



**Newsletter Number 89**

**February 2020**



**BOTANICAL SOCIETY**  

---

**OF OTAGO**

## BSO Meetings and Field Trips February 2020 - July 2020

**19<sup>th</sup> February, 5:20 pm: Eco-evolutionary stories about plant diversification in New Zealand.** Speaker: Bill Lee, Manaaki Whenua - Landcare Research. Plant radiations are a feature of the New Zealand flora and contribute endemic elements to many ecosystems. In this talk I explore what we are learning about the chronology, trait development, ecology and evolution of the modern flora by looking at woody and herbaceous lineages through time. This perspective focuses on distinct lineages and integrates time-calibrated phylogenies with the ecology and distribution of modern species. Immigration, abiotic and biotic selection and geography have all played a role in facilitating species-rich groups, especially after major extinction events and the appearance of new biomes. I will mainly use genera that have come out of the forest into open areas above and below treeline.

**21<sup>st</sup> – 23<sup>rd</sup> February 2020: Weekend Field Trip to Invercargill.** We are planning to visit Invercargill and explore sites of botanical interest there. These weekend trips have proved very popular in the past, especially for out of town members who do not get the opportunity to participate in local field trips. There is a lot of scope as there are many diverse natural areas close to Invercargill. We are planning to base ourselves at one of the local camping grounds. The preferred option at this stage is the Beach Road Holiday Park west of Invercargill, close to Oreti Beach. If you are interested in coming, contact David Lyttle ([djllyttle@gmail.com](mailto:djllyttle@gmail.com)) ph (03) 454 5470. We are planning to visit the following sites:

Friday 21<sup>st</sup> afternoon – Sandy point (for those that travel down early)

Saturday 22<sup>nd</sup> morning – Tiwai Peninsula

Saturday 22<sup>nd</sup> afternoon – Bluff Hill

Sunday 23<sup>rd</sup> morning – Otatara (including Otatara Scenic Reserve, Bowman's Bush and Rance's covenant)

**11<sup>th</sup> March, 5:20 pm: New Caledonia: a Botanist's Paradise.** Speaker: Peter Johnson, Manaaki Whenua - Landcare Research. "A Botanist's Paradise": so-claimed in an interpretation panel at the Noumea Aquarium. Indeed: a challenging Paradise for a young NZ botanist visiting New Caledonia 40 years ago, accompanying a group of NZ entomologists. My role was to collect plants of interest to the insect people, and get identification help from the resident (French) botanists. This had the additional challenge of understanding, for example, that 'Not-a-far-goose' was *Nothofagus* (5 spp. there). New Caledonia has a flora of some 3000 taxa, compared with c. 2400 in NZ, being mostly woody spp. of rainforest, dry forest, maquis (ultramafic shrubland), and savannah (mostly niaouli, a *Melaleuca*).

In 1978 I had a camera for black-and-white film, and another for a strict ration of 35mm colour slides. Revisiting New Caledonia in 2019 with a digital camera allowed for many more snapshots, even if winter meant a limited number of plants in flower. But more than enough for a picture show: some of the 13 spp. of *Araucaria*, one of the 95 *Pittosporums*, the only other (non-NZ) *Xeronema*, bracken fern that looks like bracken, filmy ferns that are not quite familiar ... and so on. Landscapes of misty montagues, hillsides affected by mining, machetes, and the matchbox, localities with names like Riviere Bleue, Mont Koghi, and Dumbea. Plus road-signs, graffiti, markets, and cuisine ... all in French. Join me for a travelogue. Warning: we'll be driving on the wrong side of the road.

**28<sup>th</sup> March, 8.00 am: Field trip to Poolburn.** We are planning to visit the Poolburn Reservoir in the upper Ida Valley. The reservoir was formed by damming the Poolburn during the Depression and gained some recent fame as a “Lord of the Rings” location. We will drive to Oturehua then to Moa Creek, where we will pick up the road to the Reservoir. The Reservoir is situated in a montane basin surrounded by tussock-covered schist ridges. The elevation is approximately 840 metres so should offer an interesting range of vegetation types. We will explore the lake-shore environment and adjacent wetlands with excursions on to the ridges and schist outcrops. BSO has not visited this location before so it is possible we may find something unexpected and interesting. If you are interested in coming please contact David Lyttle (djl1yttle@gmail.com) ph (03) 4545 4750.

**4<sup>th</sup> April, 8:30 am: Quoin Point.** This trip offers another opportunity (a previous field trip has been to the mouth of the Akatore River) to look at the distinctive plant communities defined as coastal turfs. These salt tolerant (halophytic) plants are made up of low growing (generally less than 50mm in height), herbs, sedges and grasses, and are well adapted to living in the exposed marine shoreline locations, like this one on the southern Otago coast. Contact Robyn Bridges 021 235 8997.

**8<sup>th</sup> April, 5:20 pm. A search for the co-evolutionary partner(s) of New Zealand’s sequestrate fungi.** Speaker: Dr Toni Atkinson. New Zealand has long been known as a “land of birds”. The idea that the array of sequestrate fungi found here, many of which are colourful, may have arisen through coevolution with birds was first mooted in mycology around 20 years ago. It seemed a natural progression from the widely accepted hypothesis that New Zealand’s diverse divaricating plants evolved due to selective pressure from the now extinct moa species. The suggestion appears to have been taken up by mycologists, and is becoming part of the story of science in this land. Last year, an international team using high-throughput sequencing techniques to analyse the DNA in moa coprolites, revealed the first real evidence that moa may have eaten fungi.

But what happens if we take a fresh look at the whole question? Are moa the most likely coevolutionary partners of our sequestrate fungi, out of all the vertebrate and invertebrate inhabitants of prehistoric New Zealand? In this recently humanised but greatly altered land, it is challenging to hold in mind the relationships that might have played out over evolutionary time. What might we have missed?

**3<sup>rd</sup> May, 8:30 am: Fungal foray to Racemans Track.** We will explore local fungi with a morning foray along Racemans Track. The track passes through areas of kānuka, which hosts ectomycorrhizal fungi, so it should be an interesting and valuable site to explore. Wear all-weather clothing, walking boots and bring cameras and morning tea. We will collect in the morning, and then those interested can return to the Department of Botany at lunch time to prepare the samples for drying and lodging in the herbarium. Bring lunch if you want to stay to process specimens in Botany. Meet at the Department of Botany car park at 8:30 am or at the Silverstream car park on Silverstream Valley Road at 8:45 am. Return at 12 noon. Contact David Orlovich, email: david.orlovich@otago.ac.nz, cell phone 0211227230.

**13<sup>th</sup> May, 5:20 pm: BSO Annual General Meeting and Photographic Competition.** The photographic competition is a popular and eagerly anticipated event for anyone interested in botanical photography. Enter your best photos and learn what makes a good photograph and how to improve your photographic skills from our panel of expert judges. Your photographs may be chosen for the BSO Calendar so this is your opportunity to have one month of fame. Start organising your entries now and don't wait until the last minute.

**10<sup>th</sup> June, 5.20 pm: Sexy Lichens.** Speaker: Dr Allison Knight, Research Associate, Department of Botany. The lichen symbiosis is extraordinary, intertwining organisms from two or even three distantly related kingdoms. Lichenised fungi are extremophiles, capable of living in environments well beyond the range of vascular plants. Some can even survive days or years exposed to the vacuum, radiation and temperature extremes of outer space! Intriguingly, lichens are very sensitive indicators of air pollution and can also be useful indicators of climate change. On the lighter side, the Sexy Pavement Lichen grows on the asphalt outside the Botany Department, and covers footpaths and roads all over New Zealand. It has been exploited by the unscrupulous, enticed the gullible and recently caused a global media frenzy.

**20<sup>th</sup> June, 9:00 am: Working morning at Orokonui Ecosanctuary.** We will spend the morning lending a hand at the ecosanctuary, helping with a bit of weeding and seeing if we can add to their plant species list. In addition, there will be a chance to see the Otago Rare Plants garden (which many of our members have contributed to) and perhaps spy a takahe or tuatara. Meet at Botany Department carpark at 9am. Contact Gretchen Brownstein 021 065 8497 or brownsteing@landcareresearch.co.nz.

**8<sup>th</sup> July, 5:20 pm: Silken harp chords and the green choir.** Speaker: James Crofts-Bennett. The mutualistic relationship between the plant kingdom and the arachnid order Araneae is remarkable both in nature and how often it is overlooked. There is extensive literary coverage on spider abundance and diversity in relation to vegetation texture diversity. So extensive is the research that beyond mere ecological significance, the relationship between spiders and plants has been adapted into agricultural practices! This talk will explore the theory, supporting evidence, then finally practical applications of exploiting this relationship. Research sites range from the William James building green roof to Orokonui ecosanctuary, grassy meadows to glorious podocarp forest and furtive fern villages! Descriptions of tiny tarsal claws guaranteed to make your skin crawl and close encounters with *Aciphylla* sure to incite sympathetic cringing! Come one, come all and behold the union of silken harp chords and the green choir!

**11<sup>th</sup> July, 9:00am: Field trip to Tavora Reserve, North Otago.** Tavora is a coastal reserve near Palmerston managed by the Yellow-eyed Penguin Trust. Over more than 20 years the Trust has transformed the previously marram covered dunes into a showcase of pingao with many associated threatened species including shore spurge, Cooks scurvy grass and sand tussock. This is augmented with advanced riparian planting alongside the stream leading to the dunes. The reserve also has natural populations of the uncommon *Aciphylla subflabellata*, *Lepidium tenuicaule*, and *Tupeia antarctica* mistletoe hemi-parasitic on ribbonwood trees. We'll do an easy walking circuit of the reserve that takes in all the highlights. Meet at Botany Department carpark at 9am. Contact John Barkla (03 476 3686) [mjbarkla@xtra.co.nz](mailto:mjbarkla@xtra.co.nz)



*Mountain daisy, St Bathans range (Photo: John Barkla)*

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

## Contents

<b>BSO Meetings and Field Trips.....</b>	<b>2</b>
<b>Chair’s Notes .....</b>	<b>7</b>
<b>Secretary’s Notes.....</b>	<b>7</b>
<b>Treasurer’s Notes.....</b>	<b>8</b>
<b>Editor’s Notes .....</b>	<b>8</b>
<b>Correspondence and News .....</b>	<b>9</b>
<b>Otago Peninsula Plants .....</b>	<b>9</b>
<b>BSO Photo Competition 2020.....</b>	<b>10</b>
<b>Articles .....</b>	<b>11</b>
<b>An Island revisited: Luggate Red Bridge .....</b>	<b>11</b>
<b>Tectonic correlations support a Cretaceous-Oligocene vicariance origin for northern North Island taxa of New Zealand .....</b>	<b>13</b>
<b>Meeting and Trip Reports.....</b>	<b>18</b>
<b>Geoff Baylis Lecture: Geological constraints on the age and antiquity of land in New Caledonia and the Chatham Islands. Hamish Campbell, 18<sup>th</sup> September 2019 .....</b>	<b>18</b>
<b>Field trip to Akatore, 21<sup>st</sup> September 2019 .....</b>	<b>18</b>
<b>Botanical Art: drawing the line between scientific illustration and artistic expression, a talk by Wayne Everson, 9<sup>th</sup> October 2019.....</b>	<b>19</b>
<b>Weekend Field trip to the Catlins, 19<sup>th</sup> -20<sup>th</sup> October 2019 .....</b>	<b>21</b>
<b>Field trip to Andersons Lagoon, 2<sup>nd</sup> November 2019 .....</b>	<b>23</b>
<b>Assessing the ecological consequences of extinction: are flightless birds important seed dispersers in New Zealand? A talk by Jo Carpenter, 13<sup>th</sup> November 2019.....</b>	<b>25</b>
<b>Committee and BSO contacts .....</b>	<b>26</b>
<b>BSO Membership Form 2020 .....</b>	<b>27</b>

*Cover: Monkeys paw flower (Chiranthodendron pentadactylon), illustration by James Crofts-Bennett. Hilariously, taken as a potion for woes of the heart in Aztec medicine. One simply had to climb Chiranthodendron and pluck a claret claw of Chernabog himself to lower one’s cholesterol. Given the numbers laid to cardiac (ar)rest on the chacmool for ol’ ma Coatlicue, it may simply be the gods reciprocation.*

## Chair's Notes

*Gretchen Brownstein*

Welcome to 2020 and a new decade! I'm actually writing this in December before I head off for a cycle tour in Tasmania. It will be my first time there and I am really looking forward to exploring the wild areas and getting up close with a few new plant species. The hardest bit is deciding which plant ID book(s) will fit in the paniers! While it's great to explore new places, I do try to remind myself that our backyards and local wild areas are just as worthy of our time. A recent publication by three BSO members, "*Otago Peninsula Plants: A revised, annotated list of vascular plants growing in wild places*" (by Peter Johnson, John Barkla and David Lyttle), is a wonderful reminder of what special plants are on our Dunedin doorstep. And even closer to home, literally on the doorstep, Allison Knight's "Lichens of Urban and disturbed areas of New Zealand" (a work in progress, status update coming soon) illustrates the diversity of lichens that are found in our populated areas.

The BSO committee has put together a great programme of talks and trips for the year, starting with a trip to Southland for the weekend with David Lyttle and Brian Rance. Later in the year, Allison Knight will speak about her exciting new urban lichens book. Also, we will hopefully have an opportunity for a society working bee at Orokonui. So there is a little something for everyone this year!

Don't forget the BSO photo competition is coming up soon. Entries are due end of April (see more details on page 10), so get snapping! We are always keen to see people's unique takes on botanical photography.

As always, if you have ideas for projects, trips or talks please get in touch.

Happy Botanising!

## Secretary's Notes

*Angela Brandt*

Ngā mihi o te Tau Hou ki a koutou katoa!

I hope everyone has been taking advantage of each bit of fine weather we've had to get out and about this summer. It certainly has been sobering, though, to watch our neighbours across the Tasman facing such catastrophic bushfires and all the conditions that come with them. Having grown up in the western USA and continuing to visit family there almost every northern summer since I moved to NZ, I'm no stranger to hazy summer skies and bright red sunsets behind hills I can't see. But the sheer scope of these fires and the resulting air quality issues is staggering, and not something I'd personally experienced before. It was simply amazing on New Year's Day to watch the level of smoke in the air over the South Island grow gradually lower and lower while driving from Golden Bay to Christchurch, obscuring all views of the Southern Alps and Port Hills once we'd reached Canterbury, and to be able to smell the smoke once we were on the northern outskirts of the city. I was shocked to learn later that the smoke had been even thicker in Dunedin earlier in the day.

Reading the accounts of the many losses of native Australian flora and fauna and the large uncertainty surrounding the future of many species, including whether certain small populations of threatened plants have been wiped out, reminds me just how important it is to monitor and document all biodiversity, both common and rare. Knowing what is where is the first essential step to being able to conserve it, and societies like the BSO and events like the Fungal Foray and John Child Bryophyte and Lichen Workshop play an admirable role helping to build species lists for sites that we visit. And for all the foibles of the digital age, it has never been easier for every person, regardless of skill

level, to contribute to documenting biodiversity, such as through iNaturalist. So I'm taking heart from all the efforts that so many people, like all our members, put in every day to learn and share more about the natural world, and I'm looking with an even keener eye at the exciting schedule of BSO field trips being lined up for 2020!

## Treasurer's Notes

Mary Anne Miller

## Subscriptions Due.

It's that time of year when membership is due for renewal. If any details have changed over the past year, especially email and postal addresses, please also complete the form on the inside back page of this newsletter and email to [bso@otago.ac.nz](mailto:bso@otago.ac.nz) or send to BSO Treasurer, PO Box 6214, Dunedin North 9059. When depositing your 2020 subscription, please also follow the instructions on the inside back page of this newsletter.

## Donation Tax Credit Claims

In September last year we had notification from Inland Revenue that improvements to their myIR Secure Online Services make it easier for supporters to claim tax credits when they make donations. This will help you claim your entitlements more easily and quickly. One piece of information they require is our charity number - it is CC24010. Please go to [ird.govt.nz/donations](http://ird.govt.nz/donations) or our website for more information. Also, please let me know if your receipt will be used for a tax credit as we'll need to supply more information than our current receipts include.

## Lichen Guide Update

Allison Knight's very popular *Lichens of New Zealand; an Introductory Illustrated Guide* sold

out last year so she had some more printed, which included a name change list. For those who bought their Guides prior to August 2019 this update can be obtained from our website or write to us for a copy.

## Student awards

It was our pleasure to award Tom Dawes, a PhD student at Victoria University, a grant so he could attend the John Child Bryophyte and Lichen Workshop last November at Taringatura Reserve in Southland. We also funded Penelope Gillette, an Invercargill DOC contractor.

The final report of the Peter Bannister Student Field Grants was presented in the last newsletter. Zoe Lunniss of the University of Otago's Botany Department gave us a summary of her research to date into the decline of local *Tupeia antarctica* and its fascinating relationship with invertebrates. Our thanks to Jennifer Bannister who, between 2014 and 2018, funded eleven grants to students from four University of Otago departments who met the award criteria.

## Editor's Notes

Lydia Turley

New year; new newsletter! Thanks, as always, to all our wonderful contributors. If you haven't written for the newsletter lately, consider giving it a go this year. We always need people to volunteer to write up our field trips and talks, and articles are greatly appreciated. You don't have to be an expert to write an article; any botanical thing that catches your attention is interesting, and I'm particularly keen to see more botanical poetry.

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 *10 May 2020*. Earlier submissions are most welcome.

**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.

**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.

## New Members

To our existing members, thank you for your continuing support.

Thank you very much to Tony Aldridge, Dinah Dunavan and Rebecca Brown-Thompson for their generous donations.



*Giants in the mist: Towering emergent rimu on a misty Okarito morning (Photo: Esther Dale)*

## Correspondence and News

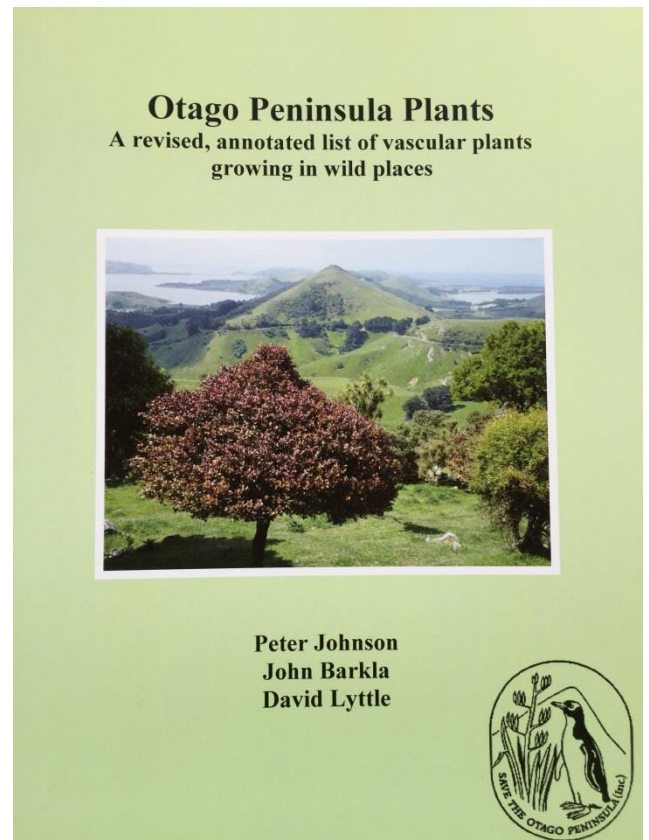
### Otago Peninsula Plants

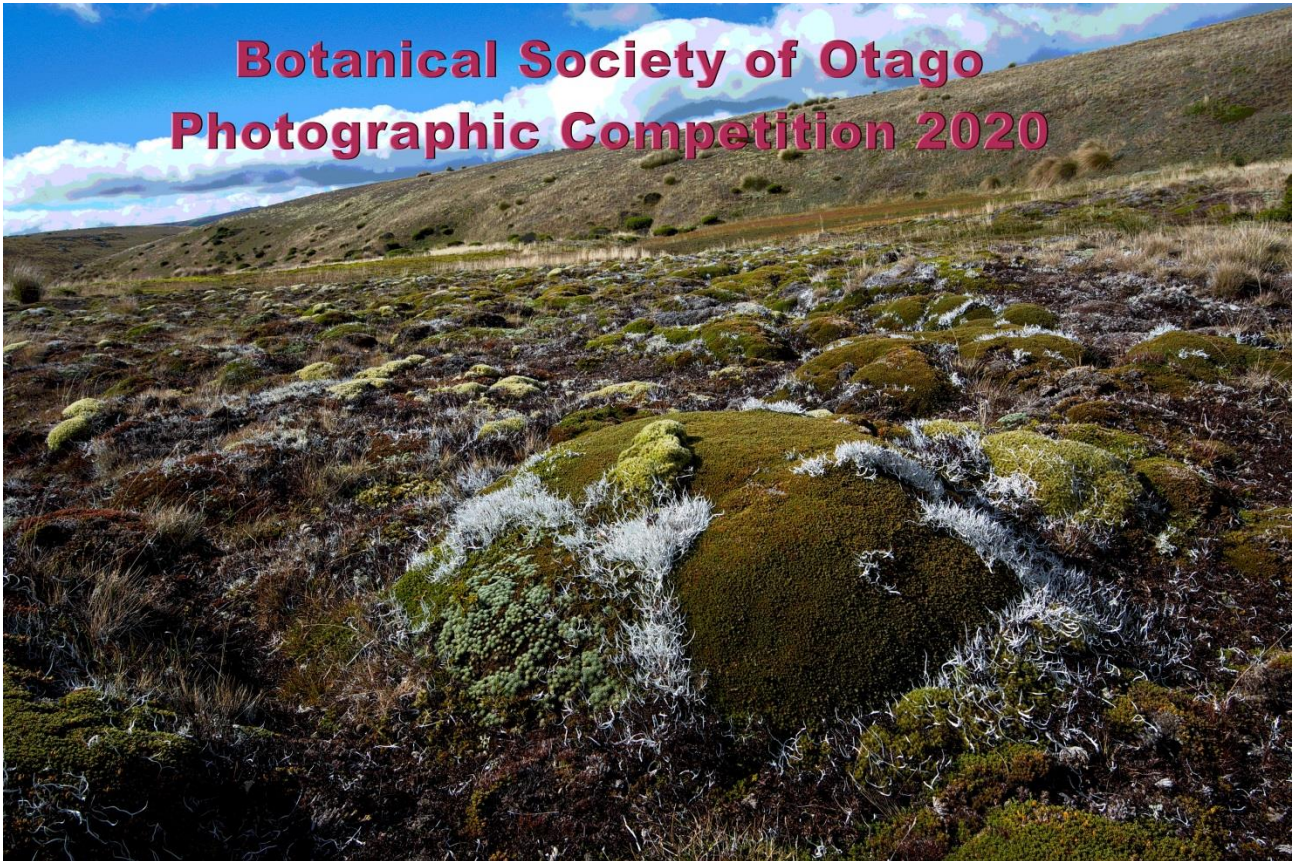
The recent revision of *Otago Peninsula Plants* is now available.

STOP's new publication lists 764 plants, together with detailed notes on their locations, habitats, abundance and threat status. This is a valuable resource for anyone interested in the Peninsula flora.

Copies available at some BSO meetings, price \$15.00. To have a copy posted to you, price \$20.00 inc postage, email [stopincsoc@gmail.com](mailto:stopincsoc@gmail.com) with your name and address and deposit \$20.00 in STOP A/C 03 0903 0595631 01

Particulars – your Name  
Reference – Book





**Enter the Competition and support the Calendar  
Entries due April 24<sup>th</sup> 2020**

**Categories are:**

- 1. Plant Portrait**
- 2. Plants in the Landscape**
- 3. Plants and people**

**It's easier than ever - no prints required.**

To enter just email up to 5 digital photos as JPEG files between 2 – 8 MB to [BrownsteinG@landcareresearch.co.nz](mailto:BrownsteinG@landcareresearch.co.nz) along with the electronic entry form. Label each image with the category number followed by a caption and email in batches of no more than 16 MB per batch. Entrants must be current members of the Botanical Society of Otago. Entry and membership forms will be posted on the BSO website: <https://bso.org.nz/photo-competition>

There will be a prize of \$50 for the winner of each category. Entries will be judged on technical and artistic merit by a panel of three judges. A separate prize of \$50 may be awarded for members' choice on the night. Photos will be displayed and winners will be announced at the meeting on 13<sup>th</sup> May. Only photos of native plants (with or without people and landscapes) will be considered for the calendar and pictures in landscape orientation are more suitable for this.

# Articles

## An Island revisited: Luggate Red Bridge

Peter Johnson

Islands are tempting places to botanise: tidy geographical units, and they offer some form of adventure getting there. One such island, in the Upper Clutha, just above Luggate Red Bridge, is accessible by wading from the true right bank when the river is low. During a summer holiday, on 27 December 1959, my interest in plants took me there, at the age of 13. Well before earning any qualification as a botanist, I produced my first vegetation map, sketching in the prominent plants and main vegetation types.

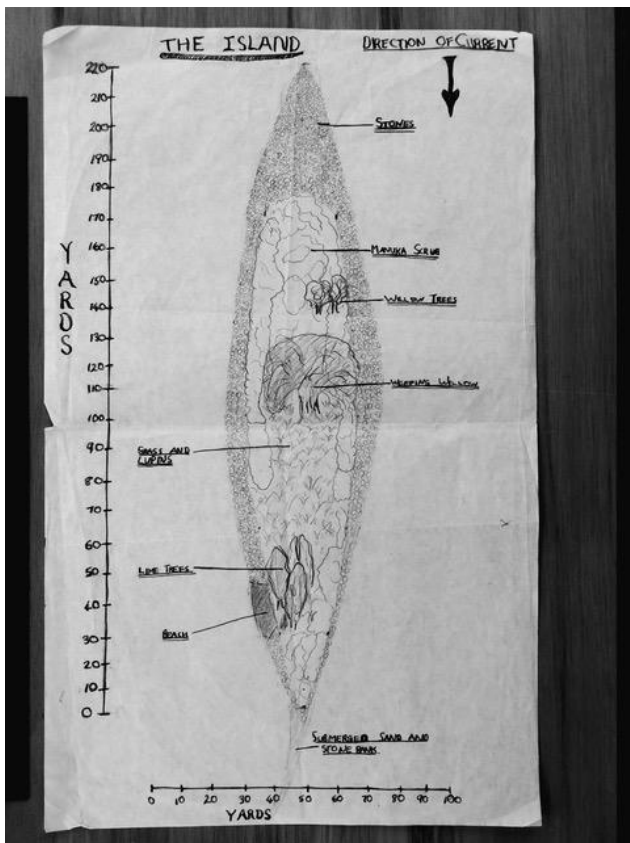


Fig. 1. "The Island", 1959

Sixty years later, in September 2019, a very low river level allowed dry-foot access: an opportunity to make a new vegetation map and take photos as a comparison with my originals. Further photos were taken in October 2019, when the deciduous trees had come into leaf.

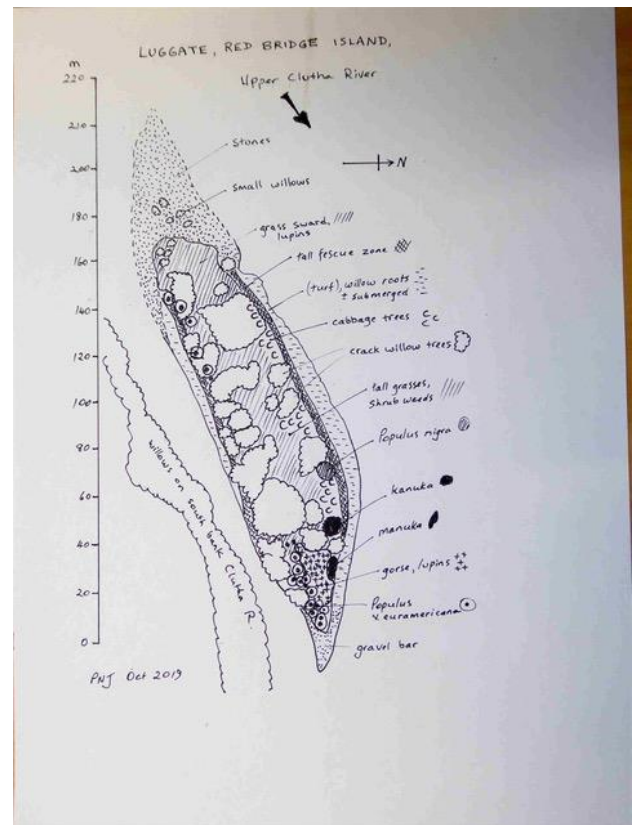


Fig. 2. "The Island", 2019

### The Maps, Compared:

The lozenge-outline of my 1959 map (Fig. 1) would have been drawn from the ground. My island measure of 220 yards long by 40 yards wide must have been from pacing it out. What a surprise, then, to deduce from my 2019 map (Fig. 2) based on Google Earth, the dimensions of 220 m x 40 m; virtually the same when one considers the near equivalence of yards to metres!



Fig. 3. Luggate Bridge Island, December 1959

In 1959 I mapped the only prominent willow as a weeping willow, verified from its pendent limbs that show in the black-and-white photo (Fig. 3). This tree was no longer present in 2019. The early mapped location of ‘willow trees’ would have been a few crack willows, which have since become abundant as spreading trees 10–18 m tall, now taking the place of what I had initially mapped as ‘manuka scrub’ and which my early photo shows as the main scrub community. That ‘manuka scrub’ would have included kanuka. By 2019 there was but one kanuka remaining on the island, a 9 m tree, and a few manuka shrubs at the downstream end. My early mapping of “lime trees” was a misidentification for a group of upright poplars which I now conclude to be a cultivar of hybrid black poplar (*Populus X euramericana*) having distinctive bronze foliage in spring. These poplars are 20–25 m tall; other clusters now occur along the south bank of the island. Also by 2019, there is a single tree of black poplar (*P. nigra*). At least one small Lombardy poplar is also present. At the upstream end of the island, small (3 m) willows appear to be a golden willow cultivar.



Fig. 4. Luggate Bridge Island, 5 September 2019

The mapped item “grass and lupins” of 1959 is still relevant in 2019, though of lesser extent since willows have taken over. One native species present in 2019 – cabbage tree – was not recorded in 1959, although I would have been familiar with it. By 2019 cabbage trees are quite

common, mainly along the north bank, both beneath willows and in the open gaps between; many are 4–7 m tall, most with just a single foliage tuft, and along with youngsters, indicative of an establishing population.



Fig. 5. Luggate Bridge Island, 19 October 2019

The grass sward is dense (rabbit-free), mainly creeping bent, tall fescue, cocksfoot, and meadow grass, joined by a tangle of shrub weeds: yellow lupin, broom, gorse, sweet briar, and cotoneaster. Natives have a token presence: *Coprosma propinqua*, flax, and prickly shield fern.

That which I mapped as “stones” in 1959, around most of the island perimeter, might today be mapped as *didymo* (rock snot) the invasive diatom which smothers stones and boulders, as it has been doing since 2005. Among other changes to the Clutha River has been the arrival of the aquatic weed *Lagarosiphon major*, first recorded in Lake Wanaka in 1973 and, from some time after 1979, abundant in the Clutha and the now-Lake Dunstan. This has replaced native aquatic plants such as pondweeds and milfoils, and trapped silt along stretches of river margin that were formerly coarse gravels and stones. A third impact, generally as well as on the Luggate island, has been the steady, and largely unnoticed increase in crack willow, with its propensity to form dense root-masses in river-margin sediments, competing with and often usurping the former turf communities of

numerous low-growing, native, semi-aquatic plants. On the Luggate island I did not set out to map the riverbank turfs in 1959, but have done so in 2019, for a habitat that is now mainly willow roots and didymo, a partial cover of spike sedge, but otherwise mere traces of only three other native herbs (*Lilaeopsis ruthiana*, *Hydrocotyle sulcata*, *Carex gaudichaudiana*). The island flora, in total for 2019: 26 naturalised species, and 14 natives.

What flora and vegetation might the island, and indeed all Upper Clutha river margins, have held in pre-human times? Clues come from the surviving vegetation of Lake Wanaka shores, and from the forest patches that have suffered the least fire history, as on the islands of Lake Wanaka, in the gullies and gorges, and on shaded aspects such as on Mt Iron and near Glendhu Bay.

I surmise that Clutha River margins would have had some manuka scrub in the moister gravels, soon grading back to kanuka on drier ground. Kowhai would have found favourable riverbank sites, with some Hall's totara, broadleaf, and lancewood, and plenty of kohuhu, cabbage tree, marble-leaf, and shining karamu. Native shrubs would have included the ubiquitous mingimingi, matagouri, porcupine shrub, and koromiko, along with corokia, weeping matipo, native broom, and various species of *Olearia* and *Coprosma*. Flax would have been common, fringing the river and where nourished by seepages and springs, along with toetoe, other robust tussocks and native grasses, and various tall sedges.

If anyone, or any agencies, might one day see fit to recreate some of this riverside biodiversity, having first dealt a blow to the overcrowding willows and shrub weeds, then the above plant list might be a starter-pack for prospective woody-plant revegetation. And why not make a trial start on this island?

I have a more comprehensive account of the island vegetation for anyone who might like it.

## **Tectonic correlations support a Cretaceous-Oligocene vicariance origin for northern North Island taxa of New Zealand**

*John Grehan*

The small angiosperm family Xeronemataceae is made up of a single genus with only two species (Chase *et al.* 2000). Both species have restricted distributions; *Xeronema callistemon* (Fig. 1a) is endemic to Poor Knights and Hen (Taranga) islands in Northland, while *X. moorei* is disjunct nearly 2,400 km to the north in New Caledonia (Fig. 2a). How did these sister taxa evolve to be both allopatric and disjunct? Following the ideas of Charles Darwin, distributions such as that of *Xeronema* would be explained by an origin in just one of the regions – New Zealand or New Caledonia – and chance dispersal from there to the other region. This sort of ‘centre of origin – dispersal’ explanation is still widely used today, especially when the fossil-calibrated molecular clock estimates of groups’ ages are misrepresented as actual or maximum, rather than minimum ages. (The young ages that are inferred, incorrectly, in these studies are thought to preclude earlier, tectonically-mediated origins and support recent, overwater dispersal).

If the example of *Xeronema* were an isolated and exceptional phenomenon, there would be a case for recent, chance dispersal being responsible for the distribution. But, in fact, the New Zealand-New Caledonia pattern is shared by many other taxa with very different dispersal abilities and ecological requirements. In *Xeronema*, the distribution in New Zealand is restricted to the north. Again, this is not an isolated phenomenon. Another example is a group of tussock wetas (Fig. 1b) that occur only in New Caledonia and the northern North Island between Northland and East Cape (Fig. 2b).



Fig. 1. Examples of groups displaying northern North Island-New Caledonia biogeographic connections. (a) *Xeronema callistemon* (photo courtesy of Lisa Forester); (b) *Anisoura nicobarica* (photo courtesy of Stephen Thorpe).

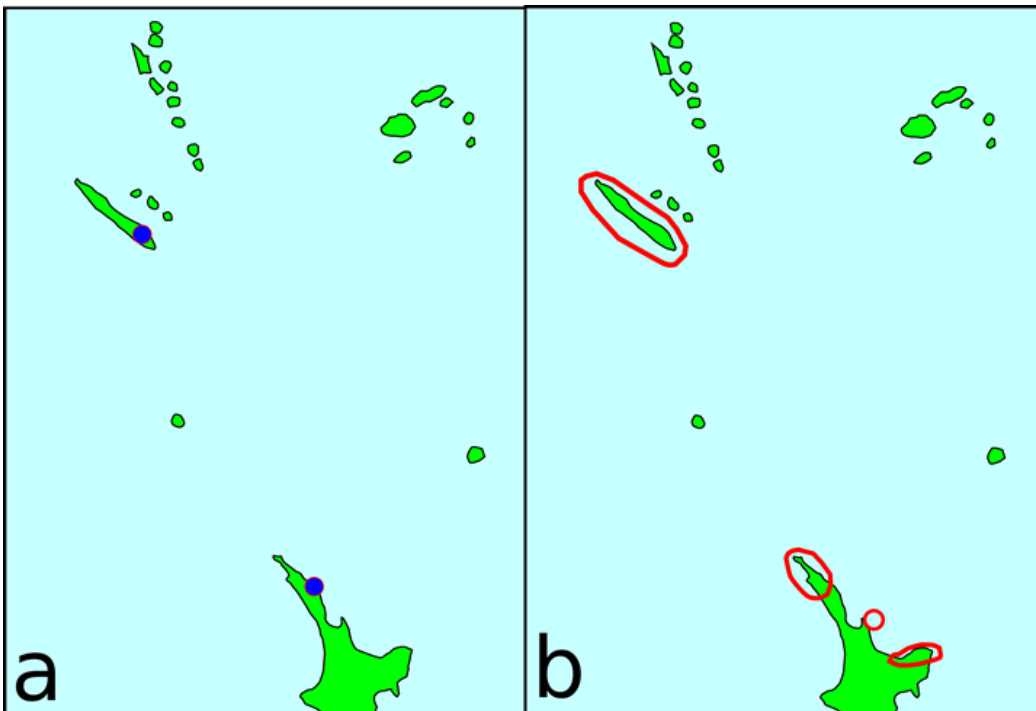


Fig. 2. Distributions of two taxa shared by New Zealand and New Caledonia. (a) The angiosperm genus *Xeronema*; (b) The tusked wetas (*Orthoptera*), a clade comprising the genera *Anisoura* and *Motuweta* (in New Zealand and *Carcinopsis* in New Caledonia. (Distribution from Heads, 2017).

Groups distributed between Northland and East Cape include a diverse range of plants and animals, some of which are restricted to offshore islands while others include mainland areas. Some Northland-East Cape groups have relationships that extend to New Caledonia and also other regions. For example, the angiosperm genus *Sicyos* is represented in New Zealand by two species that are widespread but also allopatric with a shared distribution boundary between Northland and East Cape (Fig. 3a). *S. australis* is also in Norfolk and Lord Howe Islands, and eastern Australia. In northern Queensland it is replaced by *S. undara* while more distantly related species occur in the Americas (Fig. 3b). This is consistent with a Pacific ancestral range that has broken up in concert with former Pacific paleogeographies (see Heads 2012 discussion of Pacific geology).

The allopatry of *Sicyos* and the disjunct relationships of other species with New Zealand distributions centered on Northland-East Cape invite historical explanation. A topographic and stratigraphic approach was taken by Gibbs

(2016) who noted that while the present day Tasman Sea north of New Zealand includes only two tiny volcanic islands, (Lord Howe and Norfolk) there is geological evidence of other former islands or island chains that could have served as stepping stones for migrating terrestrial organisms (Fig. 4a). The islands were produced by volcanism behind a subduction zone between New Caledonia and New

Zealand 50-20 million years ago. In this interpretation, the New Zealand endemics are attributed to chance (but directional) dispersal along island chains that allow for shorter (and presumably more feasible) travel distances.

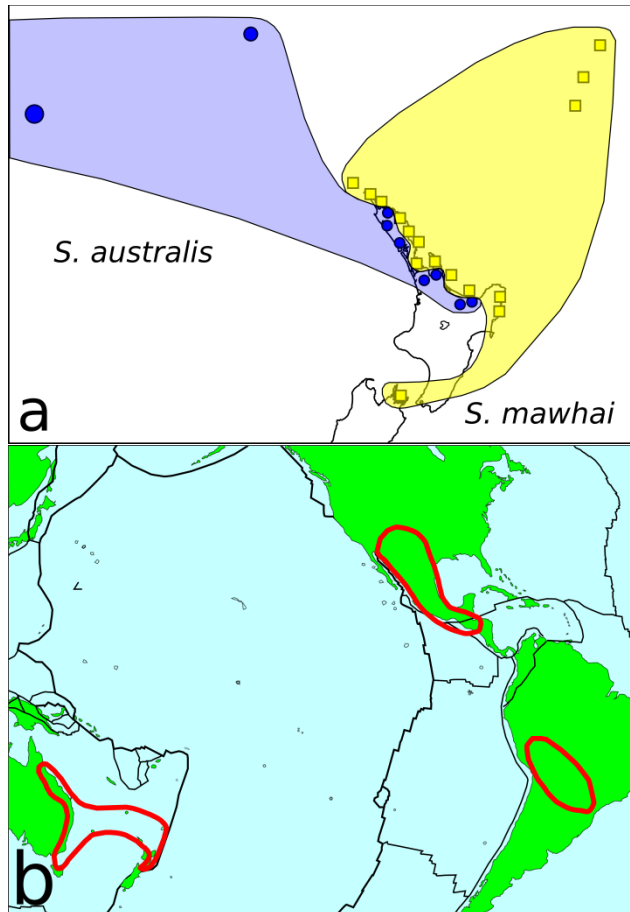


Fig. 3. Distribution of *Sicyos* (Cucurbitaceae): (a) two New Zealand species allopatric between Northland and East Cape (based on Heads 2017, fig. 5.7; (b) Pacific distribution of New Zealand clade (distribution data from Lira et al. (2002), Telford et al (2012) and Heads, 2017). Plate boundaries as black lines.

The role of islands as stepping stones for dispersal mostly from New Caledonia to New Zealand was not specifically justified by Gibbs (2016), but it appears to be based on his view that molecular divergence estimates represent actual and maximal clade ages – these would preclude the possibility of widespread ancestral ranges prior to the geological isolation of the Zealandia block. Thus Gibbs (2006) attributed the origin of New Zealand cicadas to chance dispersal of ancestral cicadas into the Tasman Basin sometime during the mid-Cenozoic, and

this was too recent for an origin of the trans-Tasman connection by earlier Gondwanan rifting. But the estimates of cicada ages are based on fossil calibrations and therefore cannot represent anything more than minimum dates. The possibility of a former physical connection cannot therefore be precluded. Apart from the illogical conversion of fossil-calibrated divergence estimates from minimums to actual or maximum clade ages, there is no actual evidence for any New Zealand group having an ancestral origin postdating the tectonic extension, rifting and subsidence of East Gondwana. A chance dispersal mode of origin for the general New Caledonia- New Zealand relationship is problematic because it requires exceptional dispersal capabilities over long distances, and yet the New Zealand members often (as in the tusked wetas and *Xeronema*) have restricted distributions.

As stressed already, fossil-calibrated clade ages represent minimum dates only, but this does not mean that absolute clade ages cannot be estimated. The distributions of many clades belong to repeated patterns that also coincide spatially with tectonic structures such as major faults. This suggests that ancestral distributions were widespread over former paleogeographies and that both the ancestors and the paleogeographies were disturbed in similar ways in similar places. Phases of tectonic activity on particular features are often well-dated, and this provides a way of dating clades with boundaries at those features. This panbiogeographic approach was applied to the New Zealand- New Caledonian pattern by Heads (2017). He pointed out that the northern North Island was not a single geological unit, but included allochthonous terranes in the Northland and East Cape regions that run in parallel with the Vening Meinesz transform margin and an extinct subduction zone running through mainland North Island (Fig. 4b). The accreted terranes include distinctive rock sequences (ophiolites) that are slices of oceanic crust that have been

ramped up onto continental crust, often in close association with subduction zones and island arcs. This North Island belt of ophiolites forms the southern extension of the Loyalty (New Caledonia) -Three Kings (New Zealand) arc.

The geographic coincidence between the distribution of ophiolites and associated island arcs and the terranes of the Northland-East Cape region suggests that the biogeographic

connections between New Caledonia and New Zealand are the product of ancestral distributions that existed on islands of Loyalty-Three Kings-Northland plateau before these became submerged or tectonically transferred to the northern margins of the North Island. The Northland and East Coast allochthons are thought to have formed in Cretaceous-Oligocene time and were transferred to mainland New Zealand during the Oligocene.

A close tectonic relationship between geology and distribution is illustrated by the distribution of tusked wetas in the North Island, where three allopatric species are distributed between Northland and East Cape almost entirely to the north of the extinct subduction zone (Fig. 5). This tectonic correlation is consistent with the ancestor of the New Zealand tusk wetas having been geologically incorporated into the North Island, along with the terranes. Since that time (Oligocene) the wetas have not dispersed beyond

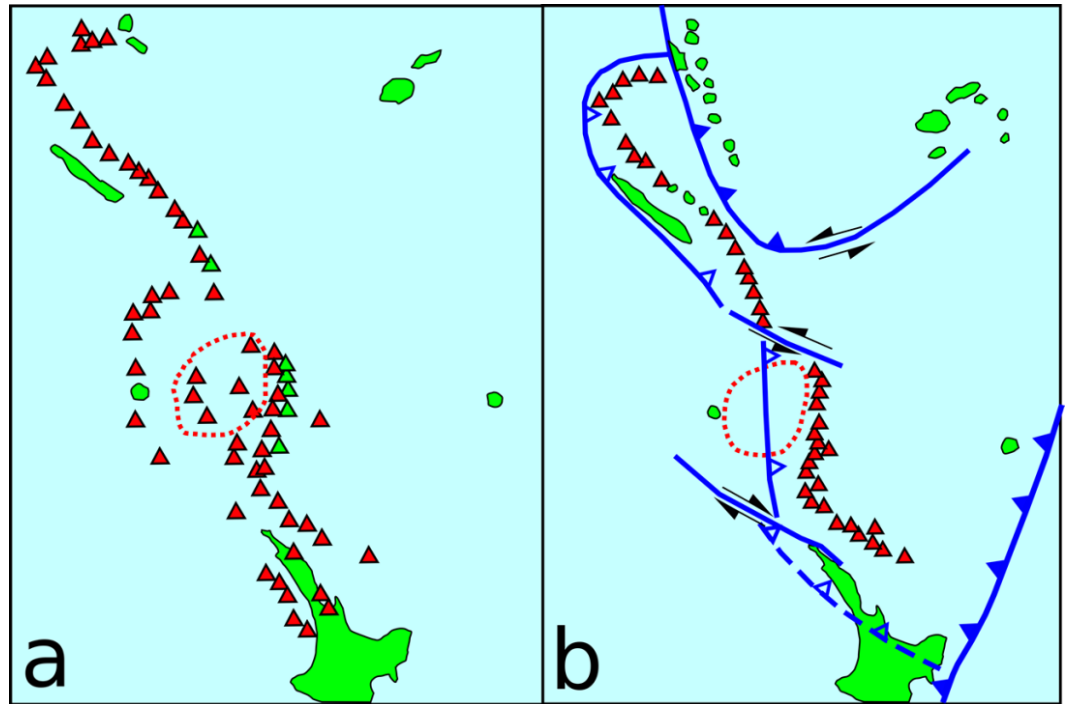


Fig. 4. (a) Stratigraphic model for geological connections between New Caledonia and New Zealand (Gibbs 2016, p. 107). Red triangles – former volcanoes; dotted circle – area of former large island or islands near Norfolk Island. (b) Tectonic model for geological connections between New Caledonia and New Zealand (Heads 2017, fig. 5.2). Red triangles – former volcanoes; dotted circle – area of former large island or islands near Norfolk Island; lines with barbs – active (closed barbs) or inactive (open barbs) subduction zones.

their initial distribution ranges. Differentiation of the species may have occurred following terrane accretion, or it could represent a pattern of earlier differentiation that had already developed along the former island arcs. The phylogenetic connection of the New Zealand clade with New Caledonia is consistent with a broader ancestral range that extended along the former island arc system between the two countries. This correlation provides an Oligocene clade age for the ancestor of this group of tusked wetas in New Zealand while the upper clade age could extend back at least 50 Ma to the inception of the New Caledonia subduction zone as it was displaced west from the original Pacific subduction zone that began moving east from Gondwana about 90 Ma (Heads 2017).

Biogeographic and tectonic correlations, as in the northern North Island belt discussed here, contribute important evidence about the origins of biological groups in space and time. The



patterns summarized here indicate that present-day groups reflect ancestral distributions that have been disturbed by massive tectonic displacement, including subsidence, orogeny, and volcanism. This biogeographic-tectonic evidence has far-reaching implications for conservation, as it suggests that conservation programs should aim to preserve, not just populations of 'unique' plants and animals, but also aspects of their biogeography and evolution, such as allopatric boundary zones (nodes) (Heads 2017).

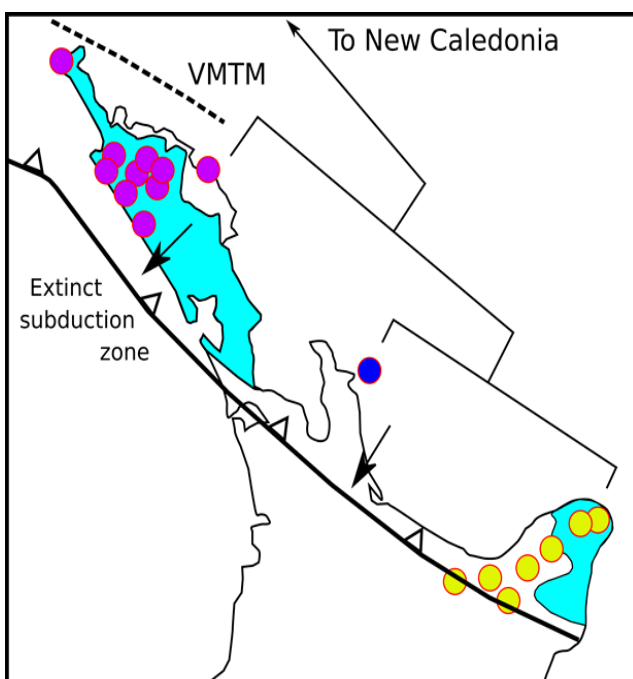


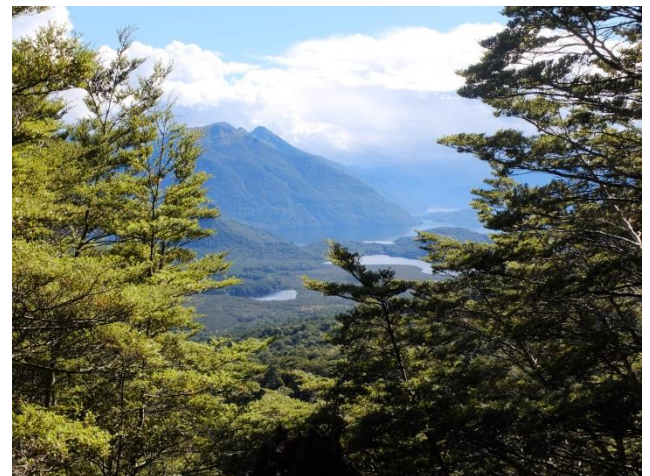
Fig. 5. Spatial correlation between tusked weta distribution and tectonic features. Circles – tusked weta species rooted in cladogram of phylogenetic relationships extending to New Caledonia; blue shading – allochthonous terranes; line with open triangles – subduction zone (open triangles on upper plate) black arrows – direction of movement of the subduction zone; VMTM – Vening Meinesz transform margin. (from Heads, 2017, fig. 5.6).

### Acknowledgments

I am most grateful to Lisa Forester, Steven Thorpe, and the New Zealand Plant Conservation Network for help with species photos. I am also grateful to Michael Heads for improvements to the draft manuscript.

### References

- Chase, M.W., Rudall, P.J., Fay, M.F. & Stobart, K.L. 2000. Xeronemataceae, a new family of asparagoid lilies from New Caledonia and New Zealand. *Kew Bulletin* 55:865-870.
- Gibbs, G.W. 2016. *Ghosts of Gondwana: The History of Life in New Zealand*. Potton & Burton. Nelson. 367 pp.
- Heads, M. 2012. *Molecular panbiogeography of the tropics*. University of California Press, Berkeley. 562 pp.
- Heads, M. 2017. *Biogeography and evolution in New Zealand*. Taylor & Francis, Boca Raton. 636 pp.
- Lira, R., Villaseñor, J.L. & Ortíz, E. 2002. A proposal for the conservation of the family Cucurbitaceae in Mexico. *Biodiversity and Conservation* 11:1699-1720.
- Telford, I.R.H., Sebastian, P., de Lange, P.J., Bruhl, J.J. & Renner, S.S. 2012. Morphological and molecular data reveal three rather than one species of *Sicyos* (Cucurbitaceae) in Australia, New Zealand and Islands of the South West Pacific. *Australian Systematic Botany* 25:188-201.



Beech forest frame: Hope Arm, Lake Manapouri, from surrounding *Nothofagus* forest. (Photo: Mary Anne Miller)

## Meeting and Trip Reports

### The 18<sup>th</sup> Annual Geoff Baylis Lecture: Geological constraints on the age and antiquity of land in New Caledonia and the Chatham Islands. Hamish Campbell, 18<sup>th</sup> September 2019

Warren Jowett

Hamish gave an entertaining and informative presentation on the nature and origin of Zealandia, now recognised as the 8<sup>th</sup> continent of the world (or 7<sup>th</sup> if Europe and Asia are considered to be one continent). 95% of Zealandia is submerged and its 21-35 km thick continental crust is comprised mainly of granite, schist & greywacke. Zealandia is the 3<sup>rd</sup> youngest continent (Australia and Antarctica are younger). Whilst the presence of another continent has been hinted at for many years, it wasn't until a paper written by fellow GNS scientist Nick Mortimer led to a press release on 3 February 2017 that the world began to take notice. More than 16,000 news articles followed, reaching nearly a billion people.

The parts of Zealandia that are above sea level are Auckland and Campbell Islands in the south, Lord Howe Island in the west, New Caledonia in the north and the Chathams in the east. The Chathams emerged above sea level 6 million years ago and are geologically a very stable part of Zealandia.

Hamish has visited New Caledonia and the Chathams many times from 1975 to the present day. He leads tours to both places each year. Being the Geoff Baylis lecture, I thought that Hamish may have included in his lecture the affinities that flora of the Chathams have with mainland New Zealand. He knew that he had a challenge in delivering a geological lecture to a botanical audience. But he rose to the challenge

well. He is a gifted speaker who communicates his knowledge of the geology of Zealandia with passion and authority.

### Field trip to Akatore, 21<sup>st</sup> September 2019

Lydia Turley

Despite beautiful sunshine, only a small group attended this trip; Robyn Bridges, John Steel, Zola Yun, Jessica Paul, Kath Graham and Lydia Turley. On arriving at Akatore we discovered that despite the sunshine it was very cold – maybe all the people who didn't come had looked at the weather report.



The first part of the trip took us alongside a river with covenanted bush on one side and lambs on the other. The bush contained totara and *Carmichaelia petrei*. Exotics included gooseberry, raspberry and flowering currant, which Robyn said are commonly found as remnants from early farmhouses, where the plants have survived longer than the house. Flowering currant isn't edible but was often planted by the dunny for its smell. There were several weeping *Myrsine* with windswept foliage and interesting root formations where the ground they were growing in is being slowly washed away. *Olearia fragrantissima* is one of few deciduous native trees and the leaves were just starting to come out. Southern rata reaches its northernmost limit at Akatore, and we spotted some lovely big individuals.

*Coprosma obconica* has previously been identified at Akatore, although John was

sceptical of the veracity of these identifications. It is very rare, so we were keen to find it again and Kath got very enthused about the hunt. John found one that looked hopeful and sparked great interest, and Kath thought it looked the same as one she'd seen earlier, but the eventual conclusion was that we were looking at *Coprosma robusta*. We had many other false alarms but they all ended up being something else, so we left with no identifications of *Coprosma obconica*.

Robyn, Kath and I enjoyed a pleasant morning tea in a sheltered spot while waiting for the others to catch up (they missed out). Beyond our sheltered spot the river edge turned more coastal, with big rocks to scramble over and native spinach and *Veronica* growing in cracks in the rocks. We ended up leaving Zola and Jessica in this section, playing with crabs in the river mud.



*Blechnum banksii* (Photo: Lydia Turley)

Finally we came out on the shore. Here we found a few individuals of *Lepidium tenuicaule*, a rare coastal turf plant, growing in a sandy patch surrounded by grass. John says that the patch of sand has existed for an extended period of time, a strange thought given that it doesn't seem topologically all that different from the grass it's next to. Why is the sand there and not here? *Blechnum banksii* grows in gaps in the rock and in caves which look like fern grottos. There are many types of seaweed on the seashore, although the only one I can call anything more specific than "seaweed" is bull kelp – great fun watching it swirl back and forth in the waves crashing on the rock.

## **Botanical Art: drawing the line between scientific illustration and artistic expression, a talk by Wayne Everson, 9<sup>th</sup> October 2019**

*James Crofts-Bennett*

During a recent BSO seminar, Wayne Everson explored the more artistic facets of botanical illustration while discussing his work at Olveston. The classes he teaches cater to a wide range of ages and skill sets, officially starting at 15 years of age (he explains this is somewhat arbitrary and as long as students bring the fire, he will stoke the kiln) with no upper limitation. Artistic skill development in fresh students was as low as never being initiated in some cases, yet still people were able to express the beauty of the green world to levels boarding professional.

The process begins with the classical drawing, pencil work that can further be used as scaffolding for further illustrative processes. He notes that this is perhaps the optimal method of scientific illustration as it perfectly captures the finest points of plant (or just general) anatomy without becoming distracted by excess or unimportant details such as colouration. It was at this point that Wayne emphasised the importance of legacy within artistic development. Much like science, art is in a state of evolving flux and innovation must walk hand in hand with consultation of prior methods. By understanding the methods of those who have come before, one can refine ones own skills by borrowing and blending previous methods. Not only did he teach his students of the old masters, he also encouraged them to imitate to truly get a feel for these older implementations. This was followed by sessions of critique, both crucial for building character and refining skill regardless of level of mastery.

The next phase of teaching is where the borders of illustration and art begin to shift and haze. Painting; in this case water colour and gouache

(an unholy union of watercolour and bean dip). Characteristics that shift this more into the camp of artistic expression include the emphasis on the individual rather than the generic. The process of painting captures colouration, lighting, blemishes and structural damage, things that are specific to the subject rather than the idea of the species. The process of painting offers many more options for expression but also becomes more complex and difficult to master. Water colours can be layered to provide gradients of colour, making the process much more three dimensional compared to line art hatching. However, some things are remarkably similar between disciplines; the importance of capturing detail and accuracy of image and subject are crucial to art as much as scientific illustration, preserving much of the crucial data of the subject.

Moving on to tricks of the trade, Wayne gave various examples of colour sampling worksheets. Crucial to any form of colour work, colour sampling is found throughout traditional and digital works. Colour sampling allows for regular colour reference as well as experimentation without actual commitment that could ruin the base work. This can extend to practicing details, shown to be effective for flower form in the visual examples given, in practice it is great for eyes and muscle detail for our more zoologically inclined readers. Further on this line of thought, one practice sheet was shown with a multitude of simulated three-dimensional geometric shapes. Wayne explained the ease by which a growing artist may practice hue and shading with these tools. He pointed out how a cube, made of three rhombuses, was a simple yet effect exercise in mixing hue to simulate shading. From a drawing perspective, shading and depth can be shown through application of pressure onto the tool of choice, providing darker lines, or through hatching and cross hatching. As hatching allows for control of the direction of line strokes, adding curvature to hatching alongside application of varied pencil

pressure can produce convincing curves and bumps to a work.



*Botanical artwork from the classes*

Despite the classes short length (ten weeks) the examples given allowed for a detailed exploration of the development of Wayne's students. Though there were some implications of natural talent at play, the later works that were showcased showed some immense skill development. Wayne became impassioned by one particular student's work that frequently roamed into the realms of experimentation, and heresy judging by the reaction to the use of silver paint. It was noted that this form of rebellion/ignorance resulted in some stunning works. A key example of refining existing methods into a tempered form of innovation, the ultimate goal of developing an artistic method.

Moving on from the actual work to theory and practice, Wayne explored the passage of time in botanical art. While plants are not wont to roam and flee from captivity, they can be seasonal, particularly regarding flowers and fruit. Because of this, you may find your work requires a balance of both disciplined scheduling and patience. The actual process takes time, some works exhibited requiring weeks to create. Being a botanically inclined lot, we have some advantage regarding being informed or able to research the finer points of capturing a certain subject. This can play off the methods Wayne has provided in allowing for the faster process of illustrating said subject. Key tricks such as the use of contrast to improve the three-dimensional effect of complex flower heads or the use of intense colouration in a flower petal lattice creating the illusion of the internal space within the flower head. Botany and art effectively play of each other's strengths in this way. Perhaps this may explain the extensive history of botanical art?

## Weekend Field trip to the Catlins, 19<sup>th</sup>-20<sup>th</sup> October 2019

*Kate Caldwell*

About 15 cheery botsoccers converged in Owaka to visit some hot spots in the northern Catlins. John Barkla guided us to some magical spots, providing species lists and even topo maps. It was sunny! Ladybirds and *Clematis paniculata* were in season.

Our first stop was Jacks Bay, 6 km south of Owaka. A lone sealion on the sandy beach struck poses as we filed past. A warming walk took us past well-established reveg plantings, with glimpses of stony Penguin Bay and big clumps of *Celmisia lindsayii*, a few in flower, clinging to white-lichened cliffs. *Senecio bisseratus*, *Anisotome lyallii* and *Veronica*

*elliptica* thrived trackside along with scotch thistles, nettles, and the smell of nearby cows.

At Jack's blowhole we squinted to identify the vegetation clinging wetly on the edges of the chasm. What was that glossy, lax grass? *Hierochloe redolens*, it was conjectured. *Anaphalioides hookeri* and the sucking, churning sea in the blowhole were mesmerising – but some were huddled at the bush edge, more mesmerised by *Asplenium obtusatum* – or was it *oblongifolium*? A tricky pair, only distinguishable by the shape of their scales.



*Clematis paniculata* showing off at Jacks blowhole (Photo: Gretchen Brownstein)

Back to Jacks Bay for lunch on the rocks and a wander to the cliffs and tidal pools at the northern end of the beach. Some added six letter codes to species lists. Others snapped pics of marvelous ginger algal beards, poked at sea snails or patted a passing brown dog.

We left the beach, in perfect time for a low-tide walk across the Catlins River Estuary to Hinahina Island. The island had a gothic vibe:

sun bleached seaweed swaying from fallen and dead limbs of salt-sucked tōtara, slowly dying coprosma and mapou. In the centre of this tiny island is a forest microcosm with podocarps, rata, clumps of astelia, and ferns smoothed flat by resting sealions. *Clematis paniculata* was peaking everywhere we went. We noted the difference between the male flowers (bigger – and showoffs, much like the sealions) and female. We compared dangly bits on *Coprosma lucida*, too. Lea found a geocache containing plastic soldiers and a few kids' scribbles and unabashedly pronounced it to be the find of the day. I munched on some *Apium prostratum*.

Some might argue the find of the day was the *Drymoanthus* orchid in the forested scenic reserve right on the Pounaweia motor camp doorstep. This gem of a campsite, where most of us were staying, is right on the estuary, peaceful and alive with bird song. The afternoon and evening were spent enjoying the place.

Morning came and we headed to Cannibal Bay. Wind shaped tōtara and coprosmas on cliffs and hills, more gorgeous *Celmisia*. A sandy beach. Between Cannibal and Suarat Bay are dips and hollows amidst the marram and lupin covered dunes. Wet in winter, dry in summer, communities of turfy, herbaceous plants form mosaics. Some special natives compete with *Crepis*, clover, *Prunella* and ever encroaching lupins, gorse and marram. Among them were *Lobelia arenaria*, *Samolus repens*, *Leptinella dispersa*, *Lagenophora* sp., *Hydrocotyle moschata*, a minute *Euchiton*, many mosses and charming *Mazus arenarius*. Tiny *Corybas orbiculatis*, with its very leathery inrolled leaf, was in flower. Down on hands and knees, we hunted for treasures. Curly little caterpillars. A long moth. Slime mould balls? And – what's this thing? Oh, that's a rabbit poo. Plenty of that. Also dotted around were raggedy flaxes holding onto last year's stocky seed pods, the common coastal *Ficinia nodosa*, some *Poa cita* and *Pittosporum tenuifolium*.

John B observed that the turfy spot has changed a lot since he was last here some years back. It has closed in, with fewer open sandy bits, and more lupins especially.

Over to Suarat Bay, then back to Cannibal for lunch by the creek outlet. More rock face examinations - *Anisotome lyallii*, blue poa on the cliffs (*Poa cita*, I was told? But so blue!) Yet more *Celmisia lindsayi*. *Myrsine australis* and small leaved shrubs hugging the cliffs and grassy hills.

Nugget point was the grand finale. Cloud pruned coprosmas, tunnels of gnarled branches. Nesting spoonbills far below us as we walked up to the nuggets. It was a great time to visit, with many species in flower: windshorn *Corokia cotoneaster*; *Helichrysum lanceolatum* with fragrant, creamy white clusters; more *Pittosporum tenuifolium*, and *Meliccytus alp...*mumbleindeterminatemumble. *Parsonsia heterophylla* with many, many buds and some flowers. I couldn't decide if their fragrant waft on the breeze was sweet or... a bit yuck? We saw *Olearia fragrantissima*, bonsai *Pseudopanax ferox*, a chunky little stunted *Sophora microphylla*. We noted both *Ileostylus micranthus* and *Korthalsella lindsayi* side by side on a *Coprosma propinqua*. The soft new leaves of the naturally uncommon *Chenopodium allanii* looked yummy, so I ate one. It was ok.

Nugget Point was a real botanical highlight – not only an interesting suite of species, but all growing together into a huge, gnarly cloak, hugging and holding hands, clinging to the ground and to each other. These plants up there are as tough as old boots – in fact will last much longer than an old boot would up here in these challenging conditions. The views were a feast for the eyes, with so much to see both near and far. The sun shimmered off turquoise-silver water.

At the lookout over the nuggets I got a sense of vertigo, weirdly willing me down towards a

huge patch of *Urtica ferox*, or a swirling pit of bull kelp and seals. A dramatic place.

We descended back the way we came and with poetic timing the southerly hit just as we got to the cars. We quickly said our goodbyes and dispersed.

Thank you to John Barkla and fellow plant lovers for another wonderful BSO trip!

## Field trip to Andersons Lagoon, 2<sup>nd</sup> November 2019

*James Crofts-Bennett*

A weekend of blaring sun following a week of extensive showering can only mean one thing to any botanist; the spiders will be out in droves! The sun gave no qualms about its overbearing presence throughout the field trip; it was out in full force from the get-go as we sheltered in the shadow of the botany building. A prior check of the streetlights that night had confirmed that local humidity was climbing. No longer pinpricks of light in the darkness, they had grown to great glowing spheres of refractive moisture. As if the fates had aligned, we arrived at the lagoon to a gentle breeze that staved off the heat madness. To our delight someone had also been kind enough to flatten the fence surrounding the bushy start to the walk. I would not have been shocked if an ice cream truck had rolled in on our exit that afternoon, for all the boons we had been granted already.

We hit the ground running, immediately accosting a lonely cabbage tree regarding the local spiders. Not one to mince words, she immediately offered up a bevy of *Trite auricoma*, nuptial tents lining her jutting blades. At this point I was lagging behind the group, so farewells were exchanged as I made to catch up. Thankfully the group had become distracted by several bushes allowing me to close the gap. As I approached, I became aware of the sensation of

tiny feet on my arms which were now covered in small moving dots. Closer inspection revealed these to be the familiar *Diplocephalus cristatus*. I was uncertain where I had picked them up, I hadn't been THAT familiar with the cabbage tree but around this time of year there is supposed to be an abundance of Linyphiidae ballooning. The evidence would stack up as more and more money spiders magically found themselves on me as the trip progressed.



*The view enjoyed by the botanists lying beneath the bush (Photo: Lydia Turley)*

Already we had found more spiders than the previous species list alluded to, a good start but still a bit sparse. As the rest of the group initiated some peculiar botanical ritual of lying underneath a bush, I found myself occupied by hundreds of juvenile spiders. Various orbweavers such as *Eriophora pustulosa* and *Novaranea queribunda* and the wolf spider, *Anoteropsis hilaris*, were frolicking amongst the grass and shrub. The young weavers had already begun spinning small orbwebs and the Lycosid captivated us with a flurry of beautiful green tinged legs. At some point during this first stop the group notified me to the abundance of silvery, long legged spiders spinning messy orb

webs in the surrounding vegetation. The glorious *Tetragnatha* was easily the most dominant spider at Andersons lagoon, found in abundance every which-where we wandered. Very interactive, drawing close to their webs would cause them to panic and scurry deeper into the bush.

As we approached the lagoon proper, I noted a drop in visible spiders. Money spiders were still touching down and there was the occasional wolf spider but for the most part the lagoon bank was bare. Things picked up as we hit the beach. Overturning bleached logs revealed an abundance of small black ants and the common isopod, *Porcellio scaber*. Amphipods are a common sight on our beaches, but they were not particularly prevalent here. As we skirted the cliff side, I noted that a few small notches in the rock side that had been webbed up by one of the invasive Australian house spiders. It was a common occurrence down the beach side, small openings in rocks would be home to one of the *Badumna*. At this point I noticed Lydia moving back towards our lagging group with her hands raised as if spinning imaginary wool. Hope beyond hopes, I knew this pose! This is the posture a person takes when holding a spider! She had secured a large male *Eriophora pustulosa*, a tad flustered he quickly transferred to my hands before quickly attempting to abseil to freedom. As a bonus, Lydia had also snapped a photo of a Salticid, *Hypoblemum griseum*.



Possibly the Salticid? (Photo: Lydia Turley)

At this point, we migrated towards the far side of the beach, towards a towering cliff beside the lagoon itself. A quick survey of the staircase filled me with an intense certainty that I would definitely not find any spiders at the top of the hill (probably) so I decided to volunteer for rear-guard duty and took a quick nap to keep myself fresh, just in case we were ambushed. As I dozed, I noticed a figure coming up the beach, John Steel had apparently slipped past our groups security plan as he closed in on a grassy knoll. At this point I noticed I wasn't thinking about spiders, so I immediately shut down higher brain functionality and slipped back into sleep as John perturbed a couple of oyster catchers. It was not difficult to rest with the light breeze and ocean's song as the cliffside shaded me from the sun.

We regrouped later that day, ready to head back to the vehicles. I was informed that the hill side was fairly unremarkable. No one mentioned spiders, so I was inclined to agree. We became side-tracked by one of my favourite pastimes, overturning old logs. For the most part, it was just more isopods and amphipods but there were several spiders that would pass for *Steatoda capensis* and a jumping spider that was not either of the previously mentioned species. At this point Lydia managed to secure two adult *Tetragnatha* on a stick. Many times larger than the silvery spiders seen earlier, these spiders had an orange hue with cream stripes. They would scuttle wildly then stop and straighten their legs as to imitate dead vegetation. Concluding our observations for the day, Lydia also managed to spot *Anoteropsis litoralis* sprinting up the beach line. Exceptionally cryptic, the animal resembled the very sand itself, appearing as a dusty drift while in motion.

As we made our way back to the vehicles, I contemplated the chances that something had swapped the groups various skillsets. As I had not magically developed any competency in maths or finally had a revelation regarding the



BSO and their peculiar passion for green things, I had to resign myself to a more mundane answer. It is, perhaps, a good thing that others are good at spotting and handling spiders, more eyes and hands in the field means more spiders for me, I guess? We briefly picnicked by the lagoon before leaving. I was harassed by *Bombus terrestris* for my crime of wearing blue and we even saw *Vanessa gonerilla* (yes, they actually called a butterfly Vanessa, I'm still not over it) fluttering about the grass. As we soaked a last few sun rays, I noticed a small spider navigating the grass roots I had been digging around in. I was unable to catch it; guess we have a reason to go back now though?

Also, there were plants.

### **Assessing the ecological consequences of extinction: are flightless birds important seed dispersers in New Zealand? A talk by Jo Carpenter, 13<sup>th</sup> November 2019**

*Aidan Braid*

Jo Carpenter presented a very interesting talk on the seed dispersal of New Zealand's frugivorous birds, and its implications for conservation and community dynamics. This was intriguing because I, like many New Zealanders, was still of the understanding that New Zealand's large seeded tree species were adapted to seed dispersal by moa (*Dinornithiformes*). It was assumed in the past that the loss of moa had caused an ecological state shift in terms of recruitment and community dynamics of some plant species. However, this was shown not to be the case. I never imagined that weka (*Gallirallus australis*) are one of the major distributors of large seeds, and that they would be so proficient at doing so.

The work involved debunking the misconception that moa were one of the major seed dispersers

in New Zealand and determining instead what was the major disperser. This was first done by examining moa remains and testing whether scarification of miro and hinau (*Prumnopitys ferruginea* and *Elaeocarpus dentatus*, respectively) seeds would increase their germination. Then ground based and canopy seed predation and dispersal on sanctuary islands and the mainland was filmed and compared. Once weka was identified as a significant dispersal species, individuals were tracked to determine their range and their digestion system was timed.

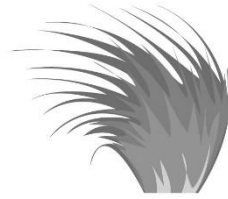
Jo found that although moa gizzards had large seeds present, their coprolites (subfossil faeces) had none. The moa had ground them up too much and only passed intact small seeds. Also, scarification of miro and hinau seeds did not increase their germination. Instead, weka was found to be the main consumer of ground fruit on sanctuary offshore islands. The tracked weka were highly mobile and had the longest avian seed retention time ever recorded, thus had the potential to be significant ground-based large seed dispersers, on a par with canopy-based seed dispersal of kereru (*Hemiphaga novaeseelandiae*). The dispersal at mainland sites was found to be impaired compared to the sanctuary islands, as they had lower frugivore numbers.

The scientific methods involved in these studies required a significant amount of ingenuity and were very amusing. In particular, an animated montage of GPS tracked weka movement on an offshore sanctuary island to 'In the Hall of the Mountain King', and the use of a concrete mixer to simulate a moa gizzard. As a trumper, I have never been overly fond of weka for attempting to steal my socks. However, I now have a much greater appreciation of them having learnt about their importance. Jo's research highlights that the ecological significance of many other species is likely assumed and not yet fully understood, and should be determined before it is too late.

**Botanical Society of Otago**

Patron: Audrey Eagle

Website: <http://www.bso.org.nz>Email: [bso@otago.ac.nz](mailto:bso@otago.ac.nz)**Committee 2019-2020**Chair: **Gretchen Brownstein**Vice Chair: **John Barkla**Secretary: **Angela Brandt**Treasurer: **Mary Anne Miller**Newsletter and Website Editor: **Lydia Turley**Programme: **Robyn Bridges**Communications and Social Officer: **Sarah Kilduff**Publications (Native plants of Dunedin): **David Lyttle**Publications (Lichens): **Allison Knight**University Liaison: **Tina Summerfield**Student Liaison: **Ian Geary**Botanical art: **Sharon Jones**Badges: **Esther Dale**Committee: **David Orlovich**[BrownsteinG@landcareresearch.co.nz](mailto:BrownsteinG@landcareresearch.co.nz)[jbarkla@doc.govt.nz](mailto:jbarkla@doc.govt.nz)[BrandtA@landcareresearch.co.nz](mailto:BrandtA@landcareresearch.co.nz)[maryanne.miller53@gmail.com](mailto:maryanne.miller53@gmail.com)[lydiamturley@gmail.com](mailto:lydiamturley@gmail.com)[robyn.j.bridges@gmail.com](mailto:robyn.j.bridges@gmail.com)[sarah.kilduff@dcc.govt.nz](mailto:sarah.kilduff@dcc.govt.nz)[djlyttle@gmail.com](mailto:djlyttle@gmail.com)[allison.knight.nz@gmail.com](mailto:allison.knight.nz@gmail.com)[tina.summerfield@otago.ac.nz](mailto:tina.summerfield@otago.ac.nz)[ian.j.geary@gmail.com](mailto:ian.j.geary@gmail.com)[sharon.jones388@gmail.com](mailto:sharon.jones388@gmail.com)[dales214@student.otago.ac.nz](mailto:dales214@student.otago.ac.nz)[david.orlovich@otago.ac.nz](mailto:david.orlovich@otago.ac.nz)Please submit copy for next newsletter to Lydia Turley by 10<sup>th</sup> May 2020**This Newsletter was published on 29 January 2020.****ISSN 0113-0854 (Print) ISSN 1179-9250 (Online)***Buttons for botanical pundits – still available at BSO meeting*



**BOTANICAL SOCIETY**  
OF OTAGO


**Membership Form**  
**2020**

Title: ..... Name: .....

Postal address (work or home): .....  
.....

E-mail address: .....

Phone: work: ( ) ..... home: ( ) .....

 BOTANICAL SOCIETY OF OTAGO	Please tick one box			
	Emailed <i>Newsletter</i>		Hardcopy <i>Newsletter</i>	
Student	\$10		\$20	
General	\$20		\$30	

Subscription Rate (one of the above): \$ .....

Donations welcome: \$ .....

Total: \$ .....

**Cheque:** Make payable to:  
*Botanical Society of Otago*  
and post with a completed form to:  
The Treasurer, BSO  
P.O. Box 6214  
Dunedin North, 9059  
New Zealand

**Cash:** Lodge the correct amount  
with a completed form at a BSO  
meeting.

**Internet Banking:** Account No: 03 0905 0029158 00 (Westpac)  
Code: 2020 sub  
Reference: *your name*

If a new subscription, please send a completed form to the Treasurer at the above address or to  
[bso@otago.ac.nz](mailto:bso@otago.ac.nz)

**BOTANY DEPARTMENT**  
UNIVERSITY OF OTAGO



Botanical Society of Otago, PO Box 6214, North  
Dunedin 9059, NEW ZEALAND

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



**BOTANICAL SOCIETY**  

---

**OF OTAGO**