCAPUS rectus simplex, 8-10 uncias altus, teres, gerens folia 3-4 sensim longitudine decrescientia et ad vaginam tantùm versùs scapi apicem reducta.

FLORÆS 2-4 alterni in apice scapi subsessiles, bracteæ spathæformi carinatà acutà ovario longiori suffulti:

14*

Translation and notes by E.D.Hatch

p163. t25. fl
n219

Diuris novae-zeelandiae[*Orthoceras novae-zeelandiae*]

Root - of 2 oblong, fleshy tubers, one smaller than the other.

Leaves - basal, linear, acute, striate, glabrous, shorter than the scape, barely 2 lines wide; basal sheaths 2-3, sessile, lax, acute, membranous.

Scape - erect, unbranched, 8-10 inches high, terete, carrying 3-4 sheathing bracts, gradually diminishing in size towards the top of the scape.

Flowers - in a spike, 2-4, alternate; floral bracts sub-sessile, keeled, acute, longer than the ovary.

Ovary - ovoid, with twisted ribs. Dorsal sepal sub-rotund, striate, hooding over the column. Lateral sepals 2, ascending, linear, twice as long as the dorsal sepal. Petals 2, enclosed by the sepals, membranous, broad at the base, gradually narrowing to an oblique, truncate-emarginate tip, the lobes unequal.

Labelium - 3-lobed, spreading, the midlobe with an obtuse callus at the base. Lateral lobes shorter, obtuse, oblique, entire. Midlobe twice as long as the lateral lobes, sub-cordate, acute, with inflexed margins.

Column - very short, with 2 lateral membranous appendages, erect, acute, gradually broadening towards the base.

Stigma - in the form of thin plates on the front of the column, glandular, oval, erect, concave, placed in front of the base of the anther.

Anther - parallel to the stigma, terminal, oblong-cordiform, the tip acuminate, 2-celled. Cells with a single groove or cleft, dehiscing longitudinally.

Pollinia - 2, oblong, pollen-grains simple, powdery, easily dissolved.

Grows in NZ in hilly places.

Ovarium ovoideum contortum costatum. Laciniae tres exteriores valdè inæquales. Superior fornicata apice acuta, dorsò subrotunda, striata, genitalia obtegens; duæ laterales lineares duplò longiores ascendentes. Interiorum duæ laterales inclusæ, membranacæ, basi latæ, sensim et obliquè angustatæ, apice truncato-emarginatæ, bilobæ, lobis inæqualibus. Labelium tripartitum, patens; medio carunculâ seu carinâ obtusatâ versùs basin bicurri notatum, ecalcaratum; lobis lateralibus brevioribus obtusis, obliquis, integris, medio duplò longiori subcordato, acuto, marginibus inflexis.

Gynostemium brevissimum lateribus in duas appendices membranaceas erectas, basi latas sensim acutas erectas, ferè longitudine interiorum, productum. Stigma anticum instar lamellæ anticæ glandulosæ, ovalis, subacutæ, erectæ, basi concavæ, ante antheram sitæ. Anthera stigmati parallela, gynostemium terminans, oblongo-cordiformis, apice acuminata, bilocularis, loculo singulo sulco seu rimâ longitudinali anticè dehiscens.

Pollinia duo oblonga, simplicia, pulveracea, facilè solubilia.

OBSERVATIONS.

Nous croyons cette espèce nouvelle. Néanmoins, autant qu'il est possible d'en juger d'après une simple phrase caractéristique, elle nous paraît se rapprocher de *Diuris emarginata* de M. Brown. La figure et la description que nous donnons ici de notre plante pourront servir

à faire reconnaître si en effet elle est différente de l'espèce ci-dessus mentionnée.

Fig.5 Above.
Achille Richard's description of *Diuris (Orthoceras) Novæ-Zeelandiæ*.

Fig.6 Left. Dan Hatch's translation for No. 11 of the Group's *Historical Series*.



Fig.7: Vauthier's drawing (Rebel's engraving, Dumenil's print) of *Diuris* (*Orthoceras*) *Novæ-Zeelandiæ* and *Thelymitra Forsterii* (*longifolia*). Print from the *Atlas Botanique*.

- (*Dendrobium cunninghamii*) and 213 (*Orthoceras novae-zeelandiae*). Bibliothèque Municipale, Rochefort, France. I am grateful to Roger Collins of Dunedin for drawing my attention to this material.
2. Wright, Olive. New Zealand 1826-1827 from the French of Dumont D'Urville. Wingfield Press, 1950. p 78.
 3. Ollivier I. Alexander Turnbull Library Ms-Group-0078. From Muséum d'Histoire Naturelle, Paris Ms 62 P.A. LESSON : Botanical Notes.
 4. Hatch ED. In St George IM 1994. Miscellaneous early writing on the NZ orchids, Part 1: 1769–1832. NZNOG Historical Series No. 11, p68.
 5. Lesson A. and Richard A. Flore de la Nouvelle-Zelende: Atlas Botanique, 1832. In Dumont D'Urville. Voyage de la corvette l'Astrolabe.... Paris, J. Tastu, 1830-35.
 6. Belier de la Chavignerie. Dictionnaire des artistes de l'Ecole Française. L. Auvray.
 7. Benezit E. Dictionnaire des Peintres, Sculpteurs, Dessinateurs et Graveurs. Vol 7. Paris, Librairie Gründ, 1957. p 139.
 8. Benezit, Vol 3, p 398.

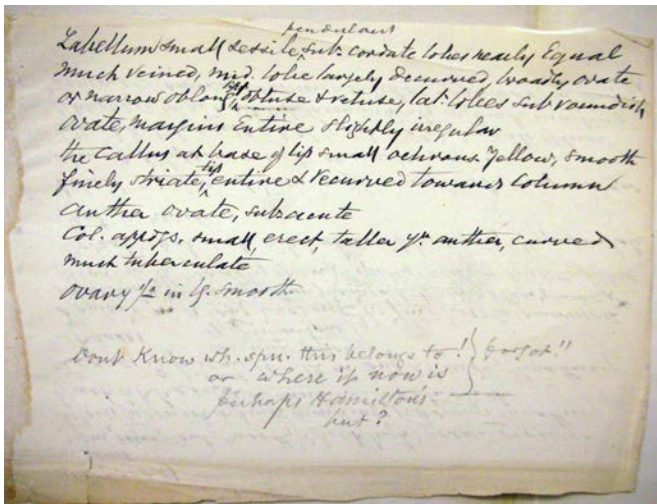
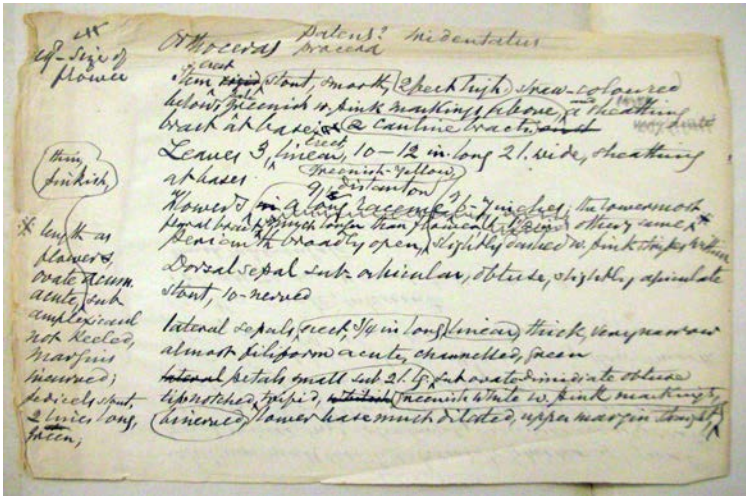


Fig.8: The Astrolabe Roadstead and Adele Island (Photographs by Mark Moorhouse).



"*Orthoceras patens?* *O. procera?* *O. tridentatus?*"

The Papa has ten of Colenso's botanical notebooks. Nine contain handwritten descriptions of the plants he formally described. In the backs of several are rough drafts, written on scraps of paper, newspaper wrappers, the backs of envelopes. Among these is a description of an *Orthoceras*, which was never published (probably mercifully!) because he had forgotten which specimen his description belonged to (see last note, in pencil)....



Only the tenth notebook contains a diary of his field trips (in 1884) into the forests of the Bush District. It makes fascinating reading.

Original papers

Are our *Pterostylis* identification markers reliable?

Three points to consider.

By Mark Moorhouse

1. The importance of synsepalum size, shape & position in linear-leaved New Zealand *Pterostylis* spp.

Clearly those *Pterostylis* species with porrect and semi-porrect synsepalums deserve recognition at specific level as they employ pollination mechanisms which are unique.

Regarding our subject matter Drs Moore and Molloy both supported Hooker's description of the lateral sepals of *Pt australis*. They described them as long, caudate and acuminate, "sts. considerably overtopping the galea, or bent strongly backwards." Other publications are not so specific, and the writer of one article [1] entirely refutes this [presumably because the opinion was not based on Hooker's *Pt. australis* ss. but rather some North Island taxon, maybe that of Hatch].

Dr Moore gave two options; very long upright or laid back synsepalum apices. Although having spent much time in the field she may not have done a specific study on this variation. [I stand to be corrected.] A lot of weight has been placed on lateral sepal position in larger New Zealand *Pterostylis* but I'm unaware of any specific paper written on it. Closest being Jones & Clements [2] under a discussion of morphology of *Pt.* in general. Personal observations of the same plant over several days have revealed a large percentage of freshly opened flowers have forward pointing or nearly vertical lateral sepals including spp. that are described as having deflexed sepals. After 24 hours, those like *P. patens* and *P. oliveri* with 'described' deflexed lateral sepals have reached this position, occasionally even reaching it before opening

fully. Others like *Pt. banksii* and *Pt australis* to name two, have also begun the same trend but on a slower schedule. Four or more days later, in many plants, they also reach a deflexed stance, widely spread and pointing backwards, merely indicating that the flower is fully mature. J113 p 16 [3] also demonstrates deflexing in mature flowers of *Pt australis*.

How many of you have looked at a deflexed *Pt banksii* and wondered if it was *Pt patens*? Or vice versa? Most of our respected botanists have at some time debated the validity of *Pt. patens* for this very reason. *Pt areolata* and mature *Pt australis* also mimic *Pt patens* in deflexure in the synsepalum apices.

A similar process occurs in *Nematoceras trilobum* where the fresh flower is often almost saccate but as it matures the lower labellum wings unfurl and even deflex at maturity making the central disc area seem prominent and causing the lower edges to tear and become ragged. This markedly alters the appearance of the flower in profile and face on.

I bring this to the attention of the reader because so often we visit a plant just once, having no inkling of its state of maturity, take a photo and later tend to judge the entire taxon by the photo. Photographs of entire plants and better still entire colonies have much greater botanical value than eg. a front on shot of a flower. A superb cluster of *Pt.* 'Bluff' that was published in the Journal showing sepals in several positions from forward pointing to rear-facing like a bunch of Texan long-horns is a good case in point. [4]

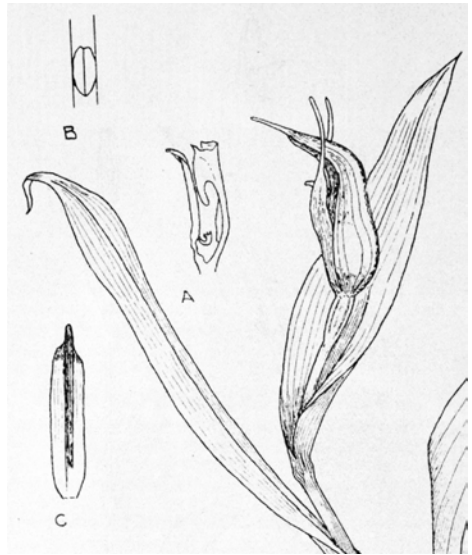
In J 91, p 11, photos 7 & 15 we see two stages

of maturity in plants which are more likely Hooker's *Pt. australis* s.s. than the suggested hybrid with *Pt. banksii*, both taken in the latter half of January. The dissection overleaf on p. 12 is a useful photo showing relative lengths of column to wings and the critical shapes of stigma and labellum appendage of what purports to be the same taxon. The pollinator a bonus.

Conclusion: Deflexing of the lateral sepals does not occur in every specimen but can be found to varying degrees in many, therefore it is not a constant feature which can be relied upon for identification, and so of necessity should only be used with caution in combination with all other identifying factors as a secondary factor.

2. Twisting of the distal end of the labellum in New Zealand spp. of *Pterostylis*

One often hears arguments about the degree of twist on the labellum of some New Zealand *Pterostylis* spp. There are several that display the twisted lip syndrome, and this feature is used frequently in descriptions as an identifying factor. Great caution is required in doing so, as careful observation reveals that the degree of twist generally increases as the flower ages. Plants such as *Pt. montana* have labella that twist before opening and this is accentuated with age, whilst others like many of the various *Pt* aff *montana* taxa open with the labellum straight or barely starting to twist, but at maturity are distinctly distally wry with unevenly pinched tip. *Ptt agathicola*, *silvicultrix* and to increasingly lesser degrees *Ptt auriculata* and *graminea* can all be found at over maturity to display an asymmetrically tipped labellum to greater and lesser degrees. Can we add *Pt australis* to this list. Hatch did [Fig.1]. This could of course be the result of cross breeding with *Pt montana*, or could demonstrate that all originate from a single branch of the ancestral tree. Genetic studies have determined this to some extent, but the purpose for raising this issue here is to demonstrate yet another variable



Detail from ED Hatch's drawing of *P. australis*, showing the unevenly constricted tip of the labellum

flower part which when put on a time/maturity based graph changes appearance. It also partly helps to explain why we seem to find endless varieties of *Pt* aff *montana* for example.

Conclusion: This feature can under certain circumstances be used as a guide to identification but should not stand on its own in doing so. It is an inconsistent and variable feature in some taxa, particularly those that have also been recorded with straight labella.

3. The importance of leaf morphology in larger New Zealand *Pterostylis*

Leaf morphology is perhaps the greatest sticking point in any argument about our larger *Pterostylis* spp. How much weight can we place on leaf structure and morphology given that all plants have an accepted natural variation in shape and size? Hark, I hear readers

screaming 'leaves have little bearing compared with flowers'. I agree, but when so-called constant floral features we currently use prove to be highly variable when placed on a time/maturity graph, where do we turn? Hatch built an entire phylogenetic tree based on leaf morphology [5]. Are we to ignore both leaves and sepal differences and lump *Pt australis* with *Pt banksii* and sweep current tagged ID's back under the carpet as natural variation? Doing so would effectively solve much of the present uncertainty and clearly Moore and other intelligent botanists seriously pondered this issue. It reiterates the need for further examination of current genetic studies and the need to extend this at least to include the 8 jordanons Moore lumped together under the *australis* epithet.

Conclusion: Identifying markers we rely on for New Zealand *Pterostylis* species must be used with caution or knowledge of the state of maturity of the flower. Otherwise we inexcusably fill the pages of our journal with unsupported tags of species nova. An aggregate of identifying markers will identify all species but a solitary one such as the twisted distal end of the labellum does not immediately place it in *Pt. montana* for example, and deflexed sepals must be considered no more than a guiding factor in considering any one of the six species commonly displaying this feature.

References

- [1] NZNOG Journal 116 p. 34.
- [2] Australian Orchid research Vol 4 pp 3-168 David Jones & Mark Clements.
- [3] NZNOG Journal 113, p 16 & 21 pers com Gael Donaghy
- [4] NZNOG Journal 127 p 3. is a case in point.
- [5] Transactions Vol 77 p. 238 ED Hatch on New Zealand *Pterostylis* species

The New Zealand Native Orchid Group

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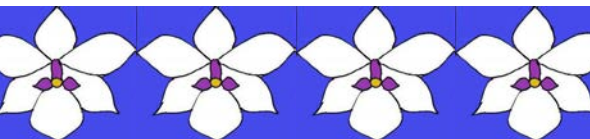
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WE MAY NOT SHARE AUTHORS'
OPINIONS .



The New Zealand orchids: distribution list 2014

By Gordon Sylvester

Occasionally we receive a new record for a district not previously recorded hence it is time to update the lists again. In the interest of brevity I have amended the Editor's irregular list for Dec 2013 to show Ecological Regions and the generally accepted genera and species only—otherwise with the inclusion of all the tagged named species this list is a very large document.

Complaints are received about a Region not being listed or nothing is found in a specific region. The database is composed of both historical records and in this particular case personal observations as well as records extracted from our Journal, in addition to any records sent to me as emails or letters. Otherwise it is where I put my personal records.

I have created another list of all the tag named species on the same lines as this—should anyone wish to have a copy please make contact with me by email.

“Dubious Records” are references recorded in early editions of the Field Guide and have not been supported by later records or observations, those records have been deleted from this list for clarity. That list was circulated to selected members for comment. And the comments acted upon.

Note: an en dash between two numbers indicates there is a numerical sequence.

Date of Revision and checking completed: 22 May 2014.

- Acianthus sinclairii*: 1–14, 16, 19–25, 29, 31, 34–39, 46, 48, 50, 72, 73, 79, 80. **New Records**
Adelopetalum tuberculatum: 4, 5, 6, 9, 10, 12, 14, 19, 22, 25, 31, 38, 39, 46.
Adenochilus gracilis: 17, 18, 21, 38–40, 46–49, 51, 53, 55, 59, 66, 68, 69, 70–74, 80.
Anzybas carsei: 11.
Anzybas rotundifolius: 3–6, 9, 11, 80.
Aporostylis bifolia: 10, 13, 15, 17–25, 28, 29, 33, 35, 38, 40, 43, 46–51, 53, 55, 59, 61, 63–74, 76–80, 82–84.
Calochilus herbaceus: 3–5, 9.
Calochilus paludosus: 5, 6, 10, 11, 13, 38, 46, 48.
Calochilus robertsonii: 11, 13, 15–17, 46.
Calochilus campestris: nil
Corunastylis nuda: 6, 9, 10, 12, 15, 18, 20–25, 29, 31, 35, 38–40, 46–48, 50, 72, 76, 80.
Corunastylis pumila: 3–6, 9–11, 13, 16, 21, 39, 46.
Corybas cheesemani: 2–6, 8–13, 17, 20, 22, 24, 25, 29, 31, 35–40, 46–48, 80.
Cryptostylis subulata: 4, 5.
Cyrtostylis oblonga: 2, 3, 5–7, 9, 10, 22, 38, 39, 46.
Cyrtostylis rotundifolia: 3, 4, 6, 9–12, 16, 20, 22, 29, 31, 35, 36, 37–39, 46, 47.
Danhatchia australis: 6, 8–12, 20, 39, 46.
Diplodium alobulum: 2–17, 20, 22–25, 29–31, 34–39, 45–48, 52, 57.
Diplodium alveatum: 39, 46.
Diplodium brumale: 3, 5, 6, 9, 10.
Diplodium trullifolium: 3–14, 16, 20–24, 29, 34–39, 46, 47.

Drymoanthus adversus: 2–17, 19–25, 29, 31, 34–36, 38, 39, 45–48, 50, 61, 65, 70, 71, 77, 79, 80.
Drymoanthus flavus: 16, 17, 29, 31, 38, 39, 46–48, 50, 69, 70, 72, 79.
Earina aestivalis: 4–6, 8, 9, 10, 12, 24, 25, 31, 36, 39, 46, 48, 50, 79, 80.
Earina autumnalis: 3, 5–25, 28–33, 35–41, 46–51, 54, 57, 59, 69–72, 77–80.
Earina mucronata: 3–25, 27–31, 33–39, 41, 43, 46–51, 54, 57, 66, 69, 70–73, 77–80.
Gastrodia cunninghamii: 5, 6, 10, 13, 15–18, 21–23, 25, 30, 31, 33, 35–40, 42, 43, 46–51, 53, 54, 55, 56–59, 61, 65, 66, 68–70, 72–75, 77, 79, 80.
Gastrodia minor: 5, 9, 10, 12, 15–18, 28, 29, 31, 38, 40–43, 46, 47, 49, 51, 55, 65, 66, 68, 72, 78, 79.
Gastrodia “long column” agg.: 3, 11, 12, 18, 24, 35, 37, 39–41, 45–47, 49, 55, 56, 61, 65, 66, 69, 72, 73, 77–79.
Gastrodia aff. *sesamoides*: 3, 6, 9–11, 13, 15, 17, 18, 25, 26, 29–31, 35, 37, 38, 40, 46, 47, 72, 73, 78, 79.
Hymenochilus tanypodus: 43, 46, 49, 54, 55, 56, 59, 61, 63–69, 79.
Hymenochilus tristis: 42, 43, 49, 54, 55–57, 59, 61, 63, 67, 68.
Ichthyostomum pygmaeum: 2–6, 9–14, 19–25, 31, 37–39, 46–48, 50, 61, 71, 72, 78.
Linguella puberula: 4.
Microtis arenaria: 3–5, 25.
Microtis oligantha: 17, 18, 26, 29, 38, 39, 42, 46, 47, 49–51, 53–57, 61, 63, 65–69, 72, 73, 76, 78–80.
Microtis parviflora: 2–6, 9–11, 13, 16, 17, 25, 35, 39, 46, 49.
Microtis unifolia: 1–7, 9–25, 27, 28, 29, 31, 35–38, 40–44, 46–50, 53–57, 61–68, 70, 72–74, 76–80.
Microtis aff. *unifolia*: 12, 28, 36, 39, 43, 50.
Molloybas cryptanthus: 2, 3, 6, 9, 12, 18, 24, 38, 39, 47, 55, 72, 75.
Myrmechila formicifera: nil
Myrmechila trapeziformis: 17, 31.
Nematoceras acuminatum: 3, 6, 8–10, 12, 13, 15, 17, 18, 20–25, 31, 37–40, 43, 46–48, 50, 51, 53, 61, 65, 68, 71, 72, 77, 79, 83.
Nematoceras hypogaenum: 3, 9, 18, 29, 31, 33, 35–37, 42, 46, 47, 49, 50, 59.
Nematoceras iridescens: 4, 11, 12, 17, 18, 22, 24, 25, 28–32, 34, 35, 37, 38, 46–48, 50, 53, 56, 65, 69, 77, 79.
Nematoceras longipetalum: 12, 18, 27, 28, 29, 31, 33, 35–41, 46–50, 72.
Nematoceras macranthum: 5, 6, 9–13, 15–26, 28–31, 33–39, 45–51, 53, 55, 57, 59, 61, 65–67, 69, 70, 72–74, 77, 79, 80, 84.
Nematoceras orbiculatum: 10–13, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 35, 37, 38, 40, 42, 45–47, 49, 53, 55, 58, 59, 65, 66, 68, 72, 77, 79, 80.
Nematoceras papa: 12, 18, 24, 25, 30, 48.
Nematoceras papillosum: 22, 28, 29, 32, 34, 47, 65.
Nematoceras rivulare: 5, 6, 9, 10, 12–15.
Nematoceras trilobum: 3, 4, 6–18, 20–22, 24–26, 28–31, 35–40, 42, 43, 45–51, 53, 55, 57, 59, 61, 65, 66, 68–74, 76–80, 82–84.
Nematoceras aff. *sulcatum*: 46, 80.
Orthoceras novae-zeelandiae: 3–6, 8–25, 27–29, 31, 35–41, 46–48.
Orthoceras strictum: 5, 9, 10, 13, 16, 17, 33, 38, 39, 46.
Petalochilus alatus: 3–6, 9, 10, 13, 17, 24, 31, 46, 47.
Petalochilus bartlettii: 2–6, 9, 10, 17, 20, 28, 35, 37, 38, 39, 46, 47.
Petalochilus calyciformis: 4.

Petalochilus chlorostylus: 2–7, 9–14, 17, 18, 20–25, 27–29, 31, 33, 35–41, 46–50, 53, 57, 64, 66, 72, 73, 79, 80.

Petalochilus aff. *chlorostylus*: 46.

Petalochilus minor: (as *Caladenia*) 2–4, 6–9, 13, 15, 17, 18, 23–25, 27, 29, 35, 37–40, 46–50, 53, 55, 57, 72, 77, 80.

Petalochilus nothofageti: 35, 38–40, 46–50, 72.

Petalochilus saccatus: 3.

Petalochilus variegatus: (as *Caladenia*) 25, 29, 35–39, 46, 47, 80.

Petalochilus aff. *fuscatus*: 3.

Petalochilus aff. *pusillus*: 9, 10, 25, 37, 39, 46.

Plumatictilos tasmanicum: 4, 9, 10, 38, 39, 46.

Prasophyllum colensoi: 6, 9, 10, 12, 13, 17–21, 23–26, 28–31, 35, 37–40, 43, 44, 46–51, 53, 54, 56–59, 61, 63–70, 72–74, 76–80, 82–84.

Prasophyllum hectorii: 3, 15, 18, 29, 30, 80.

Prasophyllum “A”: 18, 24, 42, 43, 46, 48, 49, 50, 65, 72, 77.

Pterostylis agathicola: 3–6, 8–10, 13.

Pterostylis areolata: 28, 37, 38, 43–47, 49–51, 53, 55–57, 61, 63, 69, 72, 73.

Pterostylis auriculata: 31, 39, 57, 70, 79, 80.

Pterostylis australis: 18, 21, 26, 28, 29, 37–42, 46–51, 53, 66, 71–74, 76–80.

Pterostylis banksii: 3–29, 31, 33, 35–40, 43, 45–51, 53, 55, 57, 61, 65, 66, 69, 70, 72, 73, 74, 76–80.

Pterostylis aff. *banksii*: 12, 18, 22, 39, 48–51.

Pterostylis cardiostigma: 9–13, 15–19, 21, 22, 24, 25, 31, 33, 35, 37–39, 46–48, 50.

Pterostylis cernua: 48–50, 79.

Pterostylis emarginata: 22, 29.

Pterostylis foliata: 12, 15–18, 23, 35–39, 46–48, 57, 65.

Pterostylis graminea: 4, 6, 9–18, 21–23, 29, 31, 35–40, 42, 46, 48–50, 53, 55, 57, 61, 65, 69, 70, 72, 78, 79.¹

Pterostylis humilis: 16, 18, 25, 46–50, 53.

Pterostylis irsoniana: 19, 25, 28–31, 35, 37–42, 46–50, 53, 55, 71.

Pterostylis irwinii: 18, **37**, 41, 46, 47, 49, 53. **New Records**

Pterostylis micromega: 11, 18, 27, 31, 36, 38, 46, 80.

Pterostylis montana Hatch: 28, 32, 38, 39, 48, 50, 70, 79.²

Pterostylis montana Moore: 18, 28, 33, 39, 46, 47, 49, 79, 82.

Pterostylis aff. *montana* agg.: 11, 12, 16–18, 20, 21, 23–26, 30, 31, 33, 35, 36, 39, 40, 46, 47, 49, 50, 58, 65, 69, 72, 73, 77, 79, 82.³

Pterostylis “pulchragalea”: 22, 28.

Pterostylis nutans: 15, 16.

Pterostylis oliveri: 42, 46, 47, 49, 50, 53.

Pterostylis paludosa: 10–12, 18, 79.

Pterostylis patens: 12, 16–23, 25, 28–31, 34, 35, 37, 38, 43, 47, 50, 51, 72.

Pterostylis porrecta: 12, 34, 35, 39, 47.

Pterostylis silvicultrix: 80.

Pterostylis speciosa: nil

Pterostylis subsimilis: 28.

Pterostylis trifolia: 33, 38.

Pterostylis venosa: 21, 25, 26, 28, 30, 37, 38, 46, 48, 50, 66, 72, 74, 77–80.

Simpliglottis cornuta: 3–6, 9, 10, 12–31, 33, 35–40, 42, 43, 45–51, 53–55, 57, 59, 61, 63–66, 68–70, 72–74, 76–80, 82, 83, 84.

Simpliglottis valida: 17, 40, 43, 72.
Singularlybas oblongus: 3–7, 9–13, 15–25, 29–31, 33, 35, 37–39, 42, 46–50, 59, 64, 67, 69–72, 77–80, 83, 84.
Spiranthes novae-zelandiae: 3, –5, 10, 11, 13, 15–18, 21, 28, 29, 31, 46, 48, 56, 71, 80.
Stegostyla atradenia: 3–6, 9, 10, 12, 13, 16, 17, 21, 28, 35, 38, 39, 46–49.
Stegostyla lyallii: 16–18, 24–26, 35, 37, 38, 40, 43, 46–51, 53, 56–60, 64, –67, 69, 70, 72–74, 76, 77, 79, 80.
Sullivania minor: 13.
Thelymitra aemula: 3–6, 8, 9, 10, 13, 38, 46.
Thelymitra brevifolia: 39, 46.
Thelymitra carnea: 3–6, 9, 10, 13, 16, 20, 22, 38, 39, 46, 48, 49.
Thelymitra colensoi: 5, 6, 9, 15, 20, 35, 37–40, 46, 47, 49, 50, 57, 72.
Thelymitra cyanea: 4–6, 9–11, 13, 15–18, 20–23, 25, 27–31, 35, 37–39, 43, 46–50, 53, 54, 57, 61, 65, 66, 68–74, 76–80, 84.
Thelymitra X dentata: 5, 17, 38, 39, 46, 48.
Thelymitra formosa: 9–11, 13, 17, 18, 25, 28, 29, 35, 37–39, 46, 47, 49–51, 61, 65, 66, 69, 79, 80.
Thelymitra hatchii: 9, 13, 17, 18, 20, 21, 24, 25, 28, 29, 31, 33, 35, 36, 38–40, 46–50, 53–55, 57–61, 65–67, 70, 72, 73, 76–79.
Thelymitra aff. *ixioides*: 3–6, 8–10, 12, 13, 16–18, 35, 38, 48, 50.
Thelymitra aff. *longifolia*: 3–6, 9, 10, 21, 38, 39, 46, 50, 74.
Thelymitra longifolia: 3–29, 31, 33, 35–40, 42, 43, 46–50, 53, 54–59, 61–70, 72–74, 76–80, 83.
Thelymitra longifolia agg.: 22, 31, 35–43, 46–49.
Thelymitra malvina: 3, 4.
Thelymitra matthewsii: 3.
Thelymitra pauciflora: 2–13, 16–18, 20, 21, 23, 25, 26, 28, 30, 31, 35, 36, 38, 39, 46–50, 55–57, 61, 63, 65, 66, 68, 69, 73, 76, 77, 80.
Thelymitra pulchella: 3–6, 9, 10, 17, 18, 38, 39, 46, 48, 50, 51, 65, 66, 68–72, 76–80.
Thelymitra purpureofusca: 3, 5, 9, 27, 28, 37–39, 42, 49, 68.
Thelymitra sanscilia: 3, 4, 5, 6, 9.
Thelymitra tholiformis: 3, 4, 6, 8–10, 17.
Townsonia deflexa: 10, 18, 38, 46, 48, 49, 51, 53, 66, 72, 77, 79, 83.
Waireia stenopetala: 18, 36, 38, 43, 46, 48, 50, 51, 53, 56, 64, 66–72, 74, 77, 79, 83, 84.
Winika cunninghamii: 3, 5–14, 16, 17, 19–25, 28, 30, 31, 33, 35–41, 46–51, 54, 69–72, 77, 79, 80.

Notes

1. As with *Pt. banksii* there is considerable variation in interpreting the species, resulting in lots of agg. and aff. tagnames. Some definitive work is needed to define clearly the boundaries of this species.
2. The records on the next three species are very confused and need quite a bit of field checking to determine exactly the species and areas involved.
3. A catch all for undetermined species, could also include some *Pt. graminea* agg.



Australian notes: *David McConachie*

Pollination of the Small Duck Orchid, Paracaleana minor: Flower Structure and Function.

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Abstract

The peculiar duck-shaped flowers of the Small Flying Duck Orchid, *Paracaleana minor* (R.Br.) Blaxell, are oddities among orchids. The structure and function of *P. minor* flowers in pollination is described and illustrated by photographs. *P. minor* is pollinated by sexually deceived males of the Thynnid wasp, *Thynnoturneria armiger* Turner, on the Central Tablelands of NSW. Attracted males attempt to couple with the female-mimicking duck 'head', causing it to spring over, trapping them upside down against the column in the bowl of the duck 'body'. The labellum of *P. minor* mimics key aspects of the shape of a Thynnid female, including the female genitalia, that are critical for correctly orienting the male for successful pollination. The mechanism of the rapid labellum movement is described and illustrated.

Introduction

Orchids fascinate us with an extraordinary variety of colour and form, all built on the very simple template of a column, three petals and three sepals. Some 30,000 species have evolved by the astonishing diversification of these seven floral segments. The ventral petal, or labellum, is usually the most elaborately modified part, but all segments show extreme plasticity, far exceeding that of any other plant family. Some orchids are so bizarrely contorted as to be scarcely recognisable as flowers at all.

The often complex structures of orchid flowers are adaptations for attracting, guiding and

manipulating pollinators. Generally, the more elaborate the flower, the more specialised is the pollination mechanism, and the more likely that the orchid species has evolved to exploit a particular insect or group of closely related insects. Accordingly, there is a close relationship between flower structure and function for pollination. In this paper I will explore the detailed structure and function of the peculiar duck-shaped flowers of the Small Duck Orchid, *Paracaleana minor* (R.Br.) Blaxell (Fig. 1).



Fig. 1: *Paracaleana minor*.

Structure

Small Duck Orchids have the following structural features:

- Flowers are resupinate (reversed) with the column oriented downwards.
- A long column foot extends horizontally from the base of the inverted column.
- The sepals and lateral petals are reduced in size compared to the labellum and column which dominate the flower.
- The dorsal sepal and petals are attached at the base of the column, but the lateral sepals attach to the end of the column foot.
- Large wings extend outwards from the column and column foot forming a deep concave bowl, the duck 'body' (Figs 1 and 2).
- The duck 'neck', a broad, laterally concave, strap-like claw is bent into a C-shape and holds the labellum aloft from the end of the column foot.
- Shiny dark maroon to black warty glands cover the upper surface of the labellum (duck 'head') which is vaguely insect-like; broad at the base (the 'abdomen') before narrowing into a neck (the 'thorax') and expanding into a narrow bi-lobed head at the apex (Fig. 3).

Previous studies

It is well known that if the tip of the labellum is gently pushed downwards in *Paracaleana* and the closely related Flying Duck Orchid, *Caleana major* R.Br., it will trigger the rapid rotation of the labellum into the column bowl. According to Rica Erickson (1965), it was Western Australian plant collector James Drummond who, in 1838, first reported the motion of the labellum in *Paracaleana nigrita* (J.Drumm. ex Lindl.) Blaxell. Erickson quotes Drummond as saying the labellum 'makes a prisoner of any small insect which the pouch will hold. When it catches an insect it remains shut while the insect continues to move about, but if the insect be not caught the box soon opens again.' The venerable RD Fitzgerald wrote at length in 1880 on the same phenomenon in the *C. major*. He concluded



Fig.2: Column bowl of *P. minor* formed by column wings.



Fig.3: Insect-like labellum decoy of *P. minor*.

that the flower functioned as a trap for insects, but was unable to ascertain the insects responsible for pollination.

Cady (1965) made the first modern field observation of pollination in Duck Orchids at Narooma in NSW. He saw a male sawfly, *Lophyrotoma leachii* Kirby, land on the labellum of *C. major* only to be instantly flipped violently into the column bowl and held there for a minute and a half until it could free itself. In the process, the orchid pollinia were attached to the middle of insect's thorax. Bates (1989) made similar observations on *C. major* near Wauchope, NSW and published an excellent photograph of the event in *The Orchids of South Australia* (Bates and Weber, 1990) showing a sawfly identified as *Pterygophorus* sp.) 'jammed head first between the labellum and column' with only its abdomen and wings projecting beyond the labellum. Beardsell and Bernhardt (1982) and Bates (1989) suggested male sawflies may be attracted to *C. major* by sexual deception. However, the numbers observed are very low and there is no evidence of attempted pseudocopulation to support this conjecture.

Published observations of pollination in *Paracaleana* are also limited. Although *P. nigrita* is generally considered to be pollinated by sexually deceived males of a Thynnid wasp in the genus *Eirone* (misspelt as *Erione*) (Hoffman and Brown, 1992; Hopper and Brown, 2006), all reports are based on personal communications or personal observations without corroborating evidence. As part of a review of *Caleana* pollination (Bower, 2001a), the author summarised observations he made on *P. minor* using the pollinator-baiting technique (Stoutamire, 1983) at three locations in the Bathurst-Orange area of NSW in 1988. Three attracted insects were identified by GR Brown as males of the Thynnid wasp, *Thynnnoturneria armiger* Turner.

The author also photographed the interaction between *T. armiger* and translocated flowers of *P. minor* in the Mullion Range State Forest, approximately 15 km north east of Mullion

Creek, NSW. These photos were the basis of the description of *P. minor* pollination published in Bower (2001a), but were lost in a house fire. In November 2013, the author rephotographed the pollination of *P. minor* at the same location. This paper provides a more detailed account of the pollination of *P. minor* illustrated by the new images.

Pseudocopulation in *P. minor*

Males of *T. armiger* fly upwind to *P. minor* bait flowers as if following an odour trail (Bower, 2001a). They alight directly on the labellum, grappling it with their forelegs around the narrow 'neck' (Fig. 4). The male then arches his abdomen and probes with the terminal genitalia in an attempt to mate with the labellum (Figs 5 and 6). Fig. 6 shows the expanded male genitalia clasping a small triangular process at the base of the labellum. This process is clearly visible in Fig. 1 and most likely represents pseudo female genitalia and is termed here the pseudogenital process.



Fig.4: Male of *Thynnnoturneria armiger* grappling the narrow thoracic region of the decoy with his forelegs.



Fig.5: *T. armiger* probing with his genitalia on the labellum of *P. minor*.

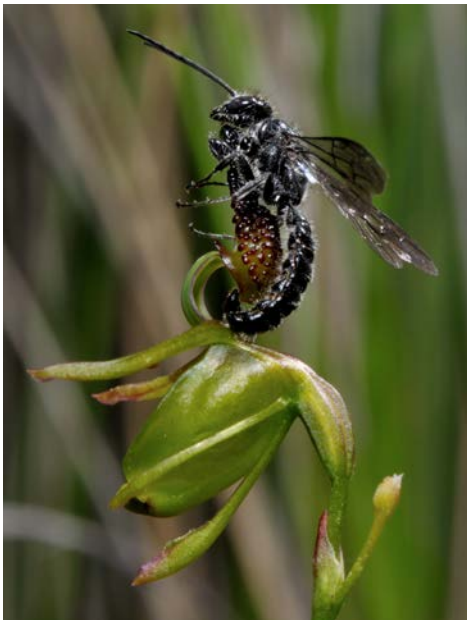


Fig.6: *T. armiger* male attempting to couple with the pseudogenital process of *P. minor*.

This behaviour is characteristic of Thynnid males when picking up their wingless females from ground cover vegetation. Prior to being picked up, females ‘call’ for males by emitting species specific sex pheromone odours to which males respond rapidly. A responding male will couple immediately with the female once he has grasped her behind the head, around her narrow neck-like thorax (Bower, 2001b). Coupling may occur at the point of pick up or after a short flight to nearby vegetation. The male then carries the female in copula to a flowering shrub or tree where he assists her to feed on nectar.

The pollination syndrome in *P. minor* is clearly based on the sexual deception of *T. armiger* males. The insect-like labellum is an elegantly crafted pseudo-female wasp. Critical structural features are:

- The length and colour of the decoy is likely to be similar to the real female.
- The ‘abdominal’ width of the decoy is greater than expected for Thynnid females. This may provide additional stimulus (supernormal stimulus) to attracted males.
- The presence of a pseudogenital process.
- The head region of the decoy is the correct size and shape to fit behind the male’s head and between his forelegs into a cavity below the thorax which is adapted for carriage of females in flight. [Some male Thynnids have concave expanded forecoxae on their forelegs to cradle females]. This fit of the decoy’s ‘head’ and ‘thorax’ to the male puts him into the correct position to couple with the pseudogenital process (Fig. 6).
- It is likely that the warty glands on the labellum emit a faithful mimic of the sex pheromone odour used by female *T. armiger* to attract males for mating.

The above features ensure correct orientation of the male for pollination of the orchid.

Trigger mechanism

The following account of the explosive mechanism of labellum closure is amended and expanded from Bower (2001a).

The strap-like labellum claw of *P. minor* has cable-like thickenings running down the sides of the thinner, broad, flexible lamina. In the resting position the lamina has a side to side concavity and the claw is curved upwards. Slight pressure on the labellum apex bends the strap outwards causing the concavity to suddenly pop out, or reverse, bending the claw rapidly downwards. This process was first described by Fitzgerald (1880).

Although labellum closure occurs in the blink of an eye, resetting is slow, taking 15 to 20 minutes (Bates, 1989; personal observations). Even when the labellum has returned to its upright position, it is insensitive to touch for some time.

The accompanying photographs were obtained by taking a flower that, unbeknownst to the author, had not fully reset after closure, and using it to attract wasps. The result was that rather than closing abruptly when a wasp landed, the labellum closed quite slowly. This allowed different stages in the mechanism to be observed and photographed.

Triggering the labellum takes place in two stages (Bower, 2001a). Reversal of the claw begins at its outer end, where it joins the labellum, and proceeds rapidly to the basal end. Reversal in the outermost part of the claw tips the labellum under and closely parallel to the claw (Fig. 7). When the concavity of the claw is half reversed, the body of the wasp is suspended horizontally upside down with its head in the column bowl (Fig. 8). Finally, when the claw is fully reversed, the wasp is head up in the bowl with its wings pointing downwards (Fig. 9). This double action ensures the tip of the labellum, and the wasp, clear the column apex.

Discussion

P. minor is an elegant example of the strikingly close relationship between structure and function that occurs frequently in the most physically complex orchids. The *P. minor* labellum decoy is an excellent mimic of a flightless female Thynnid wasp, albeit



Fig.7: Labellum of *P. minor* bent against the labellum claw.



Fig.8: Outer part of *P. minor* claw reversing concavity.

exaggerated in width, most probably to maximise attractiveness to males.

The two key physical features of the decoy for orienting male *T. armiger* are the ‘neck’ which the male grasps with his forelegs and the pseudogenital process, with which the male attempts to couple. All other genera in the Drakaeinae, including *Chiloglottis*, *Drakaea*, *Spiculaea* and *Arthrochilus* have labellum decoys with analogous distinct head and neck regions for orientation of Thynnid males (Bower, 2001b). Several species in the genus *Caladenia* (Caladeniinae) that are pollinated by Thynnid wasps (Phillips *et al.* 2009) also have decoys with similar structures.

The mechanism of the labellum claw exhibits remarkable complexity with its elegant two stage movement. Rapid closure of the labellum appears to be a mechanical action brought on by the weight of the wasp overtipping the labellum. By contrast, the slow resetting suggests that physiological processes re-establish the critical unstable equilibrium and provide the potential energy for the sudden mechanical discharge.



Fig.9: Male *T. armiger* trapped between *P. minor* labellum and the column.

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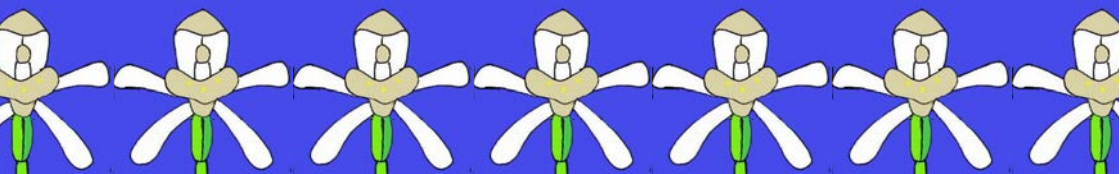
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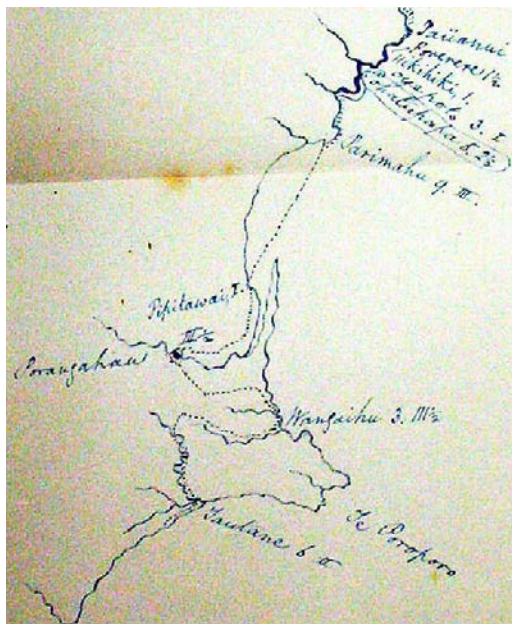
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Researchers Retha Edens-Meier, Robert A. Raguso, Eric Westhus and Peter Bernhardt write about “Floral fraudulence” and ask, “Do blue *Thelymitra* species (Orchidaceae) mimic *Orthrosanthus laxus* (Iridaceae)?” (*Telopea, Journal of Plant Systematics* 2014; 17: 15-28). They conclude that in Western Australia, “large-flowered *Thelymitra* species appear to produce a novel, visual and olfactory attractant pattern of fraudulence we call the ‘New Again, More Again Effect’.” You can read more at <http://openjournals.library.usyd.edu.au/index.php/TEL/article/view/7392>.



This ▲ is detail of a map drawn by William Colenso c.1845 (Alexander Turnbull Library 88-103-1/05).

In his first walk from Hawke’s Bay to Wellington Colenso’s party scrambled around the steep grey-white bluffs of Te Poroporo (Cape Turnagain) but in later journeys they took the inland path from Whangahau and down to Tautane as shown here.

It was on that inland path that he first found *Nematoceras macranthum* [J120: 4].

The scale is distorted. The numbers may refer to miles or hours.

Orchids. The Bulletin of the American Orchid Society (January 2014) has a paper by Giovanni Giraldo entitled “Orchid fossils and evolution” (p.52). He writes, “Recently, not just one more new orchid fossil was discovered, it was two! the new discoveries came from New Zealand and were described by Conran and collaborators (2009). The fossils consisted of two orchid leaves found in mining pits in the middle of Foulden Hills Diatomite. This is the first time that unequivocal vegetative fossil evidence has been found for the orchid family. The fossils came from the deposited sediments of a deep maar lake, and based on the pollen record and dating of the basaltic rocks at the site, it was determined that the fossils were formed during the early Miocene (23–20 Mya), when the maar lake was surrounded by rainforest. Furthermore, it was determined that these leaf fossils came from epidendroid orchids similar to modern species of *Earina* (tribe Podochileae) and *Dendrobium* (tribe Dendrobieae).”

They have been named *Earina fouldenensis* Conran and *Dendrobium winikaphyllum* Conran.

Notes on albinism

(From the e-book *Paphiopedalum* by Prof. Dr. Guido J. Braem and colleagues, and reproduced (in part) from the Orchid Species Society of Victoria's *Newsletter* April 2014)



... the terms “albino,” “albus” and/or “albinistic” are not always used with the proper meaning.

Albino: by botanical definition, a plant that lacks the possibility to produce anthocyanin pigments. It should be noted that plants have 3 groups of pigments, being (a) anthocyanins, responsible for the red and brown shades, (b) carotenes, responsible for the yellow colours, and (c) chlorophylls, responsible for the “greens”. Therefore, a plant correctly designated as an albino will not show any red or brown colour but can very well be green,

yellow, white, or any combination thereof. As soon as any shade of red occurs anywhere in any part of the plant, the specimen is not an albino.

Alba, album or albus (depending on the gender of the genus): a Latin word that simply means “white”. This term, as far as orchids are concerned, is used in connection with the colour of the flower. Only flowers that are pure white should be designated as alba/album. “Alba/album” plants are albinos, but we have already established that albinos are not necessarily “alba/album”.

Albinistic: a term that is used in various ways. The correct usage is for the designation of an albino or “alba/album”. This term can, therefore, be used for a yellow/green/white plant or an all-white plant. Unfortunately, the term “albinistic” is often erroneously used to designate a plant that is faintly but normally coloured.

The rules of taxonomy also lack proper safety mechanisms against the misuse of the designation “alba/album/albus”. A designation of a species or an infraspecific taxon, as long as it is part of a validly and effectively published concept, is to be followed, no matter how erroneous or ludicrous the designation may be. Because of this, for example, *Paphiopedalum haynaldianum* forma (or variety) *album* is the valid designation of a plant with mainly green flowers.

The taxonomic status of albino or albinistic forms is another source of disagreement and confusion. Most of these variants have been described at the level of a botanical variety. In the meantime, however, the great majority of those involved in orchid taxonomy consider colour variants - and albinos are simply colour variants - not to be worthy of the variety status. For that reason, the albinistic taxa are now generally reduced from varieties, abbreviation “var.”, to forms, and designated as forma, abbreviated as “fma.”

Contact Standards New Zealand if this worries you....

“Standards New Zealand (SNZ) is about to undertake a project, funded by the Accident Compensation Corporation (ACC), to develop a new Standard on outdoor tracks for walking and cycling (including mountain biking).

“In late 2013, the ACC, in collaboration with the Department of Conservation, requested SNZ investigate a number of options to improve the management of tracks. This includes updating the handbook *SNZ HB 8630 Tracks and Outdoor Visitor Structures*, either changing its status to a full New Zealand Standard, or developing a new Standard to include matters (such as mountain bike tracks) that are not covered in *SNZ HB 8630*.

“ACC considers updates or changes to track management need to reflect current best practice, including measures aimed at preventing accidents among those who use tracks for various sport and recreational activities. It was decided a new Standard would be developed covering the design, construction and maintenance of tracks.”

Oh, and will that “current best practice” include measures to retain trackside orchids in good health? Thanks to Eric Scanlen for making us worry about this issue—Ed.

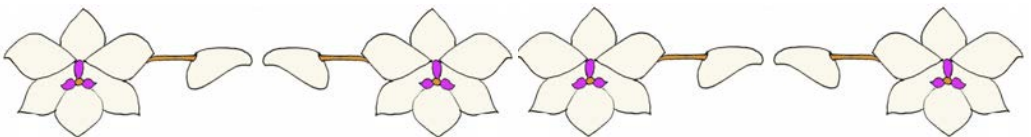


Nambour Orchid Society invites you to join them on Saturday 11 & Sunday 12 June 2016 for their Sub Tropical Orchid Council Queensland (STOCQ) Diamond Festival of Orchids.

The conference will be held at the Lake Kawana Community Centre, 114 Sportsmans Parade, Bokarina 4575 on the Sunshine

Coast in Queensland. Planning is still in the early stages and all details will be posted on the Nambour Orchid Society web site and community facebook page as it comes together.

Just go to <http://nambourorchidsociety.com/dfo/>



The Column: *Eric Scanlen*

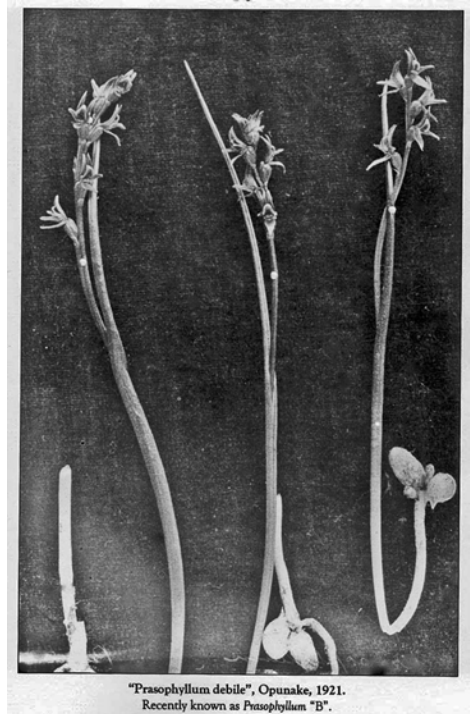
Prasophyllum roundup 2014

Seven principal *Prasophyllum* taxa, and three likely starters—not including *Corunastylis*—have emerged since JD Hooker first published *P. Colensoi* in his 1853 *Flora Novae Zelandiae*. The following are the Column's personal views of these seven, some from experience and some from others' notes and illustrations. These brief descriptions, concentrate on best traits for identifying these deceptively variable taxa. They are widespread, terrestrial orchids, single leaved with a spike of numerous, non-resupinate (labellum uppermost) small flowers. They occur from the alpine zone to sea level, in damp to wet sites, to reed-choked streams in knee deep water.

In all forms, ovaries have six tepal ridges, ovaries are often recessed at the back. A long callus adorns the inner face of a strongly recurved labellum. A glassy, threadlike stipe connects twin pollinia upwards to the tip of the rostellum which extends forwards from the stigma. If the pollinia are not removed, the stipe draws them out of the anther and swings them onto the flower's own stigma above, effecting fall-back self-pollination. Aids to identification can be somewhat variable and include the degree of joining of lateral sepals, length of the usually bifid column arms, shape of floral bract, spacing of flowers on the peduncle, habitat, including altitude, environmental region (ER), and colour to some extent.

1 *Prasophyllum colensoi* type specimens were collected by William Colenso late in 1847 [1] from Waipukurau ER29, 130m above sea level (a.s.l.) and sent to WJ Hooker at Kew late in 1848 then described by his son JD Hooker in 1853. **Fig. 1** (next page) is the type sheet from Kew showing Colenso's specimens. Note the

Lectoparatype designated by Brian Molloy—it is 33cm long. The Syntype, at lower right, has fresher flowers which align, as well as can be expected with—surprise, surprise—both *P. "debile"* by Henry B. Matthews and *P. "B"* by J. Bruce Irwin. Neither of those two dedicated orchidologists are likely to have been conversant with the type sheet, a world away at Kew. Henry [2] and Bruce [3], both got their original specimens from National Park, as it happens, no doubt from the ERs18 & 23 wetlands close by, at 800m a.s.l., but about 73 years apart (pre 1928 & 2001). Henry's photo **Fig. 2**, from AK



"*Prasophyllum debile*", Opanake, 1921.
Recently known as *Prasophyllum "B"*.

Fig.2.

Fig. 1.



ROYAL BOTANIC GARDENS KEW
K000827768

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
Kew

1848
Whid.

M. calensei
Colenso
1867

Prasophyllum calensei Hook. f.
Probable Syntypes
DET. A. S. 14/8 1985

LECTOTYPIC TYPE
Colenso 1848
of *Prasophyllum calensei* Hook. f.
... B. J. Halliday, 4-10-1991...

ROYAL BOTANIC GARDENS KEW
1185/85
3
KEW

Prasophyllum calensei M.

herbarium, is of specimens from coastal Opunake, ER25. Fig. 2 plants compare well with Colenso's type in Fig. 1. Bruce's drawings of his *P. B*" [3] let us see close ups of the essential flower parts. His drawings headed *P. colensoi* agg. [3] show the previously accepted range of forms, said to be *P. colensoi*. The evidence to hand, has the writer seriously reassessing its identity.

So, essential traits of *P. colensoi* here include; plants to 33cm tall, leaf sheathing \pm half way up the scape, 7 to 11 flowers spaced 8mm apart (mid spike), ovary 4mm long, perianth 7mm diam. (from Fig. 1 which may have shrivelled) greenish yellow in lowland plants but purple brown shades can occur at higher altitudes. Floral bract is bluntly acute. Lateral sepals are 6.6mm long connate for \pm the lower quarter, semi tubular above. Dorsal sepal is acute to acuminate, straight to slightly curved. Lateral petals are 3.5mm long. Callus has a knobby to smooth tip near the labellum tip. See **Fig. 3** from Karioi Forest, ER18, 700m a.s.l. Note that



Fig.3.

pollinia and stipe have been largely removed; by some pollinator? The anther tip exceeds the column arms but falls short of the rostellum tip. **Fig 4**, Graham Dickson's colony from ER67 Lindis Pass, 3 Jan 07, looks the part but at 960m a.s.l., may be a distinct taxon.

Fig.4.



2 Prasophyllum "Tongariro" principally from plants in **Fig. 5** at 1,800m a.s.l. west of North Crater on Mt Tongariro, ER18, 8 Feb 1971, which the Column has cherished (in error?) as *P. colensoi*, for the last 42 years! Similar plants



Fig.5.

have been observed at; ER19, Mt. Hikurangi, 1,200m; ER18, Ohakune Mtn. Rd 1,100m; ER18, Matapuna Rd. Horopito 800m; ER28 Comet Hut, 720m; ER39 Puffer Track, 500m. a.s.l. Plants to ± 120 mm tall, can be taller in the montane/subalpine but beware of hybrids due to overlapping territory with *P. colensoi*. Leaf sheathing about a third of the peduncle and may exceed it. Flowering Dec-Feb. Some nine flowers crowded closely on green ovaries 2.7mm long x 2.7mm diam. Floral bracts acute. Perianth a tawny yellow shade but maroon shades appear in petals and the labellum at the lower altitudes. Sepals are 5.5mm long. Lateral sepals are connate for the basal third and semi-tubular above. Dorsal sepal is ovate, acute and near horizontal. Labellum is recurved $\pm 120^\circ$ with a thin, emerald green callus at centre. Column arms are much shorter than the anther.

***Prasophyllum* “A”**. The late Bruce Irwin separated *P.* “A” from *P. colensoi* in Journal 79:9, June 2001, and in ref. [3] on the basis of column arms being \pm equal in length to the anther, dorsal sepal ovate and lateral sepals connate except at the tips. Bruce collected two forms from Ohakune Mtn. Rd, ER18. Both had a sheathing leaf longer than the spike and well-spaced 10mm flowers. The writer has seen fit to treat them as separate taxa as follows.

2 *Prasophyllum* “A purple”, at $\pm 1,300$ m a.s.l., was from the Ohakune Mtn. Rd, ER18, north of Mangawhero Falls, on 11 Jan 2001. It had a dark purple ovary but was otherwise close to **Fig. 6**, with its port wine stem, from the road-side, Middle Rd. Horopito ER18, 720m a.s.l. Flowers were 9mm apart. The pear shaped ovary is 10mm long x 4.6mm through, mostly green but with purple ribs at the back. Column arms are glassy below, purplish above, and as long as the anther. The 6mm lateral petals curve in to almost parallel. The labellum, with knobby callus almost to the tip, is as long as the 9mm lateral sepals, which are conjoined almost to the tip. The rostellum tip, with stipe attached, is back from the anther tip and sitting over a thick cluster of pollinia. The floral bract is oval, sheathing, and translucent purple.

Graham Dickson’s colourful **Fig. 7**, is from 6 Jan 2007, Lismore Park, Wanaka, ER66/67 and probably belongs to this taxon, with its all purple bud, peduncle and ribs at the back of pear shaped ovaries. Lateral sepals are connate to the tips.

3 *Prasophyllum* “A green”. Bruce’s specimen from Ohakune Mtn. Rd, south of the Mangawhero Falls, $\pm 1,100$ m a.s.l., also on 11 Jan 2001, was greenish, the 125mm stem was “blackish-



Fig.6 ▲
Fig.7. ►





purple” but greener towards top and bottom. The 3mm wide leaf was 140mm long. Ovaries were all green, the floral bracts were obtuse with an apiculate tip. Lateral sepals were conjoined virtually to the tips. **Fig. 8** is fairly typical, except for green stems, from 400m a.s.l., 30 Dec 1995, on Margaret Menzies’ Waitiri Track, Omoana ER24. The obtuse floral bract has the apiculate tip. In the close up, **Fig 9**, the column arms are slightly back from the yellow anther. Please excuse the cobwebs. The tip of the callus is near the tip of the labelium which almost reaches the tips of the lateral sepals. *P.* “A green” is a widespread taxon. One from Bald Hill, (J91:12) at 700m a.s.l. in the Longwood Forest, ER 77, has the overall green relieved with faint purple strips on tepal outers. The labellum callus in this form is enlarged like a tiny wheel and axle. Another from Pinchgut Track, Mt Robert, ER49, 1,000 a.s.l., looks the part except for well separated lateral sepals.

3 *Prasophyllum* “Jacks”. **Fig. 10**, from a colony at Jacks Pass ER43, 840m a.s.l. and 4km north of Hanmer Springs, was taken on 15 Dec 2002. The floral bract has no apiculus. Column arms are only half the length of the anther, excluding it from the *P.* “A” agg. Lateral sepals are connate within 2mm of the tip and have dark purple-brown, outer margins at the back. The labellum too, is dark at the back with purple-brown wings shielding an emerald green, petaloid callus. This mature flower shows pollinia spread on top of the rostellum but the stipe responsible, has broken away.

Pam Shearer spotted a similar colony of the same or very similar taxon, **Fig. 11** at the Otira Car Park ER 53, 860m a.s.l., near Arthur’s Pass, on 17 Jan 2014. Many flowers had finished but the erect leaf can be seen. **Fig. 12** shows the floral bract which has lost that apiculate tip, visible on other flowers in the well-spaced spike of nine. Lateral sepals are free only at the stepped tips; slightly different here from the Jack’s Pass specimen.

4 *Prasophyllum* “patentifolium” from Ahipara ER4/5, near sea level, was sent to TF Cheeseman in Nov & Dec of 1898, by RH Matthews and described in manuscript by his son, Henry B Matthews, c.1928 [2]. E. Dan Hatch, in consultation with Australian HMR Rupp, aligned it, in error, with the Victorian *P. rogersii* despite that one’s bigger, crowded flowers and alpine habitat from 1,200m to 1,600m a.s.l. *P.* “patentifolium” **Fig. 13**, that Henry deposited at AK herbarium on 9 Jan 1921, also from Ahipara, may have been his type specimen but the description was never formally published. The Column photographed it on 10 Dec 2002 at Herbarium CHR Lincoln, where it was on long-term loan. Also at CHR was Henry’s other specimen from Ahipara **Fig. 14**, but collected ten years later on 27 Jan 1931. This specimen shows lateral sepals apparently connate, except at the tips. Kevin Matthews found both growing in ER 5, near Awanui, at his Uncle Hackney Matthews’ place. The lateral sepals

Top to bottom: Figs 8, 9, 10.



11



12



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Fig.14 ▲ Fig.15 ▼



appear to be connate but Kevin finds that they largely separate as the flowers mature. **Fig. 15** shows the lateral sepals connate on a fresh flower but not joined at the tip. Another flower of Kevin's, **Fig. 16**, from 27 Nov 2008, is mature with lateral sepals well separated for at least the top two thirds.

Bill Campbell also had *P. "patentifolium"* **Fig 17**, at Cable Bay ER 5. Note the flowers, "rather distant, green-brown or bluish-brown outside, and yellowish green with bronze or salmon shadings inside" with 4mm lateral sepals "connate for nearly a third of their length from the base" and "small ovate-lanceolate [floral] bracts". (Underlined words are from Henry's description.) Henry, Bruce and Kevin all put the dorsal sepal at 4mm long.

Now however, the Cable Bay site has been overtaken by construction! Kevin writes that Brian Molloy's find at the rest area ER 6 at 180m a.s.l. on SH 10, just past the Matauri Bay turn off, is no longer present; out grown by weeds as with his other finds up in Ahipara Gumfields, ER5 at 180m a.s.l. It seems that whilst *P. "patentifolium"* was once found over a 40km range, its existence may now be critical. Kevin is maintaining vigil over Hackney Matthews' little colony.

Bruce Irwin [3 p441] drew from just-opened flowers sent by Doug McCrae from Paranui, ER5, 7km inland from Taipa, and labelled it *Prasopphyllum* sp. His drawing is closely similar to Kevin's Fig 15. Doug's specimen has connate lateral sepals for two thirds of their length, resembling Henry's Fig. 14 and Kevin's Fig. 15. Bruce must have associated Doug's specimen with *P. "patentifolium"* but had been advised by Lucy Moore to disregard all of HBM's work because it was unpublished; hence no tag.

5 *Prasopphyllum "Tohanga"*, Fig. 18, from west of Lake Ohia ER4 near sea level, was an exciting new find by Kevin on 23 Oct 2008. Note the free standing form of the corrugated floral bract, yet floral bracts on under-developed flowers are sheathing and apiculated. The long ovary tapers up to an all-dark bud. Dark purple-brown lateral sepals are widely separated. A shadowy, thread-like stipe can be seen connecting rostellum to pollinia below, indicating a freshly opened flower. Column arms are hard to find; well back from the anther tip in



most flowers but almost equal to it in others. A variable trait? The labellum is yellow-brown; its emerald green callus has a lumpy, creamy tip reaching almost to the tip of the labellum. So far, this taxon is known only from the area around mislabelled Tahanga Rd. (Toanga Rd. in the Tumonz map) but there are likely to be further colonies in similar damp habitat.

6 *Prasophyllum hectorii*, has to be the showiest of the genus, it has the best perfume and it thrives in reed-choked streams such as the one by Waitaramoa Rd. ER 15, 600m a.s.l., **Fig. 19**, from 2 Jan 1995. Those who cannot smell Boronia, like the Column, won't be able to detect any perfume but a large proportion of the community remark on the strong perfume. Twenty one, well-spaced flowers on a 900mm or longer stem are not unusual here but one has to wade into ± 450 mm deep, reed choked water to photograph good specimens. It was also seen at National Park wetland, ERs18 & 23 at 800m a.s.l., 4 Feb 1996, where short plants were unhappy in still swamp water. Bill Campbell sent photos from Lake Ohia, ER 4, near sea level, taken on 14 Dec 2013 and it has been reported from nu-



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merous other sites in the North, South and Chatham Islands but is never common, due no doubt, to its unusual habitat preference. How does a plant grow from seed in a reed-choked stream? Does anyone know?

About New Year, look for plants in a stream, masquerading as reeds but conspicuous when flowers start to open. Stems and buds are green to dark purple-red so not easily seen. Lateral petals are free, and the dorsal sepal juts square out from a chunky ovary. The showy white labellum has a green centred, pale rimmed callus, barely rounding the bend. Column arms are almost as long as the anther and are simple oblongs, not bifid as in the others.

7 *Prasophyllum hectorii* “alba” the last of the established seven on the list of this genus in NZ, occurs in the Chatham Islands (Peter de Lange J70:17) and the Opuatia Swamp ER 11, near sea level. Ian Reid got it at Opuatia in Dec 1944 and again in the late 1980s **Fig. 20** as reported in J98:8,9. This taxon appears to be lacking anthocyanin, leaving only greens, yellows and white, but structurally, the flowers appear to be the same a *P. hectorii*, s.s. However its distribution indicates that it is seed propagated rather than being a sterile mutant, so it may eventually achieve recognition as a distinct taxon. In-bud plants would be difficult to detect amongst the reeds.

8, 9 and 10 principally, amongst several others on file, appear to have unique characters. More details are required to place these tantalising taxa.

8 *Prasophyllum* “Ryall”. Steve Reekie, professional photographer from Greymouth, spotted **Fig. 21** atop 1,220m Mt Ryall, ER48, on 22 Jan 2009. Tricia Aspin got a close-up, **Fig 22** of a similar flower on the Sylvania Tops, ER49 at 1,520m on 21 Feb 2010.

9 *Prasophyllum* “Caples” **Fig. 23,** by Ian St George from the Caples River ER51 and/or Skippers ER66, some 30 years ago, shows an all green taxon with up to 26 flowers packed on a stem.

10 *Prasophyllum* “Otago” **Figs. 24 & 25, another starter, also scanned from Ian’s 30 year old slides, has distinction written all over it.**



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References;

1. St George, IM, *Colenso's collections*, NZNOG, Wgn, 2009 p237.
2. Scanlen, EA, *Matthews & son on orchids*, NZNOG Historic Series No. 14, p14.
3. Tyler, B. & St George, IM, *Bruce Irwin's drawings of NZ Orchids* NZNOG, June 2007, book or CD ROM.
4. St George, IM, *The Orchid Papers of ED Hatch*. NZNOG Historical Series No. 2, pps 28 & 31.



Cover & IFC

Orthoceras novae-zeelandiae from the Astrolabe Roadstead. Mark Moorhouse.

The type locality: Ian St George

3 *Orthoceras novae-zeelandiae* and the Astrolabe Roadstead.

Original papers

10 Are our *Pterostylis* identification markers reliable? three points to consider. By Mark Moorhouse.

13 The NZ orchids distribution lists 2014. By Gordon Sylvester.

Australian notes: David McConachie.

17 Pollination of the small duck orchid, *Paracaleana minor*: flower structure and function. By Colin Bower.

Notes, letters, questions, comments

12 Instructions for contributors.

23 Colenso's map of Cape Turnagain. *Thelymitra* pollination research. Orchid fossils and evolution.

24 Notes on albinism by Guido Braem.

25 A "new standard for outdoor tracks"? or trackside vandalism? Have your say. Diamond Festival of Orchids, Gold Coast 2016.

The column: Eric Scanlen

26 *Prasophyllum* roundup 2014.

