NEW ZEALAND PLANT CONSERVATION NETWORK

TRILEPIDEA

Newsletter of the New Zealand Plant Conservation Network

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Deadline for next issue: Friday 19 March 2021

SUBMIT AN ARTICLE TO THE NEWSLETTER

Contributions to the newsletter are welcome at any time. The closing date for articles for each issue is approximately the 15th of each month.

Articles may be edited and used in the newsletter and/or on the website news page.

The Network will publish almost any article about plants and plant conservation with a particular focus on the plant life of New Zealand and Oceania.

Please send news items or event information to events@nzpcn.org.nz

Postal address:
PO Box 147
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NEW ZEALAND

PLANT OF THE MONTH, p. 3

Brachyglottis compacta. Photo: Rowan Hindmarsh-Walls.

Wairaurahiri River herbfield, Fiordland South Coast

John Barkla (mjbarkla@xtra.co.nz)

The Wairaurahiri River drains Lake Hauroko in Fiordland National Park, dropping 157 metres from its source to the mouth which empties into Foveaux Strait. On the true left bank, near its mouth, is a narrow, stony, riverine terrace about 200 m long that is dominated by low growing herbfield (Fig.1). Further east, behind the herbfield, is a windshorn shrubland dominated by *Coprosma propinqua* and *Olearia avicenniifolia*.

Figure 1: Herbfield at Wairaurahiri River.

I briefly visited this area on 13 February 2021 and was impressed with the diversity of this small, coastal-influenced herbfield with its range of cushion, mat, turf, and rosette plants. The mix included three taxa that have a conservation status of "At Risk." Many lichens and bryophytes were also evident.

The small bidibid *Acaena microphylla* var. *pauciglochidiata* (Fig.2) with sessile fruits, was especially common forming large loose mats.

Figure 2: *Acaena microphylla* var. *pauciglochidiata*.

The un-named coastal *Chaerophyllum* (a) (CHR 364086; "minute flower") (Fig.3) was more local, but conspicuous in fruit. The coastal harebell *Wahlenbergia congesta* (Fig.4) occupied a narrow niche of loose granitic sand on the margin of the herbfield. The occurrence of this mostly South Island West Coast species here must be at or near its southern limit.

Figure 3 (left): *Chaerophyllum* (a) (CHR 364086; "minute flower".
Figure 4 (right): *Wahlenbergia congesta*.

Other dominant taxa included large clumps of *Raoulia glabra* in flower and *Hydrocotyle novae-zelandiae* var. *montana* exhibiting a bewildering array of leaf sizes. Occasional weeds include hawkbit (*Leontodon saxatilis*), catsear (*Hypochaeris radicata*) and white clover (*Trifolium repens*). Table 1 is a list of all indigenous low-growing plants that I observed in the herbfield.

Table 1: Indigenous low-growing plants of the Wairaurahiri River herbfield.

Taxon	**Conservation status (de Lange et al. 2018)**
Acaena microphylla var. *pauciglochidiata*	At Risk – Declining
Acaena novae-zelandiae	
Blechnum penna-marina	
Centella uniflora	
Chaerophyllum (a) (CHR 364086; "minute flower")	At Risk – Naturally Uncommon
Dichondra brevicaule	
Gunnera monoica	
Helichrysum filicaule	
Hydrocotyle novae-zeelandiae var. *montana*	
Lagenophora cuneata	
Leptinella squalida subsp. *mediana*	
Lobelia angulata	
Muehlenbeckia axillaris	
Nertera depressa	
Ophioglossum coriaceum	
Plantago raoulii	
Plantago triandra	
Raoulia glabra	
Raoulia tenericaulis	
Wahlenbergia congesta	At Risk – Declining

Taller shrubs and toetoe (*Austroderia richardii*) are dotted throughout the herbfield and may eventually dominate the site. It does however appear to be a favoured site for the local red deer population and their browsing may help maintain the herbfield.

Reference cited

de Lange, P.J.; Rolfe, J.R.; Barkla, J.W.; Courtney, S.P.; Champion, P.D.; Perrie, L.R.; Beadel, S.M.; Ford, K.A.; Breitwieser, I.; Schonberger, I.; Hindmarsh-Walls, R.; Heenan, P.B.; Ladley, K. 2018: *Conservation status of New Zealand indigenous vascular plants, 2017*. New Zealand Threat Classification Series 22. Department of Conservation, Wellington.

PLANT OF THE MONTH – *BRACHYGLOTTIS COMPACTA*

Rowan Hindmarsh-Walls (rowan.hindwalls@gmail.com)

The plant of the month for February is *Brachyglottis compacta,* one of at least 29 species of *Brachyglottis* endemic to the New Zealand region. The species is only found in the Castlepoint area in the Wairarapa district, where it inhabits open, cliffy, coastal habitats. It is a calcicole (calcium-loving) species and is found on the limestones of Castlepoint and Matira/Castle Rock. The plants grow into woody shrubs up to two metres tall, with many branches and a dense canopy of leaves spreading right down to ground level. The leaves are stiff and deeply concave, with crinkly margins and a white felty underleaf. The flowers are fairly large, bright yellow and borne in racemes near the branch tips.

Brachyglottis compacta, Matira/Castle Rock, Wairarapa 18 February 2021. Inset left: inflorescence; inset right: distinctive leaves. Photos: Rowan Hindmarsh-Walls.

The species is easily distinguished from all other New Zealand native *Brachyglottis* species by its distinctive stiff, concave, crinkly-edged leaves and very restricted distribution. The only other *Brachyglottis* species likely to co-occur with *B. compacta* is *B. repanda* which is very different in appearance with much larger, soft leaves.

The species is endemic to New Zealand and is currently listed as At Risk – Naturally Uncommon, as it has a very restricted natural distribution. The species has no immediate threats but a large portion of the population could be destroyed if fire was ever to burn into the reserve at Castle Rock. Sea level rise and increasing coastal erosion may also become an issue in the future.

The name *Brachyglottis* means "short tongue"—from the Greek "*brachys*"—short and "*glotta*"—tongue. This name describes the short ray florets of the flowers. The species epithet *compacta* refers to the compact nature of the shrub.

You can view the NZPCN website factsheet for *Brachyglottis compacta* here: https://www.nzpcn.org.nz/flora/species/brachyglottis-compacta/

NZ Plant Conservation Network funding helps with pest control

Gavin Cherrie, Ōtanewainuku Kiwi Trust (gavin@2plus.co.nz)

Generous funding from the NZ Plant Conservation Network for increased numbers of sentinel traps has led to reduced possum numbers in the Ōtanewainuku forest in the western Bay of Plenty. Throughout 2020, 479 possums were trapped using the modified sentinels which is a pleasing result and should have really knocked the possum numbers down (fig. 1).

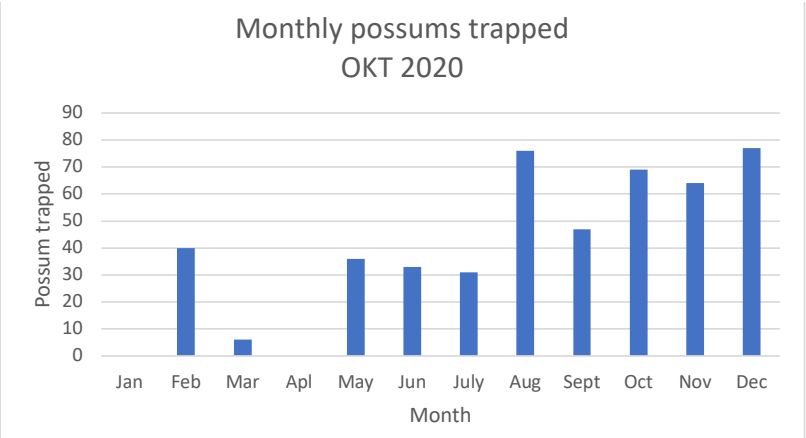

Figure 1: Possums trapped per month at Ōtanewainuku forest in 2020.

Figure 2: Dave Edwards demonstrates the modified sentinel trap.

Ōtanewainuku Kiwi Trust volunteer Dave Edwards has modified the traps making it easier and safer for volunteers to check and reset the traps with some very positive feedback coming from our own volunteers and those further away who have adopted the modifications in their own areas. You can see Dave's explanation of the changes on our YouTube channel https://youtu.be/yeM2-7i_sZc. At a training day for volunteers last year, Dave demonstrated the use of his modified traps (fig. 2).

Figure 3: Tanekaha (top) and toatoa (bottom).

In plant news, Trustee and son of the founder of the Ōtanewainuku Kiwi Trust, Hans Pendergrast recently noticed a very large leaf 'tanekaha'. The area is a tanekaha dominated forest on the higher dryer places, with many emerging rimu and totara over the edge where it is wetter and there is more soil. With a little help from fellow Trustee and kiwi expert, David Brown, they identified the tree as toatoa. *Phyllocladus toatoa*. Hans reports that he hadn't realized that this tree was in the locality but that Sarah Beadel's 1985 survey does record this species (as *P. glaucus*) so she must have identified them somewhere.

"A new name, *Phyllocladus toatoa*, was created in 1996, for a species formerly named *P. glaucus*, (a misapplied name based on a cultivated specimen of the Tasmanian species *P. aspleniifolius*). It has several unique characteristics and is easily distinguished from other members of the genus by its large and distinctive phylloclades and male and female cones. It is locally common on relatively infertile soils in lowland and montane forests from the central North Island northwards. It is well protected and not considered to be a threatened species," says Hans.

Hans says that there are 3 *Phyllocladus* species in NZ—toatoa, tanekaha (fig. 3), and mountain toatoa. These trees do have leaves, but they are small and scale like. The trees were harvested for the very straight, white, beautifully grained timber. The bark contains a tannin, in demand at the time by the tanning industry for producing high quality leather. The sawmillers made as much money out of the bark as out of the timber.

Mycorrhizae and myrtle rust?

Marley Ford, University of Auckland (mfor426@aucklanduni.ac.nz)

As the pohutukawas (*Metrosideros excelsa*) bloom this summer we ponder the future of Myrtaceae in New Zealand. We wonder how we can protect Aotearoa's species from a fungal disease with no known cure—myrtle rust *(Austropuccinia psidii*) (Stronge et al., 2019). Since the arrival of the rust in 2017 the future of New Zealand's Myrtaceae has been questioned; currently we see mature ramarama (*Lophomyrtus bullata*) trees dying, such as those in the North Island's East Cape (Radio New Zealand, 2020). In response, the threat statuses for all indigenous species have been elevated to at least 'threatened' (de Lange et al., 2018). Species once thought to be common such as ramarama (Figure 1, 2) have now been classed as a Threatened – Nationally Critical species (de Lange et al., 2018).

Figure1 (left): The bullate (rounded swellings) foliage of a mature ramarama (*Lophomyrtus bullata*) in the Waima Forest. Photo: M. Ford, 2020.
Figure 2 (right): Infected foliage of ramarama (*Lophomyrtus bullata*), the orange pustules and surrounding red are the myrtle rust (*Austropuccinia psidi*i) Infection. Photo: P. de Lange, 2020.

However, there are some potential solutions hidden within the same kingdom as myrtle rust—fungi! Studies have been undertaken into the manipulation of the leaf microbiome in the Hawaiian Eugenia tree (*Eugenia koolauensis*) (Chock, 2019). These have concluded that increased fungal diversity can promote resistance to myrtle rust. Genetic studies working towards understanding the genetic basis of Myrtaceae resistance to myrtle rust (Tobias, 2017), show that inoculated Myrtaceae respond by a change in a gene, which produces a hormone known for its role in the promotion of symbiotic mycorrhizal interactions. Therefore, it seems likely that mycorrhizal fungi can help protect our native plants against myrtle rust.

To begin to understand New Zealand's Myrtaceae species mycorrhizal communities' and their relationships to myrtle rust a baseline needs to be established. This is the aim of my Masters: "examining the mycorrhizal communities of New Zealand's endemic Myrtaceae species, *Lophomyrtus bullata*". We hypothesise that the community is most likely composed of arbuscular mycorrhizae that live inside the roots of the tree. Three sites were chosen from Western Far North in the North Island of New Zealand in the Tutamoe Ecological District—without myrtle rust (Figure 3). These are owned by local Iwi, Kaipara Council and family friends and aim to represent the natural range of the ramarama, including coastal, lowland and cloud forest vegetation types. Roots have been collected from ramarama trees and now await analysis using molecular and microscopy techniques. Soil samples were also taken to work towards understanding the site's influence on fungal communities. Lastly, the ecology of the local forest at each site was recorded. Further, during the fieldwork done so far a new population of the Nationally Endangered (de Lange et al., 2018) and Regionally sparse (Miller & Holland, 2008) grass *Microlaena carsei* was found.

Figure 3: Ramarama (*Lophomyrtus bullata*) in the forest interior of the Domain, one of the sample sites. Photo: M. Ford, 2020.

Moving forward the results of this study could be compared with the mycorrhizal communities of sites infected with myrtle rust. Then mycorrhizae could be identified that support plant resistance. This resistance could then be isolated to inoculate infected populations and inoculated plants could even be used in restoration plantings. As the spores settle and the first mature trees of indigenous forest die the reality is clear, we need to understand ecosystem resilience to work towards ensuring forest and biodiversity health, otherwise, plants like ramarama could be a tale like that of the Moa (Dinornithiformes).

For more information see my interview: https://bioheritage.nz/beyond-myrtle-rust-marley-ford-a-student-of-ecologys-underdogs/

Acknowledgements

I would like to thank the beyond myrtle rust programme, Manaaki Whenua – Landcare Research and my talented supervisors Mahajabeen Padamsee (who made comments on this article), Luitgard Schwendemann and Peter de Lange.

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Radio New Zealand, 2020: *Myrtle rust infection kills mature tree on East Cape*. https://www.rnz.co.nz/news/country/432493/myrtle-rust-infection-kills-mature-tree-on-east-cape

The type locality: *Prasophyllum hectorii* near Picton

Ian St George (istge@yahoo.co.nz)

The Wairau Plains has lost 99 percent of its wetlands, but determined conservationists are protecting what's left.

The Para wetland is situated north of Blenheim in the Waitohi Valley to the west of State Highway One. The area was a large kahikatea and totara swamp in pre-colonial times but most of the forest was cut and rafted down the Tuamarina River to Tuamarina. Large numbers of birds and fish used to inhabit the location and it provided an important food gathering area for Maori. Due to the extremely limited difference in height of the northern and southern ends of the swamp, draining proved to be impractical and as a result the wetland survived colonial development, however, willows were planted, in theory to stop flooding, but in reality severely degrading the habitat [1].

John Buchanan found a plant he thought was a *Gastrodia* nearby and described it in the T*rans* in 1886, naming it after Hector [2] (fig. 1).

Gastrodia hectori, Buch.

Root tuberous, stem and spike of flowers 18 inches high, closely sheathed for $\frac{2}{3}$ of its length by a long leaf, $\frac{1}{3}$ of the leaf being free, a short outer sheath at bottom encloses the base of the sheathing leaf. Scales none. Racemes $3\frac{1}{2}$ inches long. Flowers 13, close-set, brownish-yellow, $\frac{2}{10}$ of an inch in length, seed-vessel black, or dark brown, orbicular.

The present species was collected several years ago in Marlborough district, near Picton, and has also been seen on the Conway River. The species of *Gastrodia* are probably abundant, but their dark habitats, in dense bush country, prevent them from being easily seen.

Figure 1: John Buchanan's description of *Gastrodia hectori* [sic] in the Transactions of the New Zealand Institute, 1886.

He drew it himself (fig. 2).

Harry Carse sent Cheeseman specimens of a new *Prasophyllum* from Maungatapere, Thomas Kirk sent the same from Great Barrier Island and Cheeseman himself found plenty of them in the Ngaere swamp in Taranaki. He identified them formally with the Australian *Prasophyllum patens* R.Br. in 1906 [3].

Dan Hatch was liaising with HMR Rüpp in Australia and noted in 1946 that *P. patens* had been split into three species and that, of these, "There can be no doubt that our plant is *Pr. suttonii* [4]. His father's drawing is below (fig. 3).

In 1970 Lucy Moore put it back in *P. patens.* She wrote, "N.Z. specimens examined… approach t.109B (overleaf, from Hooker's *Flora Tasmaniae*), while t.111 shows some of the features attributed to *P. suttonii.*" [5]

In the course of unfinished work attempting to typify all of the New Zealand orchids, Brian Molloy examined Buchanan's *Gastrodia hectorii* and found it to be a *Prasophyllum,* matching the NZ plant till then identified with Australian plants—either *P. patens* or *P. suttonii.* He and his Australian colleagues Mark Clements and David Jones recognised the NZ plant was actually neither of these and named it in 2005 (preserving Buchanan's epithet) *Prasophyllum hectorii* (Buchanan) Molloy, D.L.Jones & M.A.Clem. [6].

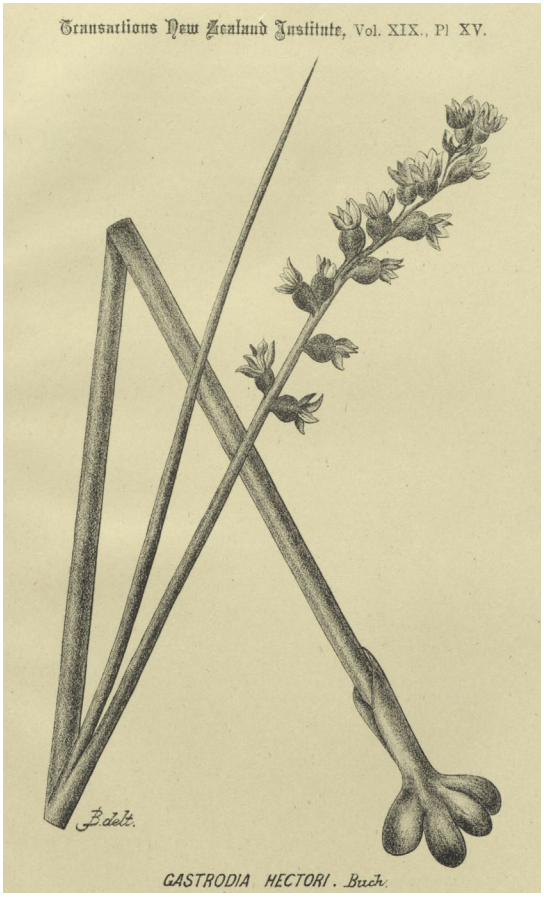

Figure 2: John Buchanan's illustration of *Gastrodia hectori.*

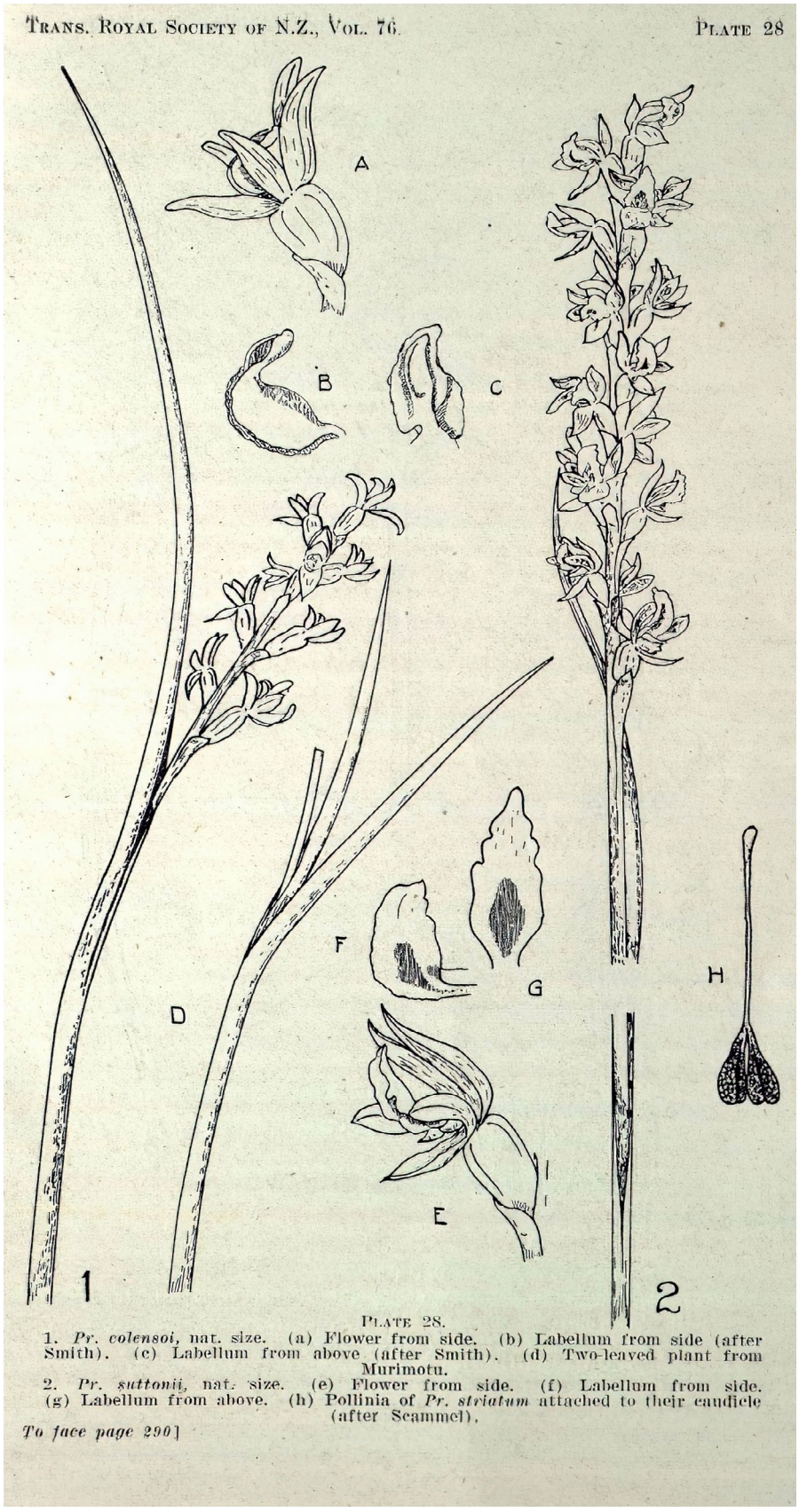

Figure 3: Illustration of *Prasophyllum colensoi* and *P. suttonii* in *Transactions of the Royal Society of New Zealand 76 (3).*

The NZ Plant Conservation Network has its distribution: "Endemic. North and Chatham Islands. Formerly known in the North Island from Te Paki south to near Waiouru, and from one site on the main Chatham Island. Current records exist for Te Paki, the Waikato and Central Volcanic Plateau."

Not since Buchanan has it, to my knowledge, been found in the South island. Perhaps it will reappear in Marlborough's Para Wetland.

Images from Hooker's *Flora Tasmaniae* (1860) drawn by W Archer and WH Fitch, lithography by Fitch.

(a) Detail of Plate 109 (fig. 4) showing B: *P. truncatum* which Lucy Moore considered NZ specimens approached.

(b) Plate 111 (fig. 5) showing *P. patens* which Moore considered "showed some of the features attributed to *P. suttonii*."

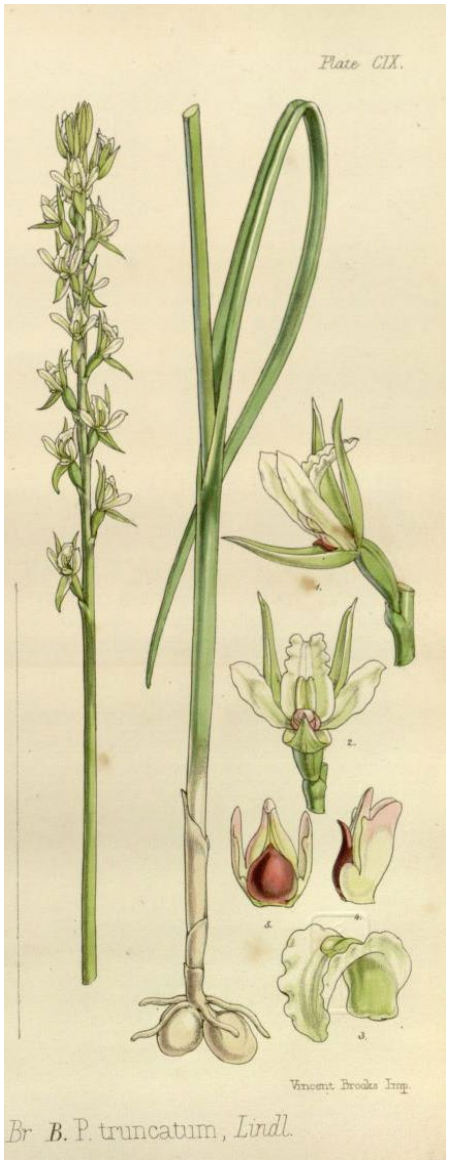

Figure 4 (left): Detail of Plate 109 showing *Prasophyllum truncatum* in *Flora Tasmaniae* (1860).
Figure 5 (right): Plate 111 showing *Prasophyllum patens* in *Flora Tasmaniae* (1860).

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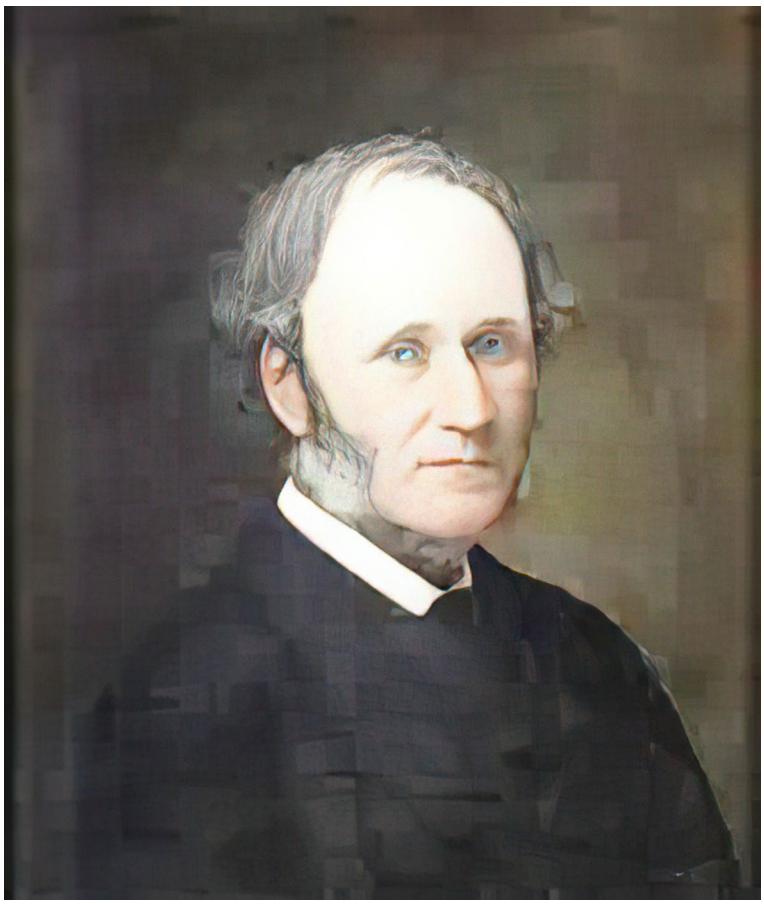
John Buchanan



This Scots pattern designer arrived in Otago in 1852 and sent back to Kew what J.D. Hooker described as the best collection of plants received from Australasia. He explored much of the interior, often in the company of Dr Hector, and his "Sketch of the botany of Otago" was a major paper. The Hocken Library has a number of his diaries, and they give a vivid picture of the hardships of collecting.

Buchanan's main botanical work was produced in response to Sir George Grey's request that N.Z. grasses should be catalogued and evaluated for their fodder potential. The illustrations for *The indigenous grasses of New Zealand* (1877) were made by inking the plants and pressing them direct onto the lithographic stone, the detail to be filled in later.

He was a prolific artist. Sketchbooks in Dunedin, Wellington and Auckland are full of beautiful natural history and topographical drawings. He was chief illustrator for the *Transactions of the New Zealand Institute*, and drew and engraved many of the lithographs for its first nineteen volumes – "JB del." appears on most. His "Milford Sound, looking North-West from Freshwater Basin" has been described as one of the masterpieces of New Zealand landscape painting.

He took an interest in orchids. His sketchbooks contain accurate copies of the W.H. Fitch drawings of New Zealand orchids in Hooker's *Flora*; a watercolour dated 25 November 1862 and labelled "wet banks of creek under shade of trees, North side, North East Valley. *Nematoceras* (?*triloba*)" shows *Corybas iridescens* and it still grows there; there are delicate pencil sketches of *Pterostylis banksii* and *Calochilus paludosus* from Collingwood.

UPCOMING EVENTS

If you have events or news that you would like publicised via this newsletter please email the Network (events@nzpcn.org.nz).

Auckland Botanical Society

Meeting: Wednesday 3 March at 7.30pm. Lucy Cranwell Award recipient Jarden Howard will be speaking, also the AGM.	**Venue:** Unitec, School of Natural Sciences, 139 Carrington Road, Mt. Albert (Gate 4, Building 115, Room 1028).
Field Trip: Saturday 20 March to Mahurangi east extension.	**Leaders:** Sam Sutherland and Dhahara Ranatunga.

Waikato Botanical Society

Meeting: Monday 15 March at 6.00pm. Speaker Catherine Beard**. Topic:** History of botanical illustration and botanical artists of note.	**Venue:** The Link Centre, corner of Te Aroha Street and River Road, Hamilton East.
Field Trip: Saturday 27 March to Nikau Caves near Waikaretu, north west Waikato**. Meet:** Gate 10 Carpark, University of Waikato , Silverdale, Hamilton or the Nikau Caves café car park on Waikaretu Valley Road at 9.30am. **Grade:** Easy to moderate.	**Leaders:** Lucy Roberts, email lucyroary@gmail.com, ph. 022 649 8804 and Yanbin Deng.

Rotorua Botanical Society

Field Trip: Saturday/Sunday 6/7 March to Makatiti Dome Scenic Reserve, Rotorua Ecological District. **Meet:** Rotorua carpark at 8.00am or Rotoiti Rugby Club carpark at 8.30am. **Grade**: Medium.	**Leader:** Paul Cashmore, email pcashmore@doc.govt.nz, ph. 07 349 7432 (Wk). Please contact Paul by Friday 26 February regarding vehicle availability and camp option.
Field Trip: Saturday 20 March to Mt. Tarawera. **Meet:** DOC Ashpit Road campground, Lake Rerewhakaaitu at 9.00am. **Grade**: Medium-Hard.	**Leader:** Paul Cashmore, email pcashmore@doc.govt.nz, ph. 07 349 7432 (wk) or 027 650 7264.
Field Trip: Saturday 27 March to Putauaki (Mt. Edgecumbe) summit and wetland. **Meet:** Rotorua carpark at 8.00am or at Maori Investments Limited (near entrance gate), Waterhouse Stret, Kawerau at 9.00am. **Grade**: Medium-Hard.	**Leader:** Mieke Kapa, email mieke.kapa@boprc.govt.nz, ph. 027 538 1586.

Wellington Botanical Society

Meeting: Monday 15 March at 7.30pm. Speaker Winifred Long, Ecological Analyst. **Topic:** Kotukutuku Ecological Restoration Project (KERP) – Impact of rodent control on forest regeneration.	**Venue:** Victoria University Lecture Theatre M101, ground floor Murphy Building, west side of Kelburn Parade.
Field Trip: Saturday 6 March to Martins River, Akatarawa Forest. **Meet:** Tunnel Gully carpark, off the end of Plateau Road, Te Marua, at 9.30am.	**Co-leaders:** Jon Terry, email jonterry.nz@gmail.com, ph. 021 168 1176 and Helen White, email helenamywhite@gmail.com, ph. 022 413 5194.

Nelson Botanical Society

Field Trip: Sunday 21 March to Pelorus.	**Leader:** Penny Palmer, email stevepenny@xtra.co.nz, ph. 027 535 6441. Please contact Penny for further details.

Canterbury Botanical Society

Meeting: Monday 1 March at 7.30pm. Speaker and topic to be confirmed.	**Venue:** Upper Riccarton Library community meeting room, 71 Main South Road.
Field Trip: Saturday 6 March to Grey River picnic area, Mt. Grey/ Maukatere Conservation Area. **Meet:** Belfast Hotel carpark at 9.00am or the Cramptons Bush Road entrance to Mount Grey (Ashley) Forest at 9.45am.	**Leaders:** Miles and Gillian Eller, email ggillerma1@actrix.gen.nz, ph. 03 313 5315. Please let Miles or Gillian know if you intend to participate.

Botanical Society of Otago

Meeting: Wednesday 10 March at 5.20pm. Speaker Cara-Lisa Schloots, Masters student, Botany Department, Otago University. **Topic:** The End Peak wetland complex.	**Venue:** Room 215, 2nd Floor, Zoology Benham Building, 346 Great King Street.
Field Trip: Saturday/Sunday 27/28 March to Mahu Whenua. Leaving Dunedin at 7.00am on Saturday.	**Leader:** Matt Larcombe,email matt.larcombe@otago.ac.nz, ph. 027 919 9709. Please register your interest with Matt by Monday 22 March.