



**BOTANICAL SOCIETY**  

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**OF OTAGO**



**NEWSLETTER NUMBER 85**

*October 2018*



*Ferns in New Zealand and the World*

by Bill and Nancy Malcolm, 2017, Micro-Optics Press

An introduction to ferns – what they look like on the outside and how they're built on the inside, what goes on during their surprisingly eventful lives, how they differ from other plants, and the mythology that's grown up around them. Fiddleheads, the young shoots of ferns, are a recurring *motif* in Māori marae carvings and tā moko (facial tattoos). Overseas, our ferns have been prized as decorative plantings for gardens and window-sills or as oddities in glasshouses, and they're seen by millions of people around the world as the familiar silver fern emblem of New Zealand sports teams and the distinctive koru logo on the tailplanes of Air New Zealand's fleet of aircraft.

233 pages, illustrated with 400 colour photographs, microscope views, drawings, and diagrams.

Price NZ\$59 (includes GST and shipping inside New Zealand). Order from Bill by **e-mail** at [nancym@micro-optics.com](mailto:nancym@micro-optics.com) or by **post** at P.O. Box 320, Nelson 7040, or by **phone** at 03-545- 1660. Payment options PayPal or direct credit.



## BSO Meetings and Field Trips October 2018-February 2019

**Saturday 6<sup>th</sup> October, 8.30 am: Field trip to 'Dogwood' at Kuri Bush.** Dogwood at Kuri Bush is a c.5ha remnant of mixed podocarp-broadleaf forest in a steep-sided gully on private land. It is in the process of being considered for a QEII covenant and one of the aims of this field trip is to contribute to a growing species list for the QEII report. The lower part of the gully at 20-30m above sea level is a kanuka-totara open forest with abundant lichens. Stock had access to this area up until c.15 years ago but regeneration is good. The highest point is 40m above sea level and the middle and upper areas have been fenced from stock for c.30 years or more. The size of many matai and totara trees suggests that core areas have never been cleared or logged completely. The gully itself contains typical species such as *Fuchsia excorticata*, *Griselinia littoralis* and tree ferns, but the slopes support less common dry forest with *Hoheria angustifolia*, *Streblus heterophyllus* and *Lophomyrtus obcordata*. Two orchid species are relatively common – *Pterostylis graminea* and *Corybas trilobus* - and so far more than 20 species of ferns have been found. Bryophytes, lichens and fungi have not yet been explored. Birdlife is abundant with not only kahu, tui, bellbird, kereru, grey warbler and silvereyes but also shining cuckoo, the occasional falcon and possibly little owls. The stream is rumoured to contain koura but this has not yet been verified. Banded kokopu occur in a side catchment. Access is via adjacent paddocks and a narrow track that follows the stream up until the mid-section. Access to the interior of the upper area is via a marked route which involves some steep sections and stepping over obstacles. Good footwear is essential. For people not inclined to scrambling, many species including dwarf mistletoe and orchids can be seen from the margins. Field trippers are invited to stop for a hot drink at the house after the expedition. Meet at Botany Dept 8.30 am to carpool or on-site at 9.10 am. (see location map on website) Rain date Sunday 7 October. Contact Janice Lord phone 029 4881900. See NatureWatch for a current local species list: <http://inaturalist.nz/lists/848636-Kuri-Bush>

**Wednesday 10<sup>th</sup> October, 5.20 pm: Were native plants on settler's farms in southern New Zealand used or abused?** Speaker: Peter Holland, Emeritus Professor, Department of Geography, University of Otago. By 1900, European settlers had transformed the terrestrial vegetation cover of the southern New Zealand lowlands. The extensive tussock, shrub and fern lands, with large and small expanses of closed canopy forest and wetland in depressions had almost disappeared, and in their place was a geometrical mosaic of crop land, improved pastures, hedges and shelter belts with a smattering of native plants and remnants of once extensive native ecosystems. Did anyone express concern about what was happening to native species and ecosystems in the south, and were landholders indifferent to native plants? With information from official reports, contemporary newspaper articles, and entries in late 19<sup>th</sup> and early 20<sup>th</sup> century farm diaries I shall show that settlers valued such woody plants as broadleaf, kowhai, and totara, and were reliant on forest remnants and shrublands to shelter and sustain livestock when feed was in short supply. At the same time, many settlers were draining wetlands, burning tussock, and clearing wooded and shrubby areas on their properties, despite what they could read in their newspapers about the national importance of conserving large and small areas of native vegetation. Did early settlers use or abuse native plants and ecosystems? The answer is more complex than many of us might believe.

Entries for the biennial Audrey Eagle Botanical Drawing Competition will be displayed and the prize winners announced at this meeting.

**Friday 9<sup>th</sup> November - Sunday 11<sup>th</sup> November 2018. Weekend field trip to Southland.** Following on from a trip in February this year, we plan to further explore the botanical treasures of Southland. Local

QEII representative Jesse Bythell has organised a great itinerary for us and DOC botanist Brian Rance will lead us through that. Jesse has lined up several properties in the Dipton area that include beech forest, mature podocarp-broadleaved forest and rare small-leaved shrubland. We will travel to the Dipton area on Friday afternoon/evening so that we can be on-site early on Saturday. Participants have the option of travelling back to Dunedin on Saturday evening or staying on to visit another site on Sunday. We will base ourselves at Camp Taringatura <https://www.camptaringatura.com/> on 809 South Hillend Dipton road, which has cabins and camping sites. You are responsible for your own accommodation and catering. Please let John Barkla [jbarkla@doc.govt.nz](mailto:jbarkla@doc.govt.nz) ph. (03) 476 3686 know if you are intending to come by Monday 5 November at the latest. Travel arrangements will be advised.

**Wednesday 14<sup>th</sup> November, 5.20 pm: Native Plants are vital to Nationhood not just ‘nice to have, optional extras’.** Speaker: Colin D Meurk, Manaaki Whenua – Landcare Research. New Zealand is a biodiversity hotspot, but sadly also an extinction capital. Part of the excruciating extinction process is ‘extinction of experience’. We haven’t, so far, lost many plant species, but we are rapidly losing the experience as the visible cultural landscape is gobbled up by industrial agriculture, forestry and wilding trees and shrubs without any sensitivity to the unique history of Aotearoa-New Zealand. And with that goes identification with, and protectiveness towards, our special highly endemic nature. Extinction of species and geographic variants will not be far behind unless we reverse the root causes of this attrition.

Colin will illustrate key concepts, causes and novel opportunities in loss and recovery of our flora through urban and rural landscapes where most people form their notions of naturalness. It is there where visibility of biodiversity is a key ingredient of our resident sense of place and of the primeval, clean green brand essential to an authentic tourist industry. He will discuss the urgency of protecting the rarest dryland ecosystems of eastern South Island, their controversial management, biosecurity control, restoration of habitat and of landscape connectivity, novel recombinant ecosystems for urban environments (perhaps the last chance for rare lowland species), heritage legibility and ecological literacy through citizen science within an emerging nationhood. These latter ideas are not new, although the level of urgency and the terminology may not be quite what Leonard Cockayne used a hundred years ago! You are invited to compare notes on the state of our flora and how we can mend and rebuild its presence in our places and in our consciousness.

**Saturday 1<sup>st</sup> December - Sunday 2<sup>nd</sup> December 2018. Weekend field trip to Oteake Conservation Park.** This will be a joint trip run by BSO and Forest and Bird. We plan to stay at the Naseby Campground. See <https://larchviewholidaypark.co.nz/>. There are a variety of cabins and campsites available. People are responsible for making their own arrangements and we suggest you book early. Note: this is a change of venue to that advertised in the May newsletter (DOC Homestead Camp Site, Hawkdun Runs Road). Staying at Naseby will give us more options especially if the weather is bad. Options for day trips are: Mt Buster Road, and/or Little Kyeburn Track, Mt Kyeburn/Timber Creek Track from the Danseys Pass road and Upper Manuherikia Tracks. The vegetation of the Oteake Conservation Park is diverse and very interesting especially in the alpine zone. There are well-developed screes which have their own specialised flora and a number of species reach their southern limit in the region. Final details will depend on the number of people attending and the number of 4WD vehicles available. If you wish to go on this trip please contact David Lyttle at (03) 454 5470 or [djl1lyttle@gmail.com](mailto:djl1lyttle@gmail.com)

**Wednesday 13<sup>th</sup> February 2019, 5:20pm. Ring of Fire: Volcanoes and Plants around the Pacific.**

Speaker: Peter Johnson. Volcanoes: ancient to active, with or without fumes, steam, scoria, sparks, ash, lava ... what places for plants to live! Over the years I have found myself scrambling, botanising, and photographing upon the slopes and sometimes summits of solidified or eroding magma mountains. Most of these have risen up from the 'ring of fire', and my retrospective journey will take us clockwise around the margin of the Pacific Plate. We shall start among gentians on the highest point of the Auckland Islands, rest briefly on the basalt hills of Dunedin, then head north for a dose of younger volcanic fields: Tongariro, Taupo, Tarawera, and Rangitoto. Then up through Pacific Islands (Samoan lava fields, *Metrosideros* mist forest, erupting Mt Yasur) towards Indonesian mountains (or Gunung) with names such as Agung, Abang, Kawa Ijen, Bromo, Merapi, and Sibayak ... with plants ranging from rice to wild raspberries, *Dianella* to *Dodonaea*. In northern Japan we shall climb Mt Asahidako and Rishirifuju, see familiar genera such as *Rhododendron* and *Betula*, another gentian, and wildflowers you may have never heard of. Google Earth will take us to Kamchatka, Canada, and Guatemala; we have garden plants from all those places. Finally, to the dry Andes, to see red mistletoes upon columnar cacti, and to Volcan Llaima where the alpine herbs bloom blue and white, yellow and orange and red ... an illustrated nursery catalogue to die for ... except: take nothing but photographs!

**Saturday 16<sup>th</sup> February 2019 Blackstone Hill Conservation Area 8.00 am** This is a block of montane tussock grassland and shrubland rising to an elevation of 800 m accessed from Highway 85 between Wedderburn and Becks. The Blackstone Hills separate the Ida Valley from the Manuherikia Valley. They are relatively flat on top but are dissected by gullies that contain grey scrub vegetation. BSO has not visited the area before so it will be a useful exercise to make a species list for the area. Meet at the Botany carpark at 8.00 am. Contact David Lyttle on (03) 454 5470 or [djl1yttle@gmail.com](mailto:djl1yttle@gmail.com)

**Meeting details:** Talks are usually on Wednesday evening starting at 5.20 pm with drinks and nibbles (gold coin donation), unless otherwise advertised. Venue is the Zoology Benham Building, 346 Great King Street, behind the Zoology car park by the old Captain Cook Hotel. Please use the main entrance of the Benham Building to enter and go to the Benham Seminar Room, Room 215, located on the second floor. Please be prompt as we have to hold the door open. Items of botanical interest for our buy, sell and share table are always appreciated. When enough people are feeling sociable we go to dinner afterwards: everyone is welcome to join in. The talks usually finish around 6.30 pm. Keen discussion might continue till 7 pm.

**Field trip details:** Field trips leave from Botany car park 464 Great King Street unless otherwise advertised. Meet there to car pool (10c/km/passenger to be paid to the driver, please). Please contact the trip leader before Friday for trips with special transport and by Wednesday for full weekend trips. A hand lens and field guides always add to the interest. It is the responsibility of each person to stay in contact with the group and to bring sufficient food, drink and outdoor gear to cope with changeable weather conditions. Bring appropriate personal medication, including anti-histamine for allergies. Note trip guidelines on the BSO web site: <http://www.otago.ac.nz/botany/bso>

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## Chair's Notes

*Gretchen Brownstein*

Hello! How exciting, my first chair's notes! And a little scary... I've got some big boots to fill. David Lyttle did a wonderful job in the role, steering the society on a good steady course. My style may be a bit different (let's say more 'crazy american'... in a nice way). But we've got a great committee and general membership, so I'm sure we won't capsize.

Over the winter the Society has been cracking on with projects. David Lyttle has compiled a list of plants to include in the Native Plants of Dunedin book and is now putting together an outline for it. Allison and co. have started a project on Urban Lichens with the Botanical Gardens (more about that below). John Barkla has produced another stunner of a BSO calendar; these are on sale now, so snap one up quick! They make great Christmas gifts.

In August, I attended the "Town Belt – What's next?" stakeholder workshop run by the DCC. The Town Belt Boost is a flagship project of the Te Ao Turoa, Dunedin's Environment Strategy. The aim of the workshop was to identify the main themes and high-level actions for the project. One of the key themes was biodiversity, with many of the actions proposed revolving around promoting native plants. Can't help but think there is a place for the BSO to offer up some enthusiastic expertise here. Let me know what you think, any one keen to jump in here?

And news from the committee: we have a new webmaster! David Orlovich handed over the role to Lydia Turley as he no longer had the time to devote to website. David built the original website in the early 2000's and has maintained it ever since (with help from Hadley O'Sullivan)! A massive thanks to David and Hadley for keeping the BSO on the web for 15 years! With the change in webmasters, there has also been a bit of revamp of the site and a change in location: we can now be found at [www.bso.org.nz](http://www.bso.org.nz). Lydia and David, with support from outside the BSO (Daniel Pritchard, a Botany PhD graduate), have worked hard to make sure all the old newsletters are still available and the Dairy, with all past events, has been moved over. Please let us know what you think of the new site.

As always, if you have any ideas for trips or talks or projects you think the Society should do, let the committee know.

Happy botanising!

## Secretary's Notes

*Allison Knight*

Spring has sprung and BSO is full of vigour, too. There are so many exciting, intriguing and worthwhile things going on that it was a pleasure to write the minutes of the September committee meeting. By the time you read this our colourful 2019 Calendar should be ready to delight you for another whole year with an extraordinary collection of botanical photos selected by John Barkla. This year we have printed a slimmer version, which will make it easier to post, and the price has been slimmed down too. Great for presents at Christmas time.

Janice Lord will have given the 17th annual Geoff Baylis Lecture and a tour of her Kuri Bush native forest remnant will be in the pipeline. Back-pedal a week and the Swedish Ambassador will have visited Dunedin to see what the city can do to celebrate the anniversary next year of 250 years since Daniel Solander first brought New Zealand botany to European eyes. Ironically, the Ambassador's visit coincides with the Royal Society Leonard Cockayne Lecture on current and future threats to New Zealand by non-native plants, yet another highlight on the botanical calendar.

Lydia is putting a lot of work into setting up a stand-alone BSO website. We hope this will make it easier for you to check what is happening, and there is certainly plenty in the pipeline. A bonus at the October meeting will be a display of the entries in the biennial Audrey Eagle Botanical Drawing Competition, along with the presentation of prizes.

Looking ahead to next year there are two botanical books from BSO in the pipeline, one on Dunedin Forest Plants, spearheaded by David Lyttle, and one on Urban Lichens. If you have any intriguing lichens growing in your urban area do send a photo.

Finally, advance notice on two summer trips and an apology. It is Wellington Bot. Soc. who are holding a summer camp based at Bannockburn, 25 Jan – 1 Feb 2019. Canterbury Bot. Soc are planning a summer camp based at Borland Lodge in 2020 and would appreciate visitors who know their southern botany.

## Editor's Notes

*Lydia Turley*

Wow, it's another jam-packed newsletter! We've got some great articles, including Ali Nicholls' beautiful essay on anthropology and fungi and John Barkla's list of threatened Otago Peninsula plants. We're again printing part of the newsletter in colour thanks to Bill Malcolm and his fern book – and what could be better than full colour pictures of ferns?

Thanks, as always, to everyone who contributed to this newsletter – you're the reason the newsletter keeps happening. And a super special thank you to Gretchen Brownstein for all the work she's put into this edition.

We've got a new website – check it out on [www.bso.org.nz](http://www.bso.org.nz) and save it to your browser. This is the new go-to place for up to date information on events and stuff. Any comments or suggestions let me know. On that note, if you haven't already, like us on Facebook; we're Botanical Society of Otago.

Suggestions and material for the newsletter are always welcome from our members. If you are keen to submit stories, drawings, reviews, opinions, articles, photos or letters – or anything else you think might be of botanical interest to our diverse range of members, don't hesitate to get in touch. Send your feedback, comments or contributions to [lydiamturley@gmail.com](mailto:lydiamturley@gmail.com). Copy for the next newsletter is due on 5 January 2019. Earlier submissions are most welcome.

**Disclaimer:** The views published in this newsletter reflect the views of the individual authors and are not necessarily the views of the Botanical Society of Otago.

## Treasurer's Notes

*Mary Anne Miller*

As predicted in the last newsletter our membership numbers increased after preparation of the end of financial year report - which was 31 March 2018. We now have 69 general members, up from the 26 reported back then, and have 9 students on board. This is very encouraging.

You will have also seen in the annual financial report that we have funds put aside for projects which are developing in the background, and there are some good ideas floating around about future publications.

The annual Peter Bannister Student Field Grant has been one of our special projects for five years now. Thanks to Jennifer Bannister, it has been very beneficial to post-graduate students studying some aspect of botany at the University of Otago. However, this is the last year grants will be awarded. This newsletter has the results of the 2017 grantee's summer investigations and we have pleasure in announcing the recipients of this year's grant.

## New Members

A warm welcome is extended to Ann-Kathrin Schlesselmann, Mike Small, Melanie Vermeulen, Bill Nagle, Matt Larcombe, Paul Smale, and Adra Yagolnitzer. To our existing members, thank you for your continuing support.

Thank you very much to Edna Parkyn, Tony Aldridge, Toni Wilson and Gill Hamel for their generous donations.

**Editor's guidelines:** Try to aim for a 0.5–1 page of 14 pt. Times for news, trip/meeting reports and book reviews and 1–5 pages, including illustrations, for other articles. Electronic submission by email to [lydiamturley@gmail.com](mailto:lydiamturley@gmail.com) is preferred. Send photos as separate files and remember to include photo captions and credits.



## Correspondence and News

### Peter Bannister Student Field Grant

Mary Anne Miller

On behalf of this year's selection committee - Jennifer Bannister, Associate Professor David Orlovich and myself - it gives me pleasure to announce the winners of this year's grant. It has been awarded to Zoe Lunniss of the Botany Department, University of Otago, to assist her research into populations, seed establishment and conservation of *Tupeia antarctica*, and Duncan Nicol of the Geography Department, who will investigate the phytogeography of *Celmisia* in New Zealand. Congratulations Zoe and Duncan. We look forward to reading the results of the fieldwork you'll undertake this summer.

Also, we present the 2017 report. There was only one application for last year's grant and the selection committee had no hesitation in supporting Patricio Saldivia with his PhD research into molecular systematics of the *Celmisia* group, with a focus on sub-group *Lignosae*. Patricio outlines work he did last summer when he visited the Allan Herbarium at Lincoln and field sites in North Otago and South Canterbury. You'll notice a link between Patricio's work and that which Duncan Nicol will undertake this summer. This is due to Duncan assisting Patricio with his explorations to find areas of rare *Celmisia* species.

Our thanks to Jennifer Bannister, who initiated this grant in memory of Peter Bannister, Professor of Botany, University of Otago, 1979-2005.

**New Website:** [www.bso.org.nz](http://www.bso.org.nz)

Save it to your browser!

## Botanical Art & Illustration Exhibition at Olveston 2018

Olveston Historic Home, 42 Royal Terrace, Dunedin

Saturday, December 1<sup>st</sup> – Saturday, December 8<sup>th</sup> 2018

This exhibition highlights work from the Advanced Botanical Art and Illustration Course taught at Olveston in 2018, featuring contemporary botanical art and illustration in Dunedin.

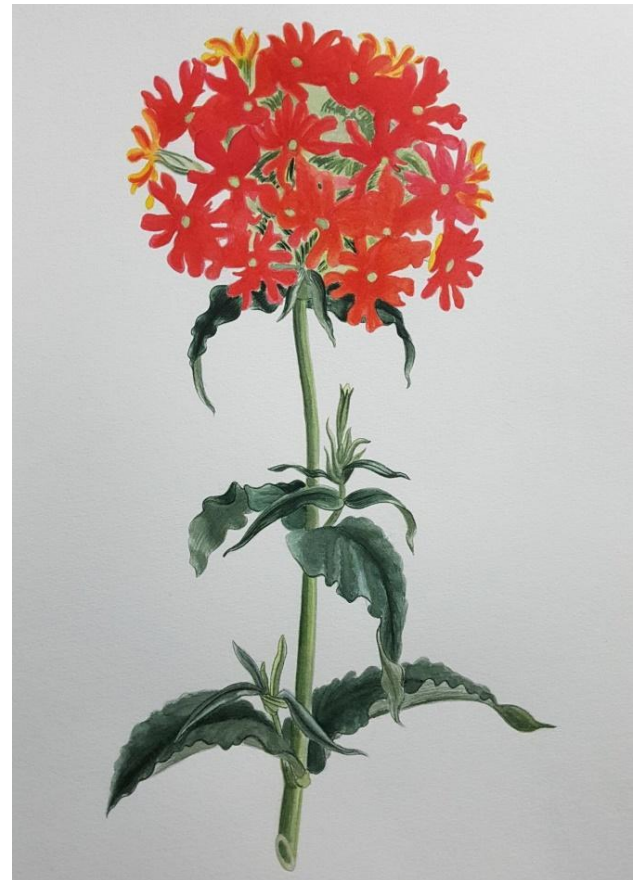
Exhibition Schedule:

Friday 30<sup>th</sup> November: Exhibition opening (5.30-7.30pm)

Saturday 1<sup>st</sup> - Friday 7<sup>th</sup> December: Show open 10.00am-4.00pm

Saturday 8<sup>th</sup> Dec: show close 2.00pm

Admission: Free



## Articles

### Molecular Systematics and Taxonomy of the *Celmisia* Group with Emphasis on *Celmisia* subgenus *Lignosae*.

Patricio Saldivia

PhD Candidate, Department of Botany, University of Otago.

The *Celmisia* group (in the family Asteraceae / Compositae, daisies) is one of the most diverse angiosperm groups in New Zealand, including the genera *Celmisia*, *Olearia*, *Pachystegia*, *Pleurophyllum*, and *Damnania* (along with the representatives of some of these genera in Australia and New Guinea). However, its taxonomy at the generic and specific level has been without work for decades and, consequently, some key aspects like the monophyly of the genera, its relationships, and its correct and formal naming following a phylogenetic and morphological framework and the botanical nomenclature rules, are still waiting to be solved. These questions are one of the main goals of my project, with an additional emphasis at the specific level in the shrubby *celmisias* (*Celmisia* subgenus *Lignosae*).

In August 2017 I was awarded The Peter Bannister Student Field Grant by the BSO which allowed me to undertake both herbarium studies and fieldwork.

I spent one week working at the Allan Herbarium (CHR, Lincoln), which is the main New Zealand herbarium holding a large collection of all the New Zealand species belonging to the *Celmisia* group. I studied over 400 specimens of several species but focused on the *Celmisia brevifolia-angustifolia* and *Celmisia discolor-incana* complexes, and I also chose representatives of several species under-represented at the Otago Regional Herbarium (OTA, Dunedin) for sending on loan to OTA. This was an important complement to my work at the OTA Herbarium since, although it holds an important collection of most of the *Celmisia* species from the central-south of the South Island, it lacks collections of several *Olearia* species and some *Celmisia* species from the north of the South Island (e.g. *Celmisia rupestris*). The study of herbarium specimens is a central point in taxonomy, allowing the researcher to

have a complete (or at least a broad) view of the natural variation or plasticity of the taxa (e.g. species, genera), along with the study of specimens from populations that could be currently extinct, and the interpretation of old botanists' original descriptions (study of type specimens) that are often brief and lacking enough information.

I also had the opportunity to study several *Celmisia* and *Olearia* species in the north Otago – south Canterbury area during a three-day fieldtrip, which also focused on the *Celmisia brevifolia-angustifolia* complex. This fieldwork is of great value for taxonomic purposes, providing the opportunity for the researcher to gather information often impossible to see from herbarium specimens, like architecture and ecological aspects.

I am just in the middle of my project, so I still have lots of work to do! And although preliminary results are not yet conclusive, it is likely that in one way or another this group will need some major taxonomic rearrangements.



Left: Herbarium specimen studied at the Allan Herbarium (CHR 478729) belonging to the *Celmisia brevifolia-angustifolia* complex. Right: *Olearia odorata* collected on slopes east of Guffies Creek, west of Marys Range, north Otago.

### Book Review: New Zealand Ferns

John Steel

Malcolm, W.; Malcolm, N. (2017) *Ferns in New Zealand and the world*. 233 pp. Micro-Optics Press, Nelson.

Ferns form a significant part of the New Zealand psyche as well as the environment and are well-known as such, but for many that is about as far as it goes. In a recent exercise, members of the public were given several plant specimens and asked to put them in an appropriately named box – the moss, *Cyathophorum bulbosum*, was the most commonly thought to be the fern; the fern, a small frond of *Blechnum penna-marina*, ended up all over the place!

Over the years and from around the world there has been a steady supply of fern books approaching the topic from different areas of interest – academic, horticultural, coffee table, etc. – using examples primarily from beyond our shores, but with the occasional nod to some of the more interesting species to be found here. New Zealanders have also had their share of local productions, mainly florae – national (Field (1890); Dobbie (1921); Brownsey & Smith-Dodsworth (2001)) and local, and a steady supply of popular works of variable quality (Chinnock & Heath (1981-1999); Crowe (2004); Koller & Tripp (2010)). All tend to be variations on the same theme. This book is different. Here the Malcolms have tied it all together and lifted the bar to a whole new level for local and international appeal, but using New Zealand species as examples.

Often important details (e.g. scales, indusia, etc.) for appreciating, separating and identifying different species can be difficult to determine from the literature, but here the judicious use of photographs, drawings and microscopic images to highlight a feature give it its own perspective and stands out in its own right not just as an addendum to the text. The writing style is both informative and entertaining; there is not a wasted word nor any superfluous verbiage to distract from the message.

The first forty pages comprise short, informative and entertaining chapters on a dozen or so varied topics from folklore to food. This can be problematic – it is nigh impossible to stop oneself from moving on from one gem to the next. Photographs more than live up to the promise of encouraging the reader to appreciate those characters generally hidden to the eye due to their small size. The full-page image of the baby sporophyte developing from the tiny gametophyte defies superlatives.

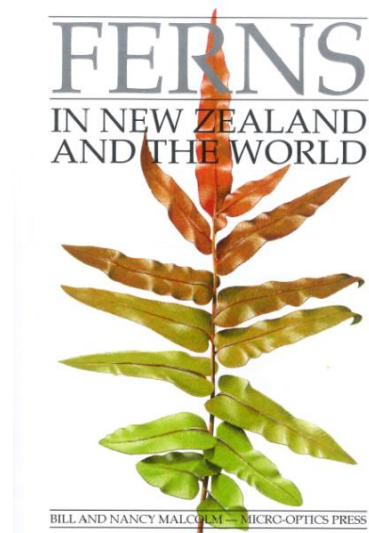
There follows a clever use of close-ups of scales, hairs, sori and indusia alongside their microscopic, often full-page, images. These features are often crucial for identification and yet regularly brushed over because of their small size and the consequent

requirement of a hand lens to gain any interpretation of them. After viewing them here, appreciation of these tiny structures moves to a whole new level.



It's more than halfway through the book that the classification of the different families of lycopods and ferns is introduced. Twenty-two groups are introduced under their common names, each with photographs - close-up for the habit and microscopic for their minute characters. The use of New Zealand examples is not new for the New Zealand fern lover, but will bring a new dimension to those overseas. However, no other New Zealand treatment of our ferns comes close to capturing the beauty up to now hidden to general view. In the nineteenth century New Zealand was known as "The Land of Ferns"; with this book it is not difficult to see why.

If you have any interest in ferns, you won't fail to be further enthused by this book; if you are not interested in them, then you very soon will be!



Fern Book Cover (Bill Malcolm)

233 pages, illustrated with about 400 colour photographs, microscope views, drawings and diagrams. Priced at NZ\$50 (including GST and shipping inside New Zealand). **Order** from Bill by **email** at nancym@micro-optics press.com or by **post** at P.O. Box 320, Nelson 7040, or by **phone** at 03-545-1660. Payment options PayPal or direct credit.

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## Ghost Moth Fragments of Gondwana

John Grehan

Just about everywhere in New Zealand one may be fortunate enough to come across ghost moths. Well, fortunate if one is fascinated by these insects. Nearly worldwide in distribution, ghost moths comprise the family Hepialidae with about 700 described species. In New Zealand the best-known species are probably the ‘porina moths’ (*Wiseana* spp.), with larvae that infest pastures, and the North Island puriri moth, *Aenetus virescens* (New Zealand’s largest moth), with larvae that bore tunnels into trees and shrubs such as *Nothofagus* spp., *Carpodetus serrata*, and *Vitex lucens*. New Zealand has a total of 27 species of ghost moths in six genera (Dugdale 1984). The Otago region and adjacent areas are particularly

diverse, with about 18 species inhabiting forest, lowland and alpine grasslands, and bogs.



Fig. 1. Blue Mountains, 1 March 1987. Moss bog and cushion plant habitat of *Aoraia oreobolae* (endemic). Brian Patrick (left in view) and Neville Hudson (right) searching for moths.

In the general evolutionary scheme of life, ghost moths are considered to be quite primitive compared to butterflies and most moths. The adults are the reproductive phase of the life cycle, but they are non-feeding and short-lived. Caterpillars live in seclusion, tunneling in soil, roots, or stems of various host plants ranging from mosses to angiosperms (Grehan 1989). Most species feed on a variety of plants, but some are restricted to a few species. In the bogs of the southern South Island and Stewart Island the sphagnum ghost moth *Heloxycanus patricki* feeds only on sphagnum moss. Another wetland species, *Cladoxycanus minos*, will emerge in midwinter, at a time when only the most stubborn naturalists venture into the wild (Patrick 2014). The female drops eggs onto the ground, where they require an almost completely saturated substrate. Hatched larvae proceed to feed on dead plant detritus and sometimes even fungi. The young larvae of *Aenetus virescens* actively graze the surface of polypore fungi that encrust the undersides of dead logs and branches on the forest floor before transferring to live plant hosts.

New Zealand’s ghost moth genera and species are all endemic, with the sole exception of *Aenetus*, which is also present in Australia, New Caledonia, Papua New Guinea and Indonesia (Grehan et al. 2018). As with New Zealand’s other endemic plants and animals, the question of how ghost moths came to be here is part of a much larger question – how to study and interpret the evidence for New Zealand’s

formation and geographic isolation. New Zealand is geologically a combination of geological terranes that collided with East Gondwana during the Mesozoic. The chunk of this combined landscape that became New Zealand and New Caledonia (Zealandia) was sliced off the Gondwana mainland with the formation of the Tasman Sea, beginning at 84 Ma. As this land separated it was stretched and lost much of its buoyancy, so that by the Oligocene most of it was submerged and only small islands remained. Some geologists and biologists have proposed that at one point there was no land left at all, but this account has been widely discredited by geological and biological evidence (see reviews in Gibbs 2016 and Heads 2017).

After such a prolonged history of geological upheaval combined with climatic extremes one may be forgiven for being skeptical about the long term persistence of New Zealand's original endemic biota. But such persistence is indicated by the fact that New Zealand endemic animals and plants have precise geographic relationships with other parts of the world such as Australia, South America, Africa, and even regions in the central Pacific. These patterns have been well established in two recent books examining the biogeographic and geological history of New Zealand and Australasia (Heads 2014, 2017). These publications presented evidence showing that many endemic taxa are involved with very precise tectonic correlations both within and beyond New Zealand (Grehan 2017). The biological distributions and their boundaries coincide with tectonic structures (such as faults, spreading ridges and zones of extension or compression), and this suggests a shared evolutionary history.

With this general biogeographic background in mind, my Brazilian colleague Carlos Mielke and I recently investigated the evolutionary history of ghost moth distributions worldwide, with a focus on Australasia. This was made possible by the extensive geographic and taxonomic documentation available for New Zealand (Dugdale 1994) and Australia (Simonsen 2018). Our study (Grehan & Mielke 2018) showed the same kinds of distributional relationships of ghost moths with tectonic features as those found in many other organisms. For example, in New Zealand, one of the

major patterns involved the Alpine Fault (but not the main divide of the Southern Alps). As in many other plants and animals, there are examples of ghost moth distributions dislocated north and south on either side of the fault. This can be understood as the result of an original distribution on both sides of the fault that has been moved, and sometimes split, in different directions (Fig. 2). The correlation between the biological disjunction and the fault displacement suggests that the ancestral population existed prior to horizontal movement along the fault, which started about 20 Ma. This Alpine fault correlation provides evidence that modern ghost moth species, along with many other New Zealand animals and plants, are at least 20 million years old.

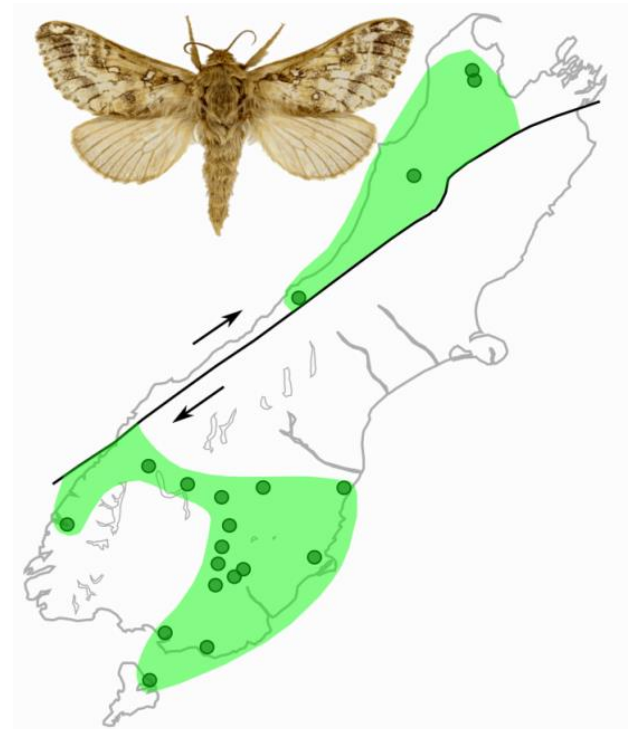


Fig. 2. Distribution of *Wiseana jocosa*, an example of a distributional disjunction correlated with the Alpine Fault. Specimen photo: Landcare Research, New Zealand

Another series of correlations concerns ghost moth species in the southern South Island that have distributional boundaries at or near tectonic structures dating back to the Cretaceous or early Cenozoic. An example is *Aoraia rufivena*, which is widely distributed through Otago, but not Southland. The species lives in subalpine grasslands and mires, and upland and lowland forests. Its distributional boundaries (Fig. 3) involve three tectonic features (i) the Moonlight Tectonic Zone

(MTZ) that was originally an inland Cretaceous sea and part of the 1200 km long Challenger Rift System, and later active during Eocene and Oligocene time; (ii) the Waitaki Fault Zone (WFZ) that first formed during the mid-Cretaceous; and (iii) the Earnslaw-Taieri-Wakatipu synform (ETWS) as a partially Jurassic fold system.

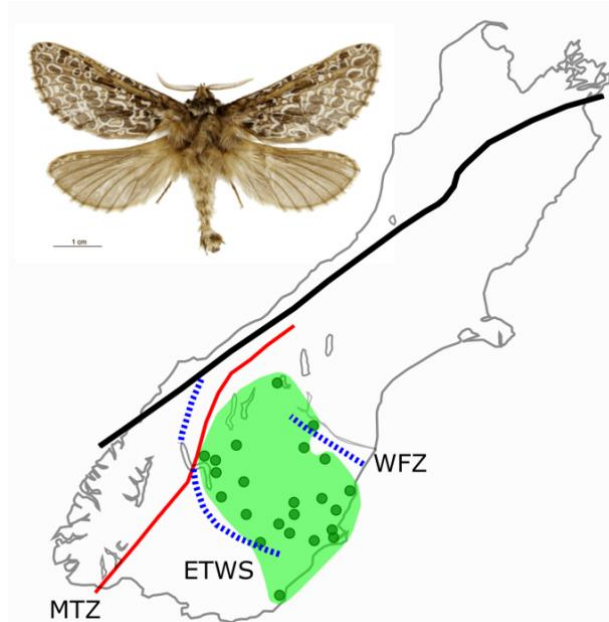


Fig. 3. Distribution of *Aoraia rufivena* and correlated tectonic features. MTZ= Moonlight tectonic zone; ETWS= Earnslaw-Taieri-Wakatipu synform; WFZ = Waitaki fault zone. Specimen photo: Landcare Research, New Zealand

The possibility that modern species may date back to at least the late Mesozoic may seem incredible, but there is no evidence precluding this possibility. Molecular divergence dates are often presented as evidence that many New Zealand endemics are of recent origin, but the dates are usually calibrated by fossils, which can only generate minimum divergence dates. This means that molecular divergence ages cannot falsify other evidence of earlier origins. The interesting aspect of the Mesozoic correlation is that despite the dramatic geological and climatic upheavals, some New Zealand organisms, including ghost moths, have maintained at least part of their ancestral distribution ranges throughout the Cenozoic. This conclusion implies that many species are not necessarily disposed to expand or radically alter their range just because suitable habitat or geography seem to offer the opportunity. Thus, for *Aoraia rufivena*, its Mesozoic distribution boundary with an inland sea did not appreciably expand westwards when the sea

was obliterated by subsequent geological compression or uplift. Instead, the western limits of the moth’s distribution remained intact in the region of the former topographic boundary (Fig. 4).

What I have presented here is a minimum outline of the possibilities resulting from biogeographic analysis, particularly for the existence of correlated tectonic and distributional patterns. I appreciate that New Zealand’s evolutionary history often invokes very strong views about what did or did not take place, and that alternatives to those most often presented in the literature may be viewed with skepticism. But all I can say is that such patterns are out there to be observed and studied just as much as one might study the ecology and biology of an individual plant. Species have histories and that history is tied to the history of the landscapes. Uncovering that history is exciting and fun (for those of us so inclined). So whatever view one may hold about such matters, the biogeographic patterns are there as a resource for everyone to study. And for me, if there is any lesson at all, it is that of the many great places in the world to study evolution beneath one’s feet, the Otago region is one of the best - perhaps better than the Galapagos, Hawaii, or the Amazon. The Otago region is like a book waiting to be read, of which ghost moths (along with their host plants) are but one paragraph among many.

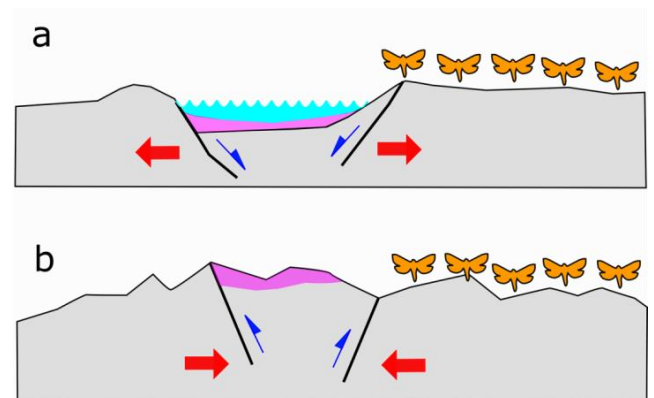


Fig. 4. A ghost moth distribution boundary that remains stable over time: (a) Distribution boundary of ghost moths at a Mesozoic rift valley, (b) ghost moth boundary remains even after the rift valley has been obliterated. Half arrows: direction of uplift or subsidence, whole arrows: direction of extension or compression (from Grehan & Mielke 2018).

**Acknowledgements**

I am grateful to Brian Patrick for his enthusiasm and assistance with ghost moth explorations, and to

Michael Heads for helpful improvements to the draft manuscript.

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## Recent Name Changes

*John Steel*

*Aptenia cordifolia* (L.f.) Schwantes now *Mesembryanthemum cordifolium* L.f. Klak, C.; Bruyns, P.V. (2013) A new infrageneric classification for *Mesembryanthemum* (Aizoaceae:

Mesembryanthemoideae). *Bothalia*, 43(2): 197-206. Preferred by Landcare, iNaturalistNZ and NZPCN. Occasional and persistent in a few areas on the Peninsula. {Common names: apple; baby sunrose, baby sun rose, baby sun-rose, brack mesembryanthemum, dew plant, heartleaf iceplant, heart leaf ice plant, heart-leaf ice plant, heart-leaf ice-plant, heart-leaved iceplant, ice plant, red apple }

Five of the native brachyglottids have now been lumped into one with a preferred name, *Brachyglottis lagopus* {common name: New Zealand groundsel}. Preferred by Landcare, but not iNaturalistNZ or NZPCN.

*Brachyglottis bellidioides* (Hook.f.) B.Nord. and varieties now all *Brachyglottis lagopus* (Raoul) B.Nord.

*Brachyglottis haastii* (Hook.f.) B.Nord. now *Brachyglottis lagopus* (Raoul) B.Nord.

*Brachyglottis saxifragoides* (Hook.f.) B.Nord. now *Brachyglottis lagopus* (Raoul) B.Nord.

*Brachyglottis southlandica* (Cockayne) B.Nord. and variety now both *Brachyglottis lagopus* (Raoul) B.Nord.

*Brachyglottis traversii* (F.Muell.) B.Nord. now *Brachyglottis lagopus* (Raoul) B.Nord.

Millar, T.R.; Breitwieser, I.; Pelsler, P.B.; Smitsen, R.D. (2018) A new classification of rosette-forming *Brachyglottis* (Asteraceae: Senecioneae) recognising a single species: *Brachyglottis lagopus*. *New Zealand Journal of Botany*, 56(3): 237-263.

*Dimorphotheca fruticosa* (L.) DC. now *Osteospermum fruticosum* (L.) Norl. Funk, V.A., Susanna, A., Stuessy, T.F. (2009) In Bayer, R.J. (ed.) *Systematics, Evolution and Biogeography of Compositae*. International Association for Plant Taxonomy, Vienna. Preferred by Landcare, iNaturalistNZ and NZPCN. Common coastal plant near settlements, e.g., Toko Mouth and Karitane. {Common names: dimorphotheca, freeway daisy, shrubby daisy bush, trailing African daisy }

*Spartina townsendii* H.Groves & J.Groves now *Sporobolus townsendii* (H.Groves & J.Groves) P.M.Peterson & Saarela. Peterson, P.M.;

Romaschenko, K.; Arrieta, Y.H.; Saarela, J.M. (2014) A molecular phylogeny and new subgeneric classification of *Sporobolus* (Poaceae: Chloridoideae: Sporobolinae). *Taxon* 63(6): 1212-1243. Preferred by Landcare, iNaturalist, but not NZPCN. Occasional and persistent estuarine grass, e.g., Pounaweia and Taieri Mouth. {Common names; common cord grass, common cord-grass, common cordgrass, cord grass, English cord-grass, English cordgrass, marsh grass, rice grass, ricegrass, salt marsh grass, salt marsh-grass, *Spartina* hybrid, Townsend's grass, townsend's grass}.

## FUNNZ Fungal Foray

*Ali Nicholls*

*MA Student in Cultural Anthropology, Victoria University of Wellington*

When asked what an anthropologist is, I used to reply with a rehearsed answer: an anthropologist is a human who studies what it means to be human. Until recently, this answer seemed perfectly adequate. The clue was, as they say, in the title: anthropologist. But like many others who attended the FUNNZ Annual Fungal Foray in May 2018, there came a time in my life where I felt drawn to a subject from a kingdom entirely different to my own.

Early in my postgraduate studies, I heard the ringing call of fungi cut through my everyday life. The 'mushroom fever' I had heard of from others took hold, and I found myself not only drawn into the 'world of fungi', but questioning whether in fact there was any difference between their world and my own. Over the course of five rainy autumn days on the West Coast of the South Island, I followed the many avenues that fungi carve through the lives of myself and my fellow forayers in the hope of better understanding how humans relate to their fungal friends and foes.

Being an anthropologist offers me a different toolkit to many that I encountered at the FUNNZ foray in Moana. My research calls into question the commonplace distinction between the 'natural world' and the 'cultural world' that exists in many Western societies. In the West, we tend to look at the 'natural world' through a unique lens: one that shows us a mechanical picture of the workings of nonhuman

species as they live and die. Alongside this, the lens of the 'cultural world' allows us to see a myriad of interactions between humans that have allowed for the development of cultures around the world. Everything from our social class, our gender, and our race to our preferred foods, the work we do, and the relationships we create, exist within the frame of the 'cultural world'.

When we remove the lenses of 'nature' and 'culture' that draw a line between 'us' and 'them', we are offered a very different view of the world. It is a view that sees the development of human society not as happening alongside the evolution of other species, but as a result of our interactions with them.

Fungi are transgressive creatures in many respects. Their uncanniness continually challenges our attempts to neatly categorise them. We see ourselves reflected in them through the way they digest food, the way they produce body heat, the networks of interaction they forge, and the intimacy they share with other species. And yet they are also alien, not simply in their appearance but in their habits, their diversity, their unpredictability, their toxicity (or if you're lucky, their edibility). At the foray in Moana, 65 fungi enthusiasts from across the world went to great lengths to join with this extraordinary kingdom and to find themselves immersed in a world that cannot be called either 'nature' or 'culture'. What was created at the Fungal Foray is often referred to in anthropology as a 'natureculture': a space wherein the boundaries between the natural and the cultural world no longer exist, or indeed matter.

What brought friends and colleagues together from all corners of the world to a tiny town in Aotearoa? What drove us out through the community of Hokitika in a torrential Westerly rain storm in the middle of a work week? What kept us all from getting back into the car when the rain and cold soaked us to the bone? Fungi!

Each autumn our fungal community initiates a ritual and a way of being together that transcends distance, time, work, and ordinary responsibilities. At the foray, people became their 'polyprop' selves – willing to go out in all conditions, to wear damp clothes for days on end, to spend hours poring over a microscope. We shared the excitement and frustration of our encounters. We went to bed early



with cold toes and fingertips. And when we woke up, we went out and did it all again.

The people we became at the foray were the result of the fungi that we encountered. Their presence called us from all walks of life and encouraged us to work together, to share knowledge, to feel safe in the company of strangers, to rekindle friendships, to find connection. The fruiting bodies that erupted from trees, clearings, and banks were visible signals of the lively social world of our forests, and they initiated a unique culture of excitement, of new discoveries, of enthusiasm and debate, of hot disputes, of shared work, of tiring days and cold nights, of care and of future ambitions, where multiple species collided. And when we were ready, we left them and one another, to wait for next year when the call of the fungi will ring out once more.

My research challenges the very notion that there can be distinct 'natural' and 'cultural' worlds. Anthropology has a place amongst it all. So the next time I am asked what an anthropologist does, I now have a better answer: an anthropologist studies what it means to be a human in a world of so many other beings, and asks how the other living creatures around us make us who we are. And the answer lies in the forest on a cold autumn day in a small town in Aotearoa, where the ringing of the fungi is loudest of all.

## **The Society for the Preservation of Natural History Meeting, Dunedin 25<sup>th</sup> – 31<sup>st</sup> August 2018**

*Lyn Cave and Pina Milne*

*Tasmanian Herbarium, Tasmanian Museum and Art Gallery, Australia*

*National Herbarium of Victoria, Royal Botanic Gardens Victoria, Australia*

The Otago Museum and University of Otago hosted The Society for the Preservation of Natural History Collections (SPNHC) and Biodiversity Information Standards (TDWG) meeting. This was the first time SPNHC had met in the southern hemisphere. This was a real coup for the hosts. Over 350 delegates from all around the world, many collection managers/curators of natural history collections from

Museums and Herbaria took part in sessions from 27 – 31 August. Many also participated in workshops and field trips during the preceding weekend.

The theme for the meeting, "Collections and Data in an Uncertain World", was explored in many of the talks and poster presentations. For the botanically minded, there were talks on managing herbarium collections, digitizing specimen data, citizen science projects and designing education programs for children, as well as lessons learned in the recent Christchurch earthquakes.

On Friday 24 August, prior to the SPNHC meeting, Managers of Australasian Herbarium Collections (MAHC), held their annual face-to-face meeting. This was the first time the group had met in New Zealand.

MAHC was instituted in 2009, and has met in various Australian capital cities. The group comprises collection managers from all the major herbaria in Australia and New Zealand. Major achievements include the development of guidelines and standard procedures for curation, management of loans, biosecurity issues and digitization of specimens. It was good to see a strong representation from New Zealand during the meeting, including collections staff from smaller institutions who have not an opportunity to attend meetings in Australia.

The meeting included a visit to the Otago herbarium (OTA), ably led by Dr Janice Lord. Janice also showed the group the botany teaching laboratories at the university, and all members were impressed with the exquisite botanical models and illustrations on display.

A follow up visit was arranged by the authors to the herbarium, because of their interest in bryophytes (liverwort and mosses). In particular, to ascertain the breadth of collections made by Dr George Scott (GAM Scott). Scott had been instrumental in progressing bryology in Australia from the 1970s onwards. From our visit we were able to establish that a significant proportion of the bryophyte collection in the Otago herbarium (for the period 1961 – 1970) is made up of collections made by Scott.

George and his wife migrated from Scotland to New Zealand in 1961 where he took up a lectureship position at the University of Otago. He moved to Monash University in Victoria, Australia, in 1970 where he was a senior research fellow. Whilst in New Zealand he conducted extensive fieldwork and published on the vegetation, including bryophytes of Lake Thomson, Secretary Island in Fiordland and Mt Anglem on Stewart Island.

Digitisation (databasing and/or imaging) of collections enables accessibility. For Australia and New Zealand, the herbarium specimen record once captured digitally, is delivered to The Australasian Virtual Herbarium <https://avh.chah.org.au/>. Databasing of the bryophyte collection at OTA would make the international bryological community aware of these Scott collections. In the meantime, the authors will certainly take every opportunity to inform their Australian colleagues of the significant collection of bryophytes at OTA.

## Threatened and Uncommon Plants of the Otago Peninsula

*John Barkla*

In 2004, the Save The Otago Peninsula (STOP) Inc. published a book by Dr. Peter Johnson titled 'Otago Peninsula Plants: An annotated list of vascular plants growing in wild places'. Table 8 in that publication is a list of nationally threatened and uncommon plants which have been recorded on the Otago Peninsula. Following reassessments of the threat status of vascular plants of New Zealand (de Lange et al. 2009, 2013), I updated that list to reflect those threat reassessments, additional taxa that have been discovered since 2004, and nomenclatural changes (Barkla 2010, 2014).

A further reassessment of the threat status of vascular plants of New Zealand was carried out in 2017 (de Lange et al. 2018) and it is again timely to update the list of nationally threatened and uncommon plants for the Otago Peninsula to reflect that assessment.

Twenty taxa on the Otago Peninsula are now ranked as 'Threatened' in the categories Nationally Critical, Nationally Endangered and Nationally Vulnerable, an increase of seven from that recorded in Barkla (2014). While three taxa were moved from

'Threatened' to 'At Risk' this was offset by three taxa moving from 'At Risk' to 'Threatened' and the addition of seven new entries to the list.

A further 43 taxa are ranked as 'At Risk' in the categories Declining, Naturally Uncommon, and Relict, an increase of nine over that recorded 'At Risk' in Barkla (2014). The loss of three taxa that moved into 'Threatened' has been offset by the addition of three taxa moving from 'Threatened', eight taxa previously considered 'Not Threatened' and one taxon recently discovered on Otago Peninsula.

The new entrants to 'Threatened' and 'At Risk' are listed in Table 1.

Several of these additions have arisen following the arrival of myrtle rust (*Austropuccinia psidii*) to New Zealand in 2017. This has resulted in the designation of all the New Zealand Myrtaceae previously considered to be 'Not Threatened' as 'Threatened', and has elevated the status of those previously assessed as 'At Risk' to 'Threatened'. The sole non-myrtaceous plant known to be intimately associated with New Zealand Myrtaceae, the endemic hemiparasitic *Korthalsella salicornioides*, has also been assessed as 'Threatened – Nationally Critical'.

One recently named taxon, *Cardamine heleniae*, ranked Data Deficient, is recorded for the Otago Peninsula.

Table 2 updates the list in Johnson (2004) and Barkla (2014) to reflect the most recent threat assessment and nomenclatural changes.

### Acknowledgements

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**Table 1. Additions to the list of Threatened & At Risk plants of the Otago Peninsula since Barkla (2014)**

	<b>Threat ranking (de Lange et al. 2018)</b>
<i>Acaena pallida</i>	At Risk – Declining
<i>Carmichaelia petriei</i>	At Risk – Declining
<i>Cotula australis</i>	At Risk – Declining
<i>Craspedia</i> (y)(CHR 516260; Cape Saunders)	Nationally Critical
<i>Kunzea robusta</i>	Nationally Vulnerable
<i>Lepidium juvencum</i>	Nationally Critical
<i>Leptospermum scoparium</i>	At Risk – Declining
<i>Libertia peregrinans</i>	Nationally Vulnerable
<i>Linum monogynum</i> var. <i>monogynum</i>	At Risk – Declining
<i>Lophomyrtus obcordata</i>	Nationally Critical
<i>Metrosideros diffusa</i>	Nationally Vulnerable
<i>Neomyrtus pedunculata</i>	Nationally Critical
<i>Oxybasis glauca</i> subsp. <i>Ambigua</i>	At Risk – Declining
<i>Raoulia australis</i>	At Risk – Declining
<i>Senecio bisseratus</i>	At Risk – Declining
<i>Urtica perconfusa</i>	At Risk – Declining

**Table 2 Plant taxa listed as Threatened & At Risk by de Lange et al. (2017) and which have been recorded on Otago Peninsula, according to their categories of threat or rarity**

	Previous threat ranking (de Lange et al. 2013)	Concordance with Johnson (2004)
<b>Threatened – Nationally Critical</b>		
<i>Craspedia</i> (y)(CHR 516260; Cape Saunders)	Not assessed	Not recorded
<i>Korthalsella salicornioides</i>	At Risk – Naturally Uncommon	<i>Korthalsella salicornioides</i>
<i>Lepidium juvencum</i> *	Nationally Critical	<i>Lepidium oleraceum</i>
<i>Lophomyrtus obcordata</i>	Not Threatened	<i>Lophomyrtus obcordata</i>
<i>Neomyrtus pedunculata</i>	Not Threatened	<i>Neomyrtus pedunculata</i>
<b>Threatened – Nationally Endangered</b>		
<i>Euchiton ensifer</i>	Nationally Endangered	Not recorded
<i>Helichrysum intermedium</i> (aff. <i>Helichrysum selago</i> var. <i>tumidum</i> ; WELT SP058412)	At Risk – Naturally Uncommon (c)	<i>Helichrysum intermedium</i> var. <i>selago</i>
<i>Lepidium crassum</i>	Nationally Vulnerable	<i>Lepidium oleraceum</i>
<i>Pachycladon cheesemanii</i> *	Nationally Vulnerable	<i>Ischnocarpus novaezelandiae</i>
<b>Threatened – Nationally Vulnerable</b>		
<i>Atriplex buchananii</i>	Nationally Vulnerable	<i>Atriplex buchananii</i>
<i>Geranium retrorsum</i>	Nationally Vulnerable	<i>Geranium retrorsum</i>
<i>Kunzea robusta</i>	Not Threatened	<i>Kunzea ericoides</i>
<i>Lachnagrostis tenuis</i>	Nationally Vulnerable	<i>Lachnagrostis tenuis</i>
<i>Lepilaena bilocularis</i>	Nationally Vulnerable	<i>Lepilaena bilocularis</i>
<i>Libertia peregrinans</i>	Nationally Vulnerable	Not recorded
<i>Metrosideros diffusa</i>	Not Threatened	<i>Metrosideros diffusa</i>

<i>Myosurus minimus</i> subsp. <i>novae-zelandiae</i> *	Nationally Endangered	<i>Myosurus minimus</i> subsp. <i>novae-zelandiae</i>
<i>Olearia fimbriata</i> *	Nationally Vulnerable	<i>Olearia fimbriata</i>
<i>Ranunculus recens</i>	Nationally Vulnerable	<i>Ranunculus recens</i> var. <i>recens</i>
<i>Raoulia monroi</i>	At Risk – Declining	<i>Raoulia monroi</i>

### At Risk – Declining

<i>Acaena microphylla</i> var. <i>pauciglochidiata</i>	At Risk – Naturally Uncommon	<i>Acaena microphylla</i> var. <i>pauciglochidiata</i>
<i>Acaena pallida</i>	Not Threatened	<i>Acaena pallida</i>
<i>Anthosachne falcis</i>	At Risk – Naturally Uncommon	<i>Elymus falcis</i>
<i>Brachyglottis sciadophila</i>	At Risk – Declining	<i>Brachyglottis sciadophila</i>
<i>Carex litorosa</i>	At Risk – Declining	<i>Carex litorosa</i>
<i>Carmichaelia petriei</i>	Not Threatened	<i>Carmichaelia petriei</i>
<i>Coprosma acerosa</i>	At Risk – Declining	<i>Coprosma acerosa</i>
<i>Coprosma virescens</i>	At Risk – Declining	<i>Coprosma virescens</i>
<i>Cotula australis</i>	Not Threatened	<i>Cotula australis</i>
<i>Drymoanthus flavus</i>	At Risk – Naturally Uncommon	<i>Drymoanthus flavus</i>
<i>Ficinia spiralis</i>	At Risk – Declining	<i>Desmoschoenus spiralis</i>
<i>Geranium sessiliflorum</i> var. <i>arenarium</i>	At Risk – Declining	<i>Geranium sessiliflorum</i> var. <i>arenarium</i>
<i>Isolepis basilaris</i>	Nationally Vulnerable	<i>Isolepis basilaris</i>
<i>Lepidium tenuicaule</i>	At Risk – Declining	<i>Lepidium tenuicaule</i>
<i>Leptospermum scoparium</i>	Not Threatened	<i>Leptospermum scoparium</i>
<i>Linum monogynum</i> var. <i>monogynum</i>	Not Threatened	<i>Linum monogynum</i>
<i>Myosotis pygmaea</i>	At Risk – Declining	<i>Myosotis pygmaea</i> var. <i>pygmaea</i>
<i>Olearia fragrantissima</i>	At Risk – Declining	<i>Olearia fragrantissima</i>
<i>Olearia lineata</i>	At Risk – Declining	<i>Olearia lineata</i>
<i>Oxybasis glauca</i> subsp. <i>ambigua</i>	Not Threatened	<i>Chenopodium glaucum</i> subsp. <i>ambiguum</i>

<i>Pterostylis tristis</i>	At Risk – Declining	<i>Pterostylis tristis</i>
<i>Raoulia australis</i>	Not Threatened	<i>Raoulia australis</i>
<i>Senecio biserratus</i>	Not Threatened	<i>Senecio biserratus</i>
<i>Senecio carnosulus</i>	At Risk – Naturally Uncommon	<i>Senecio carnosulus</i>
<i>Sonchus kirkii</i>	At Risk – Declining	<i>Sonchus kirkii</i>
<i>Tupeia antarctica</i>	At Risk – Declining	<i>Tupeia antarctica</i>
<i>Urtica perconfusa</i>	At Risk – Declining	Not recorded
<i>Veronica lilliputiana</i>	At Risk – Declining	<i>Parahebe canescens</i>
<i>Zostera muelleri</i> subsp. <i>novozelandiae</i>	At Risk – Declining	<i>Zostera novazelandica</i>

#### At Risk - Naturally Uncommon

<i>Carex cirrhosa</i>	Nationally Vulnerable	<i>Carex cirrhosa</i>
<i>Chaerophyllum</i> (a)(CHR 364086; "minute flower")	At Risk – Naturally Uncommon	<i>Oreomyrrhis</i> "minute flower"
<i>Chenopodium allanii</i>	At Risk – Naturally Uncommon	<i>Einadia allanii</i>
<i>Crassula ruamahanga</i>	At Risk – Naturally Uncommon	<i>Crassula ruamahanga</i>
<i>Montia angustifolia</i>	At Risk – Naturally Uncommon	<i>Neopaxia lineariifolia</i>
<i>Myosotis rakiura</i>	At Risk – Naturally Uncommon	<i>Myosotis rakiura</i>
<i>Pseudopanax ferox</i>	At Risk – Naturally Uncommon	<i>Pseudopanax ferox</i>
<i>Puccinellia walkeri</i>	At Risk – Naturally Uncommon	Not recorded
<i>Ruppia megacarpa</i>	At Risk – Naturally Uncommon	<i>Ruppia megacarpa</i>
<i>Senecio glaucophyllus</i> subsp. <i>basinudus</i>	At Risk – Naturally Uncommon	<i>Senecio glaucophyllus</i> subsp. <i>basinudus</i>
<i>Stenostachys laevis</i>	At Risk – Naturally Uncommon	Not recorded
<i>Thyridia repens</i>	At Risk – Naturally Uncommon	<i>Mimulus repens</i>
<i>Zannichellia palustris</i>	At Risk – Naturally Uncommon	<i>Zannichellia palustris</i>

#### At Risk - Relict

<i>Anemanthele lessoniana</i>	Nationally Vulnerable	<i>Anemanthele lessoniana</i>
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## Meeting and Trip Reports

### Fungal Foray, 19<sup>th</sup> May 2018

*Lydia Turley*

On a crisp day, we set out to hunt fungi. There was a really good turnout, with 20 or so people, including a number of people who haven't been on our trips before. My hopes to find something tasty (and identifiably not poisonous) for dinner didn't quite get fulfilled, but we did get to see lots of really cool things.

With so many people on the trip, I found myself at the back of a queue when we first entered the track, so knew I'd have to look closely to find exciting things that hadn't already been spotted. Paying careful attention to the bank paid off, and I soon spotted a tiny tiny white mushroom growing on a fallen stick. It was about as tall as the last digit of my finger and so small as to be almost transparent – what a beauty!!!! David L took one look at it, commented that it'd be hard to identify, and quickly moved on before I could try picking his brains.

Further down the track were distinctive earth stars and the equally distinctive (but much harder to spot) birds nest fungi. Someone found an orangey mushroom which David O identified as being edible, known as a golden needle mushroom. There can't have been too many of them because, as much as I looked, I didn't spot any myself; no mushroom dinner for me! The other beauty was a purple *Russula*. From the top, it looked somewhat purple, but when picked - my! – what a colour the stalk had!

Back at Botany department, we headed up to the lab to identify our findings. I'd collected only my tiny transparent white mushroom from the start of the track, knowing that identifying fungi would be hard. It turned out to be probably a *Mycena*, on the basis that the stem maybe exuded sap and wasn't wiry. We cut one up and looked at the basidia and spores under the microscope, before John S pointed out that it wasn't really going to be possible to identify it any further. Moral of the story: David L is always right, but don't let that stop you looking at pretties!

### Pā Harakeke, Orokonui Ecosanctuary, 9<sup>th</sup> June 2018

*Gretchen Brownstein*

On a pleasant Saturday in June a cheerful group of enthusiasts visited the Pā Harakeke at Orokonui. Sue Hensley (of Orokonui) guided us through the tikanga of working in the Pā and with harakeke. We then got on with the mahi: cleaning and trimming the harakeke.

The harakeke here has various origins. Some came from the Dunedin Botanic Gardens when their flax collection was reduced a few years back. Others come from the collection at Otakou (on the Otago Peninsula). Warwick Harris (a BSO member, and you may recall his talk on Cabbage trees last year) kindly sent around a report on harakeke trials done in the 2000s which provided some great background (Otakou was one of the trial sites). A large number of varieties are present in the Pā harakeke at Orokonui. Even though not all the plants are named, it is still a great resource for botanists and weavers alike.

After a few hours of cutting we stretched our backs and legs with a walk around Orokonui's Otago Rare Plants garden. Many of our members have contributed to this garden, which is wonderful! Many thanks to Orokonui and Sue for the opportunity to learn to visit and learn about the Pā Harakeke.



*Trimming and cleaning the flax (Photo: Gretchen Brownstein)*

## Conservation Genetics and Ecology of *Hardenbergia violacea*, a talk by Dr Matthew Larcombe, 13<sup>th</sup> June 2018

*Duncan Nicol*

Matt decided to return to reality from his current theoretical endeavours to present us with a recent botanical puzzle, a probable solution, and the resulting conservation efforts. *Hardengeria violacea*, “purple coral pea”, or even “happy wanderer”, was the centre of a flurry of arguments resulting from the discovery of a population around the corner from Hobart, Tasmania. *Hardengeria violacea* grows along the east coast of the Australian mainland. Two populations inhabit Coal Creek in Tasmania near early settler localities, a coincidence which led to disagreements among botanists regarding the origin of the population. Two camps emerged, each with different supporting evidence which gave both equal footing. Winifred Curtis battled for the idea that the population was introduced by settlers and their ecological footprint, including the release of sheep which could have been smuggling it for tasty treats later on. Alex Buchanan battled for the idea that the population was of native origin, a true five-star Aussie all the way down to the pod. Matt’s project was to settle the score with a little help from some handy advancements in the botanical toolkit.

DNA was extracted from a range of populations from Western Australia, eastern Australia, and down the south-eastern coasts to Tasmania. It’s strange to think that a bunch of coding sequences could be used to douse the flames of such a heated argument, but with three clear hypotheses, the plants themselves would reveal their past travels. In a logical “if, then” approach, differing DNA patterns between the Australian populations would support corresponding hypotheses and refute others. In other words, introduction by sheep, introduction by long-distance dispersal, and native origin would each have a unique fingerprint to be found in the relationships between sampled populations. Matt found that the relationship between populations based on their chloroplast DNA supported a southward migration from New South Wales to Tasmania, providing evidence of a native origin.

So, now that that is settled, here swoops in the US conservationist, slash, vintner, Tony Scherer. Upon finding out that *H. violacea* is native, Tony started erecting sheep fences to halt, at least, the livestock grazing on the populations. In addition, the local botanic gardens and conservation organisations have been planting and propagating *H. violacea* to boost the local populations. With a viable natural seed bank, with 34,800 seeds banked, with a planted survival rate of 43% and, of those, a reproduction rate of over 90%, there is an optimistic future for the conservation of *H. violacea*.

A talk with a balance of people, plants, science, graphs, pictures, and Tasmanianisms. Thanks Matt.

## Mountains of the Rain Shadow, a talk by David Lyttle, 18<sup>th</sup> July 2018

*John Barkla*

Last January past Botsoc Chairman David Lyttle joined Heidi Meudt and Ant Kusabs from Te Papa Museum for parts of their two-week South Island expedition. The Te Papa research scientists are studying forget-me-nots (*Myosotis*, Boraginaceae) to produce a taxonomic revision of all native New Zealand species of the genus, as well as a new eFlora treatment. David participated in several trips to various southern mountain ranges east of the Main Divide – the rain shadow mountains.

An important part of Heidi and Ant’s research is fieldwork to locations where *Myosotis* species have been recorded previously. David first joined them on visits to the Eyre and Livingstone Mountains, along with Botsoc members Brian Rance and Dave Toole. Their walk into Hummock Peak looked strenuous but they were rewarded with collections and images of *Myosotis glabrescens* and the recently named *M. retrorsa*.

Next up was a trip to the Ida Range where Heidi, Ant and David were joined by John Barkla, Mike Thorsen, and Neil and Barbara Simpson. The focus here was on searching for *Myosotis oreophila*, where Donald Petrie collected the type specimen in 1891. While it’s been seen elsewhere, this plant hasn’t been collected at Mt Ida since. Although the plant



remained elusive, David photographed two other forget-me-nots and many other stunning plants from this vast upland landscape, including *Montigena novae-zelandiae* in fruit.

Next up was the St Marys Range via the Awakino Skifield Road, where the Ida Range team was joined by local plant enthusiast Hugh Wood. David showed great images of their finds in the mostly bleak rockland landscape of the highest parts of the range. Here they were able to collect specimens of four different species of *Myosotis*, including two whose identities are yet unknown. Collections the team made from here are Te Papa's first from the site.

David then described his trips to the Ohau Range in North Otago and finally the Two Thumb Range on the northern side of the Mackenzie Basin. His photographs from all sites gave us a great feel for the rain shadow landscapes and their distinctive flora. David's appreciation for these places was evident throughout and we all gained a fascinating insight into the field work required to support modern taxonomic research.

## Photography Workshop, 18<sup>th</sup> July 2018

*Corinne Ebisu & Bill Nagle*

A macro-photography workshop organised by Allison Knight was held at the University of Otago's Botany Lab on Sunday the 28th of July.

Short presentations from amateur, professional and scientific photographers covered the use of smartphones and compact and DSLR cameras and provided really good tips, and a few tricks, for improving close-up photographs.

Many people carry a smartphone, so an obvious advantage is that they are almost always handy when unexpected opportunities arise. And the cameras on modern smartphones really are smart in a range of conditions. Photographs can be taken through a hand-lens or a microscope and there are also clip-on tools available, such as an illuminated macro lens, which can be used for smartphones and tablets.

Compact cameras are also much smarter than they used to be. Many have a Macro function and the

Olympus Tough camera has a microscope option which is very useful and sometimes amazing. There is a focus-stacking setting within the microscope option which automatically layers the focus in the image and gives a greater depth of field.

DSLR cameras can be used on automatic or manually adjusted for particular situations so you are able to use the Aperture and Shutter priority settings to set the depth of field. Adjusting the ISO setting in conjunction with aperture and shutter settings gives the best result.

Photography can perhaps be reduced to managing light and stability to get well-lit subjects in focus. That is simpler inside than in the field but simple methods can give superior results.

Some considerations are:

- be aware of the background as the camera will show things the brain may dismiss. Translucent material (plastic bag, plastic chopping board) will allow light in but mask unsuitable backgrounds.
- a 'weeding kit' (scissors, tweezers, soft brush) will help to gently remove unwanted distractions from around a subject.
- lifting the subject out of the background can make a photograph more meaningful. In the field, physically placing it on an upturned plastic container or using a torch to highlight it can achieve that.
- at home, use a plain matt background (black goes back, white comes forward) and place the subject above it on a clear plastic tray, frosted glass or upside-down aquarium or similar.
- carefully placed electronic flashes can make the subject really stand out, particularly if a flash is placed below the subject.
- be aware of shadows and remove them from the subject with strategic lighting where possible.
- light can be directed onto specific areas of a subject with tubes, reflective sheets (aluminium foil) and windows.
- early morning sunlight can provide highlights on the subject.
- careful use of light can provide a 3D effect.
- lighting above and below a subject will help with identification.
- lichens and mosses (but not fungi) can be rehydrated with a spray bottle just prior to photography.

- when taking photographs for species identification, or for iNaturalist, be sure to take above and below images of leaves and lichens and the stipe, cap and gills of mushrooms. (Note: be very careful when handling fungi as bruised stipes will give an incorrect colour in a photograph. Pick from the very bottom of the stipe.)
- keep mushrooms dry if possible (don't spray, keep rain off) as the condition of the stipe is often used to identify fungi.
- carry a printed scale in your photography kit and use it.
- a tripod or monopod will give good stability and there are plenty of sizes, designs and costs to choose from.
- small bean bags can also be used to keep a camera stable.
- wrapping the top of a hiking pole with a rubber inner-tube can help with holding a camera steady in the field.

After much discussion during afternoon tea, we returned to the lab for the practical session! It was great to share tips and tricks and see the technical equipment in action, as well as practice on some of the plant materials that were available.

To summarise what I learned at the workshop - for improved macrophotography one needs to; know one's equipment well (good quality second-hand equipment can be much better than new lesser-quality equipment), keep the camera stable, be aware of the background and foreign objects and make the best use of light to show the subject to advantage. And don't forget the weather – pack into a waterproof bag!

As with all events like this, new relationships were made and it was hard to leave. A big “Thank you” to Allison and the other presenters (John Knight, David Lyttle, Mike Thorsen, David Orlovich) for sharing their expertise and equipment.

Life is like a camera ...

Focus on what's important

Capture the good times

Develop from the negatives

And if things don't work out

Take another shot

- Anon

## Sullivans Dam and Cloud Forest of Leith Track, 25<sup>th</sup> August 2018

*John Steel*

The ice on the car windscreen was tempered by the clear skies, but the chilling wind was to stay with us for the last field trip before spring and a reminder that winter was still very much with us. However, Sullivans Dam is a beautiful spot and our visit soon had us exploring the mixed forest round the edge of the lake. The huge rimu log, still with its steel hawser and a reminder of what the original vegetation must have been, is always worth a stop. The colony of *Chiloglottis cornuta* that dominated the top of the log until recently has gone and a variety of mosses and lichens are now in residence. A small clump of stunted *Microsorium pustulatum* and an equally stunted, solitary *Asplenium flaccidum* cling to the log sides and look nothing like their forest counterparts. The face of the log has a mix of bryophytes and lichens including *Pseudocyphellaria crocata* struggling to hang on.



*Rimu log. (Photo: John Steel)*

A little further on, the track enters the forest edge with a mix of different ferns including *Asplenium gracillimum* some of which sported a healthy crop of bulbils. The mix of the larger members of the Blechnaceae soon had us discussing their individual characters and name changes. Similarly, *Cordyline australis* and *C. indivisa* side by side provided an opportunity to consider the differences of their branching patterns. The latter, I was told, were planted by some keen workers at the dam in its time

when the public were excluded and they took especial pride in the dam's surrounds.



David with *Cordyline indivisa*. (Photo: Lydia Turley)

The entrance to the Cloud Forest of Leith walkway through the cloud forest is an abrupt change into mixed broadleaved/podocarp forest with *Carpodetus serratus*, *Fuchsia excorticata*, *Raukaua simplex* among others, and clusters of small-leaved shrubs providing a spectacular introduction. An intermixed trio of understory *Myrsine divaricata*, *Neomyrtus pedunculata* and *Coprosma rhamnoides* provided scope for discussion. A juvenile *Podocarpus totara* and good-sized specimens of *Libocedrus bidwillii* were evidence of forest regeneration. The track meanders as befits botanical walkers and Peter Mason's intuitive construction, successfully designed to deter the destructive effects of mountain bikers, were the source of approving comments. Onwards and upwards past a stand of *Leptopteris superba* then down into Calvert Dell, named after the generous benefactors who helped finance the track's construction. *Trichocolea mollissima*, *Leiomitra lanata* and *Schistochila appendiculata* are only a few of the many hepatics gracing the walls of this special place beside the track, not to mention the mosses, ferns shrubs and overarching cover of the forest.



*Cyathea dealbata* frond (Photo: Duncan Nicol)

From here the group took the Leith Loop track but, still being less than half way to the lookout, had to pick up the pace to make it to the lunch spot on time, although it was difficult to avoid stopping regularly to take in some new find or other. The scramble over the rocky approach was well rewarded with views of the hills of Swampy Summit opposite while the sight of the city below reminded us of how lucky we are to have such gems right on our doorstep. The wind still had a sharp edge to it and encouraged us to hunker down in the shelter of the low bush and rocks with Lucy spotting *Phlegmariurus varius* sheltering under nearby shrubs. The trip was all but over with everyone heading off to their cars via the Leith Loop Extension. On the way down, David spotted the filmy fern, *Hymenophyllum villosum*, not seen anywhere else on the track, and Alf found a fine example of *Psoroma asperella*, tiny lichens usually found only by close searching among ground-loving mosses.



*Rumhorea adiantiformis* close up (Photo: Duncan Nicol)

All in all a great day out and thanks to David for organising a fitting end to winter. Contact [john.steel@otago.ac.nz](mailto:john.steel@otago.ac.nz) for anyone wanting a copy of the species list.



Members: Alf Webb, David Lyttle, Duncan Nicol, Emma Small, John Barkla, John Steel, Lucy Parsons, Lydia Turley, Melanie Vermeulen, Mike Small, Moira Parker, Toni Wilson.

## Botanical Experiences of the South, a talk by Lloyd Esler, 8<sup>th</sup> August 2018

Alex Wearing

Lloyd Esler, natural historian, teacher, Invercargill City councillor, professional guide, and author (*Southland Shells, The Southland Book of Records, 150 Years Invercargill 1856-2006, Flax and the Flax Industry of the South, Omaui and the New River Estuary, Whaling and Sealing in Southern New Zealand, History of Rabbits and Possums in New Zealand*), gave an interesting and very well illustrated talk focussing on southern South Island and Stewart Island, but also including brief excursions to Auckland, the Chatham Islands and New Zealand's Sub-Antarctic islands.

The talk contained a veritable treasure trove of botanical nuggets. It featured images and stories of lots of remarkable plants. There were reflections on the significance of big/old specimens of species (such as kauri, kahikatea, southern beech, totara, tree fuchsia, cabbage tree, bull kelp, and what is claimed to be New Zealand's largest rhododendron (growing in Fiordland)). These plants are often much bigger and/or older (and sometimes very different, e.g.,

large cabbage tree in grass paddocks) from other plants, whether of the same or different species, growing nearby.

Lloyd talked about native plants with distinctive smells (such as bog pine), native plants with large fruits, and native fruits which are nice to eat (Lloyd suggested that snow totara was the nicest tasting New Zealand berry).

Plant geography was also addressed. Many native species grow successfully, often well beyond the limits of their natural range (such as kauri in Southland (and Dunedin), and nikau palm at Bluff). Lloyd cited examples of changing plant distributions, referring to both local and regional contractions and expansions. The lone survival of a giant mamaku tree fern near the Omaui Track many kilometres from other mamaku is a consequence of past and present land-use practices, as is the southwards spread of vipers bugloss and whitlow grass on 'gavel-ways' alongside roads. Different species possessing different traits, and occurring in different contexts, produce different stories and outcomes.

Interesting material was presented on the history of the flax industry in New Zealand, flax cultivars, the ability of New Zealand flax post-fire to sprout from its base, and how it thrives in mobile sand dune systems dominated by pingao. Lloyd suggested that flax flowering had a roughly two year cycle, and that flax growing alongside surfaces which reflected light/heat (such as roads and carparks) exhibits more prolific flowering.

Lloyd mentioned that he is currently writing a book on the Foveaux Strait and its past and present role both as a barrier and as a passageway. With respect to plants, both native and introduced, the component parts of New Zealand landscapes also contain barriers and passageways. It behoves us as landscape managers to think carefully about our landscape arrangements if we want to retain places for the all the remarkable plants (but especially the big and/or old, and the solitary and/or infrequent) that were described in Lloyd's botanical experiences.

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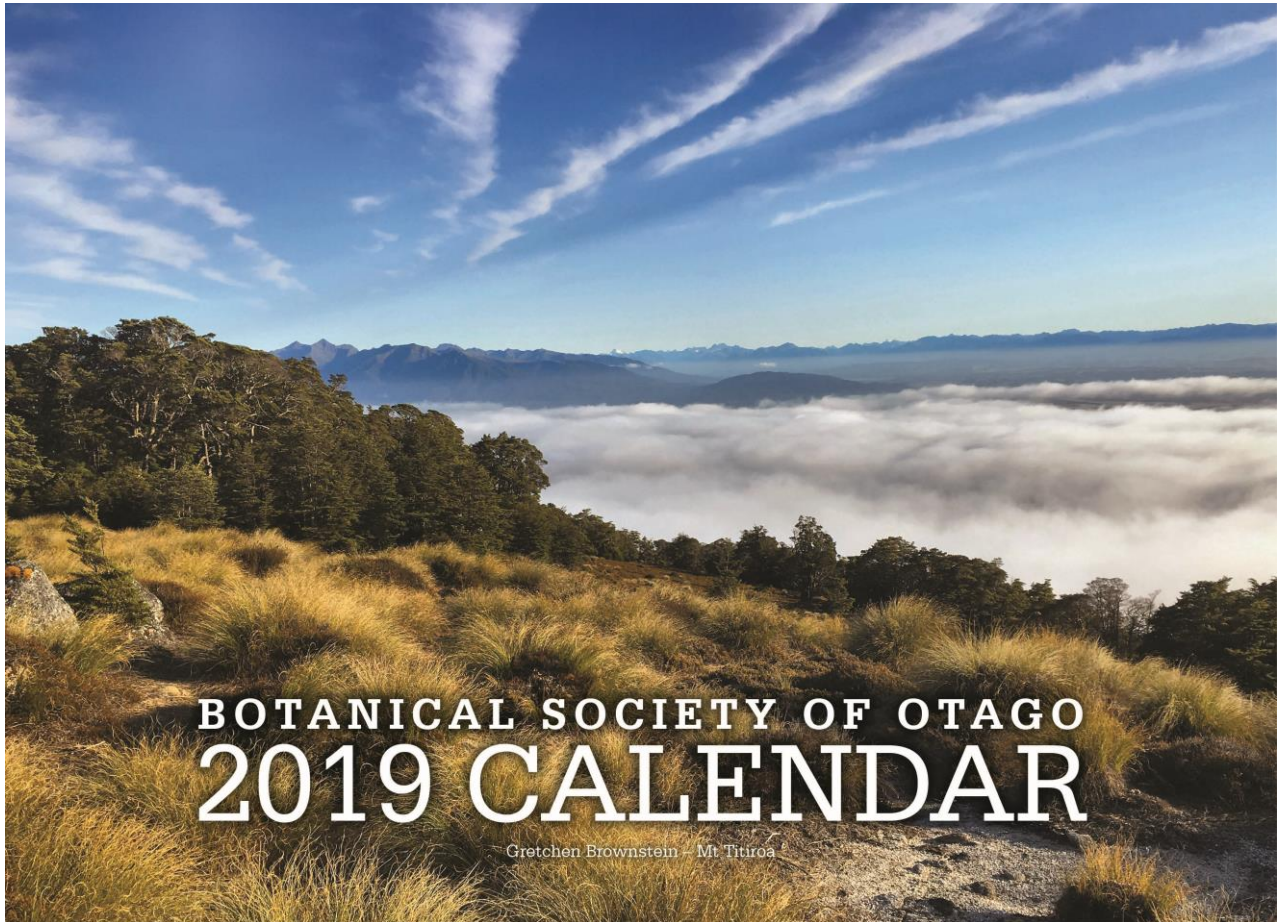
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*Right: Corokia cotoneaster branch (Artist: Sharon Jones)*



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