BOTANICAL SOCIETY
OF OTAGO

Newsletter Number 96
June 2022

BSO MEETINGS AND FIELD TRIPS JUNE—NOVEMBER 2022

New location: Talks are hosted by Manaaki Whenua Landcare Research in the main seminar room, 764 Cumberland Street, Dunedin.

8th June, 5:30 pm: Exploration of the functional significance of serrated leaves in New Zealand forest trees. Speaker: Bill Lee (joint work with Jennifer Bannister and Tammo Reichgelt). Many NZ trees have toothed/serrated leaf margins and diverse explanations exist for their functional significance, mostly derived from overseas studies on deciduous species. We survey the leaves of forest trees in NZ, investigating the presence/absence of serrations and any associated leaf pores or glands. We also compare the environmental distribution of species with either entire or serrated leaves. Serrated leaves are associated with leaf-margin and leaf-lamina hydathodes, permanent openings generally larger than stomata that are frequently attached to major veins. They may also have colletors, complex glands that appear to secrete fluid. Our previous study in New Zealand showed that trees with serrated leaves were commonly associated with high rainfall areas. The strong association between marginal hydathodes and toothed leaves supports the suggestion that serrated leaves may have a key function in regulating internal plant water pressure on regularly saturated soils.

18th June 9:00 am: Bull Creek. We will explore around Bull Creek and its small attractive estuary. Southern rata dominated forest extends down the creek to the coast. There is potential to find turf communities in the estuary. We will follow a walking track up the creek to a small waterfall before returning to the coast to explore the turf communities and other coastal surprises. Grade: ~2km of walking on a well formed track, expect mud and uneven ground. Bring water, lunch, and warm clothing. Depart Botany car park at 9 am returning mid-afternoon. Contact Gretchen Brownstein brownsteing@landcareresearch.co.nz

13th July 5:30 pm: Looking for Shrubs in all the Wrong Places. Jess: A unique patch of land in Portobello is set to be the new study site for future ecology students. Jessica describes the process of documenting the plant species diversity and abundance in four different zones over summer, and the surprising discoveries she made along the way. **Shar:** We know what climate change is, but it's harder to predict exactly what changes in temperature and precipitation will mean for species and ecosystems. During my Honours research I used statistical modelling techniques to show how future climate change will affect which parts of New Zealand contain suitable habitat for southern beech species and their associated fungi. This talk will describe some of what I found, and what these climate changes mean for New Zealand ecosystems as a whole.

16th July 9:30 am: Mihiwaka Last winter we had a very successful trip to Mt Kettle and Mt Cutten. This year we will visit the neighbouring peak, Mihiwaka. Come prepared for an uphill walk on an uneven track and boggy conditions. We will see what we see. Contact Lydia Turley 021 062 3602

10th August 5:30 pm: What's cooking with kānuka? Speaker: Matt McGlone, Manaaki Whenua-Landcare Research. As a successional tree species after fire or other disturbance, kānuka plays a key ecological role in the lowland and montane landscapes of New Zealand. It is also highly variable, with some populations contributing to lowland forest canopies 25 m or more in height and others consisting of scattered, low-growing, multi-stemmed shrubs on gravelly soils in frosty basins. Until recently, two species and several varieties were formally recognized - along with a swag of tag names. In 2014, a comprehensive revision of the kānuka group attempted to rationalize the situation and expanded the number of species to 10. The revision has had a mixed reception with many of the species proving difficult to confidently identify whether in the field or herbarium. In this talk I will present the results of a recently published genetic study of nearly 900 kānuka specimens spanning the entire geographic range of the complex and all the current species. I will discuss the implications for kānuka taxonomy but also for how we decide what is and what is not a 'species'.

13th August 9am: Field Trip to Rutherford's Bush. This trip we'll explore a steep and rather hidden 5ha bush remnant, informally known as Rutherford's Bush on the DCC Hereweka Harbour Cone property. John Barkla has written a report of the bush and his species list will be provided on the day. The forest trees are typical of the Peninsula, plus there are 11 species of vines and 22 species of ferns. The shrublands on the forest margin have a variety of divaricating shrubs and include 9 species of *Coprosma*. Two special features are a massive *Dendrobium cunninghamii* orchid growing on an ancient broadleaf and a flourishing *Raukaua anomalus* shrub, found during recent work to poison elder trees, the only major weed. The licensee supports a proposal to fence the bush to exclude sheep and cattle and efforts are being made to secure funding to fence this valuable forest remnant on public land. If we have good weather there's the option of an afternoon walk up Harbour Cone through a mixed shrubland to investigate the miniature forest on the summit, so bring your lunch if you would like a longer day.

Meet at Botany Department car park at 9am or in Portobello on Highcliff Rd by the Penguin Cafe at 9.20am. Parking is limited so please car pool. Rain date Sunday 14th. Contact Moira Parker 027 328 4443 or moiraparker3@gmail.com or Alf Webb 020 4780 809

10th September, 9am: Pipeline Track. The Cryptogang – a group of enthusiasts who meet three times a week to explore the often ignored worlds of the cryptogams, including lichens, liverworts, mosses, and hornworts (as well as their larger, more obvious co-inhabitants) – invite you to accompany them into their fascinating and beautiful underworlds. Be prepared not to walk very far and bring a hand lens if you have one.

Leave Botany Department car park at 9am. Contact John Steel, john.steel@otago.ac.nz or 021 2133 170

14th September, 6pm. Geoff Baylis lecture: Taxonomic revision of native New Zealand forget-me-nots (*Myosotis*, Boraginaceae): An update. Speaker: Heidi M. Meudt, Researcher Botany, Museum of New Zealand Te Papa Tongarewa. Location TBA.

New Zealand is a main centre of *Myosotis* diversity, with about half of the c. 90 total species worldwide. Taxonomic revision is a high priority in New Zealand forget-me-nots (*Myosotis*, Boraginaceae), a genus in which most of the species are classified as Threatened, At Risk-Naturally Uncommon, or Data Deficient according to the New Zealand Threatened Classification System (NZTCS). The core focus of my research is to produce a taxonomic revision of all native southern hemisphere *Myosotis* species using analyses of morphological, pollen, genetic and field data. We aim to answer the following questions: How many native southern hemisphere *Myosotis* species are there? How can they be identified? Where are they found? What is their conservation status? Since starting on this project in 2010, my collaborators and I have revised two-thirds of the southern hemisphere species, with the remaining 20 species and tag-names currently under study. This research continues to contribute fundamental data to biodiversity knowledge and databases, and to the NZTCS assessment panel. For example, of the c. 1700 *Myosotis* specimens at Te Papa's herbarium (WELT), almost 30% were collected since 2010, all are databased and imaged, many have been recently curated, and most are online. In this talk, I will give a broad overview of the *Myosotis* research project results, discoveries, field work, and taxonomic implications to date. I will also highlight work-in-progress and future directions.

Biography: Heidi Meudt is a Researcher in Botany at Te Papa (since 2006). She completed her PhD in Botany in 2004 at the University of Texas at Austin, and was an Alexander von Humboldt Experienced Research Fellow at the University of Oldenburg, Germany from 2012-2014. Her main research focus is on the taxonomy and systematics of southern hemisphere plants, particularly Plantaginaceae and Boraginaceae. Her research integrates data from morphology, DNA, pollen, chromosomes and other sources to revise the taxonomy and better understand the geographical, morphological and phylogenetic patterns of plant species, especially New Zealand species radiations.

1st October 8:00am: Mahaka Katia Scientific Reserve (Pisa Flats). Mahaka Katia Scientific Reserve (Pisa Flats) is situated on an elevated terrace above Lake Dunstan just north of Cromwell. It is a unique example of Central Otago dryland habitat that has mostly been lost to agricultural development and residential subdivision. Pisa Flats is one of the few remaining places where populations of a number of rare, native, dryland endemic species can still be found. These include *Raoulia monroi*, *Lepidium solandri*, *Convolvulus verecundus* and *Myosotis uniflora.* This *Myosotis* species is classified as At Risk – Naturally Uncommon and the yellow-flowered form is more or less confined to the Pisa Flats. We are timing our visit to hopefully coincide with its spring flowering. If we have time, we will possibly visit the saline sites at Springvale Scientific Reserve or the Chapman Road Reserve both near Alexandra to look at Central Otago spring annuals, a suite of dryland species that includes *Myosotis brevis*, and the tiny buttercup relatives, *Ceratocephala pungens* and *Myosurus minimus*.

We will meet at the Botany Department carpark at 8.00 am and travel to Cromwell and then on to the Reserve. Bring lunch, warm clothing, rain gear and suitable footwear. Travel time from Dunedin to Cromwell is approximately 3 hrs. Contact David Lyttle (email djl1yttle@gmail.com Ph (03) 454 5470).

12th October: An Amalgamation of Cryptogams: A Showcase of their Dynamic Life Histories and Understated Role in the Ecosystem. Come along to hear Jess, Stella and Kacey open your eyes to the often forgotten world of mosses, liverworts and lichens. Jess will explain the unexpected links between moss and climate, and what they can tell us about our environment. Stella will introduce you to the 'phyllosphere,' where her talk on epiphyllous liverworts will be sure to excite you into the microscopic world! Kacey will bring you into the vast world of lichens, how they can be utilised (in our world), and some of the main features used for identification.

9th November, 5:20pm: Drawing Competition. Come along to see the botanical artwork from our drawing competition. Entries close August 1st. There will be an art auction, so come prepared!

19th November, 9:00am: Silver Peaks Possum Hut/Green Ridge circuit. It's going to be botanising on the hoof so to speak as we follow Gold Miners Direct from Steep Hill Road down to the north branch of the Waikouaiti River, then swing left following the river to Possum Hut (now a relic). Climbing up a steepish spur from the hut, we will connect with the Green Hut/Pulpit Rock track which will lead us back to the cars. It's a good track, quite steep in places both downwards and upwards, but only for short bursts. The vegetation is quite modified comprising of regenerating coastal bush. Good footwear and appropriate clothing needed as the Silver Peaks is exposed. About a 4 hour trip. Contact Robyn Bridges 021 235 8997. If raining on Saturday we will go on Sunday 20th Nov.

Note: Please review the trip guidelines for participants, drivers and leaders on page 8 and on our website.

We encourage you to bring pencils and paper on winter trips to practice drawing ahead of the art competition.

Meeting details: Talks are usually on Wednesday evening starting at 5.30 pm unless otherwise advertised. Talks are to be hosted by Manaaki Whenua Landcare Research in the main seminar room, 764 Cumberland Street, Dunedin. Please check the website before each talk to confirm the location.

Items of botanical interest for our buy, sell and share table are always appreciated. The talks usually finish around 6.30 pm. Keen discussion might continue till 7 pm. Meetings may be held online via Zoom while gathering restrictions remain.

Field trip details: Field trips leave from Botany car park 464 Great King Street unless otherwise advertised. Meet there to car pool. 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

Cover: Clinging to the cliff*. Photograph by John Knight. Winning Plant Portrait from our Photo Competition.*

FROM THE COMMITTEE

Chairs notes

Gretchen Brownstein

Trips – We ran nine field trips last year, spanning topics from fungi and lichens to wetlands and forests. BSO members spent many hours peering at tiny leaves amongst litter, spying flowers in the canopy, and generally enjoying discussing what the name for that "little green thingy way up there is". The data and species lists collected on the trips by members is greatly valued by the community groups and landowners of the places we visit. So thank you to everyone who contributed. Also a very big thank you to the trip leaders! It is a significant amount of work to organise these trips, thank you John Barkla, John Steel, David Lyttle, Allison Knight, Robyn Bridges, and Maia Mistral for being wonderful trip leaders. If you have a suggestion for a place to visit and/or would like to lead a trip, please get in touch.

Talks – We hosted seven talks last year on a wide range of subjects: taxonomy, vegetation mapping, seaweeds, fungi, and a botanical quiz. Once again with COVID, we had to mix it up with some in-person and some last-minute changes to zoom. It got a bit chaotic at times! But thank you to all the speakers for putting together such wonderful talks! It takes a lot of work to write a talk for such a diverse audience.

Newsletter – Lydia, newsletter editor extraordinaire, put together three massive volumes of our newsletter this past year. Filling pages with original articles, cartoons, meeting and trip reports, and photos and artwork by BSO members. Lydia is always keen for content, get in touch if you would like to contribute.

Committee – A big thanks to the dedicated committee! It takes a fair bit of work to keep the BSO going forward in an organised manner. Thank you to John, Mary Anne, David L, David O, Angela, Lydia, Sharon, Matt, Taylor, and Allison for bringing their wonderful energy and making sure the trips, talks, photo competition, calendar, and newsletters we all enjoy happened.

Membership – Our membership is slowly climbing up. This year there are 76 fully paid members; that is 8 more than last year. And it's great to see members participating on trips, coming to talks, and contributing to the newsletter. It is through members' participation that we all have a chance to share and learn botanical knowledge!

Here's to another year of happy botanising!

Secretaries notes

Angela Brandt

As I near my three-year anniversary of joining the BSO committee as Secretary, I'm struck by how well we as a society have responded to all the challenges thrown our way in the past three years – especially the past two years, of course. It's a real testament to the persistence of the committee and resilience of our members that we have so successfully met and overcome the obstacles thrown our way. From setting up, attending, and enjoying many Zoom-ed talks, to maintaining our connections with each other when we had to cancel many of our monthly trips and postpone the 2021 Baylis lecture (twice!), to finding and meeting in a new venue for monthly talks in 2022. What's even more impressive is that, throughout all of this, our membership has grown. Thanks to you all for the interest and enthusiasm you bring to the BSO!

It's a similar testament to the great work of others in the botanical community across Aotearoa New Zealand that valuable events that have had to be postponed due to lockdowns and Covid concerns have been or are being rescheduled – such as the 2020 John Child Bryophyte and Lichen Workshop that was held in November 2021 and the 2022 New Zealand Plant Conservation Network Conference that has had to be rescheduled for December this year. BSO members have had great experiences at both of these recurring events in the past and we are happy as a Society to support more members to attend. Take a look further on in the newsletter for more information on grants the BSO will be offering to members keen to attend these events.

Editors notes

Lydia Turley

I have two announcements today. Firstly, we have decided to change the months in which we publish newsletters from February, June and October to **March, July and November**. This is to avoid having to chase people for bits to go in the February newsletter during their summer holidays at the start of January. Hopefully the change will make everyone's lives a bit easier! In the meantime, savour this edition since it will be one month longer than usual before the next one comes out!

Secondly, you will have noticed that this newsletter looks very different to previous ones. I got fed up

with fighting with Word over formatting, and have done this newsletter in Publisher. I hope that you like the new look, and I welcome feedback.

Finally, a big thank you to all contributors. This feels like a jumbo edition. Several people had sent me articles months in advance. It's really lovely that you want to write for the *BSO Newsletter* and our readers and I love seeing the things that people do and write about. So thank you, and keep it coming!

If anyone is thinking about writing something for the newsletter, please do! We welcome everything of botanical interest. You can send things in any time, and I'll fit it into the next edition. When submitting articles, please send images separately and keep text formatting to a minimum.

Editors guidelines: Suggestions and material for the newsletter are always welcome. We welcome stories, drawings, reviews, opinions, articles, photos, letters – or anything else you think might be of botanical interest. Remember to include photo captions and credits. Send your feedback, comments or contributions to lydiamturley@gmail.com. Copy for the next newsletter is due on *10 October 2022.* 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.

Treasurers notes

Mary Anne Miller

Below is BSO's financial summary for the year April 2021 to March 2022. As you will note, we are in a healthy position, and it's good to see our membership has increased.

Newsletter available on loan:

The following hard copy publication was recently received. Contact me if you'd like to borrow it:

Wellington Botanical Society Newsletter, April 2022

Publications for sale:

Please contact me if you wish to purchase the following:

Lichens of New Zealand: An introductory Illustrated Guide by Allison Knight, $20

Mosses, Liverworts and Lichens: A Guide for Beginners, $18

Plus postage, if necessary

maryanne.miller53@gmail.com

Statement of Financial Position			
Botanical Society of Otago, c/o University of Otago, Botany Dept, P O Box 56, Dunedin North 9059			
CC24010			
For the year ended 31 March		**2022**	**2021**
		$	**$**
CAPITAL	Current Assets		
	Everyday account	7,820	7,148
	Audrey Eagle Publishing Fund	12,859	12,606
	Business OnLine Saver Account	5,720	5,706
	Accounts receiveable	0	0
	Inventory	92	120
	Petty Cash	15	15
	Current Liabilities	0	0
	Working Capital	26,506	25,595
Membership	Total Paying Members	77	68
	Life Members	2	2
	Complementary Newsletters	26	25

New members:

A warm welcome to new members Maureen Howard, Jacinta Steeds and Karri Hartley, and to our existing members thanks for your continuing support. We wish to thank Allison and John Knight, Tony Molteno and Anthony Harris for their generous donations.

CORRESPONDENCE AND NEWS

Botanical Society of Otago Student Grants Awarded to Two Exceptional Students.

Allison Knight

Congratulations to Stella Fish, who was recently awarded $200 to database lichens. Stella is a third year Botany and Ecology student and a keen member of the extra curricular Bryophyte and Lichen Group. She has an interest in taxonomy and last year volunteered in the Otago Herbarium (OTA). This has a backlog of lichens needing to be data based. Stella's contribution will help will create an electronic record that will be searchable online.

Congratulations also to Marley Ford, who received $275 for research on urban lichens. Marley is an Auckland-based ecologist planning to do a PhD in lichen ecology and taxonomy. He is an avid contributor to iNaturalist and is entrusted with preparing lichen fact sheets for the New Zealand Plant Conservation Network. Marley has written a chapter on lichens for a book on Plants in Cornwall Park, co-authored an article on Lichens in the Garden for the New Zealand Gardener and is currently working on a book on Urban Lichens in New Zealand.

Trip Guidelines

For Participants

- **Check details:** The trip programme may be subject to alteration. Check your emails and the BSO website for updates in advance of the trip. If in doubt check with the trip leader.
- **Sign in:** Give your name and emergency contact details to the trip leader at the start of the trip.
- **Required kit:** Adequate food, drink, outdoor clothing, suitable footwear and gear for all weather conditions, first aid kit. A whistle, cell phone and/or personal locator beacon (PLB) could be handy for emergencies.
- **Recommended kit:** A daypack, hand lens and botanical field guides
- You are responsible for your own first aid kit. Those with allergies or medical conditions are asked to carry their own antihistamines and medications, and to make the trip leader aware of any potential problems and how to deal with them.
- **Communicate with the trip leader:** Individuals are responsible for keeping to the planned route and returning to vehicles at the agreed time. Ensure the trip is within your capabilities. If in doubt, discuss with the leader who reserves the right to restrict attendance. Keep with the group and inform the leader if you wish to leave the group.
- **Communicate with your driver:** If you change cars mid-trip, leave a written note for your driver.
- **Travel costs**: Transport on trips is generally by car pool. Recommended rate is 10 cents/km/ passenger (assuming 4 passengers), to be paid to the driver.

For Drivers

- Please ensure you know where you are going, and who is in your car.
- Zero the odometer at the start, agree on a return time to the vehicle and to the Botany carpark.
- Account for all your passengers before you leave the trip location to return to the Botany carpark. If you are leaving the trip location before the trip leader, inform the trip leader or leave a written note confirming you and all those in your vehicle have left.
- Collect contributions towards transport costs. Be prepared to give passengers your bank account number.

For Trip Leaders

- Advertise travel distance and cost in trip blurb, also degree of difficulty and expected return time.
- Check access with landowners.
- Obtain plant lists if available and collecting permits if needed.
- Check weather reports.
- Carry compass, map and first aid kit.
- A whistle, cell phone and personal locator beacon (PLB) could be handy for emergencies.
- Remind drivers to always keep the following vehicle in sight if traveling in convoy.
- List all trip participants and their contact numbers and leave this list in the lead vehicle (usually your vehicle). It's recommended you use the "Field trip registration form" linked to below.
- Stay aware of how many participants are within view or earshot throughout the trip and ask participants if someone seems to be missing (e.g., if the participant didn't indicate they would be leaving the group).

- Keep the group informed:
- Discuss health and safety considerations with the group at the start
- Clearly state the planned route and activities, including when and where the group will stop for breaks and what the return time is.
- Please arrange for someone to write a trip report and a plant list (if appropriate) for the Newsletter.

NZPCN Conference - new dates and BSO registration grants

The New Zealand Plant Conservation Network (NZPCN) Conference was meant to be held in Queenstown in March 2022 but has been postponed to 4-7 December. See https://www.nzpcn.org.nz/nzpcn/events/ for more information.

The Botanical Society of Otago (BSO) will again offer grants to members to cover the base early-bird registration fee for the conference. We will send out a call for applications as soon as the new registration dates are announced by NZPCN, and applications will close 2 weeks before the early-bird registration deadline.

These conference grants will be open to any member of the BSO who would otherwise not be able to attend the NZPCN conference. There will be 2 grants available for applicants requiring standard registration costs and 2 grants available for applicants who are students, unwaged, or retired. The successful applications will be selected in a lottery from all submitted applications. Each of the grant awardees will be expected to write a brief article for the June BSO newsletter about the conference, focusing on a specific aspect of their own choosing. For example, the article could be about one talk, a workshop, or a field trip.

John Child Bryophyte & Lichen Workshop 2022 - BSO travel grants

3-8 Nov 2022, Stavely, Canterbury. This informal workshop is open to any one with an interest in Mosses, Liverworts and /or Lichens, from beginner to expert. For more information email David Glenny, glennyd@landcareresearch.co.nz

The Botanical Society of Otago (BSO) will again offer travel grants of $100 to any BSO member or any student who is interested in attending the workshop. To apply for the travel grant, email bso@otago.ac.nz with “Travel Grant” in the subject heading. In your application:

1. State the ways you (and the BSO) will benefit from this grant.
2. Agree to build on your experience at the Workshop to write an article for the BSO Newsletter, give a talk or organise a field trip.
3. Confirm that you are a current member of the Society or currently a student.

Applications close on 30 September 2022.

Pathway: classic Pohutukawa on the beach (Photo: Gretchen Brownstein)

BSO Audrey Eagle Botanical Drawing Competition 2022

Submissions are now open for the 2022 Botanical Society of Otago's Audrey Eagle Botanical Drawing Competition and Art Auction. This year there are two age categories, and participants of all skill levels are warmly encouraged to submit. Artists will have the opportunity to present their works for auction after the awards have been presented, with all profits going back to the artist. You must be a current BSO member to enter.

Prizes

- First Prize $100
- Second Prize $75
- Third Prize $50
- People's Choice $25

Each winning artist will also receive a signed copy of Allison Knight's *Lichens of New Zealand, An Introductory Illustrated Guide*!

Lichen Ramalina celastri*, expressing discoid apothecia along the margins of the narrow branches. Illustrated using wind fallen specimens, collected from Ross Creek Reservoir, Dunedin, NZ. Artist: Sharon Jones 2021. Medium: watercolour*

Judging criteria

1. Botanical accuracy.
2. Detail, especially of important identification features
3. Clarity of lines
4. Proportional representation and scale.
5. Layout.
6. Suitability for reproduction in newsletter.
7. Accurate caption, eg botanical name of plant, where it came from, date drawn.
8. Botanical notes or comments of interest eg. key to botanical details, history, distribution, uses, variations etc. (The NZPCN website could be helpful).
9. Preference will be given to plants that have been rarely illustrated.
10. Above all, artistic merit carries the highest rating.

Conditions of entry

1. Unframed entries must be submitted with an entry form, by **Monday August 1 2022** to Botanical Society of Otago, c/o Department of Botany University of Otago P.O. Box 56 Dunedin, New Zealand, or handed in to the Department of Botany Office, 479 Great King Street, between 1-3 pm on weekdays.
2. The drawing must be your original work. A drawing from life is preferable and a copy of an existing botanical drawing is not acceptable.
3. There is a limit of 3 entries, with a minimum size A5, maximum A3.
4. You should include a title and notes of botanical interest; these do not need to be written directly on the drawing and can be submitted alongside the drawing.
5. Judges will be kept unaware of your identity while judging - so don't sign the front! But please do put your name on the back(s) and number each entry.
6. Entries will be displayed and prizes awarded during the meeting on Wednesday 10th August 2022, in the Benham Seminar Room on the second floor in the Zoology building, 346 Great King St., beside the Captain Cook Hotel.
7. BSO may use copies, with due acknowledgement, in the Newsletter and website.
8. Entries are open to current BSO members – our subscription is very low!
9. If there are insufficient entries the competition may be postponed.
10. There is no entry fee, so please include an addressed, pre-paid envelope or tube if you would like your drawings returned.
11. You may put your entries up for sale or auction at the meeting if you wish

Membership forms for the Botanical Society of Otago are available on the back page of the newsletter and on the BSO website https://www.bso.org.nz/

ENTRY FORM

Botanical Society of Otago

Audrey Eagle Botanical Drawing Competition 2022

Name:

Address:

Email:

Phone:

The upper surface of a Hypogymnia turgidula lichen*. Illustrated using wind fallen specimens, collected from Ross Creek Reservoir, Dunedin, NZ. Artist: Sharon Jones 2021. Medium: watercolour.*

Age Category:
18 years and over: *yes/no*
17 years and under: *yes/no*
I am a school student aged ….. years.
School:

Title of entry(s) [limit of 3]:

1. ……

2. ……

3. ……

Botanical notes enclosed: *yes/no*

Return:
I would like my drawings back: *yes/no*
I have included prepaid and addressed packaging: *yes/no*

Art Auction:
I would like to make my drawing available for auction following the award ceremony: *yes/no*
Please indicate your preferred reserve price for each drawing:

1.$..... 2.$..... 3.$.....

Membership/Declaration:

This is all my own work and I am a current member of the Botanical Society of Otago.

Signature **Date**

ARTICLES

Otago Botanist and colleague: Ann Wylie's centenary

Alan Mark, Emeritus Prof., Department of Botany, University of Otago

I was delighted to record botanist, Ann P. Wylie's Centenary on her birthday, April 12, with a small party of 12 friends and colleagues at the University Staff Club. I discussed something of her involvement with the Botany Department of Otago University which I have essentially repeated here for the Botanical Society of Otago's Newsletter.

Firstly, I offered my hearty personal congratulations to Ann on reaching this major milestone.

I first met Ann in 1950, as a first-year Botany student, when Ann was a Senior Lecturer in the Department, so that's all of 72 years ago. Ann completed a B.Sc. and M.Sc. with Honours in the Botany Department in 1945, but began teaching there ahead of this, with three other senior female students, Betty Batham, Brenda Shore (nee Slade) and Margaret Cookson, in order to sustain the Department, following the retirement, through ill-health, of its first Head, the Rev. John Holloway.

Awarded a Post-graduate Senior Scholarship for overseas study by the University of New Zealand in 1945, Ann took this offer up at the University of Manchester and completed studies there in the new fields of cytology and genetics in 1947, working in collaboration with the controversial Prof. C. D. Darlington. She published, with Darlington, the first Chromosome Atlas of Flowering Plants in 1948.

Ann then returned to Otago where she offered the first courses here in cytology and genetics. She remained here until her retirement as Associate Professor in 1987. Ann didn't publish a great deal but was noted for keeping up to the minute with the relevant literature.

Ann also had several other distinctive qualities as a Botany staff member. She was renowned for her hawk-eyes, and was the Department's expert proof reader: one never submitted a paper for publication without having it checked by Ann.

Ann also had an interesting but quite unorthodox filing system, with 3-4 piles of paper on and beside her desk, and with an amazing, yes, incredible ability to locate the relevant document directly and almost instantly.

Ann at her 99th Birthday Celebration at the Balmacewen No 7 Café, with Islay Little's very appropriate card. (Photo: Alan Mark)

Coming to the recent past, Ann is now residing at the Yvette Williams Retirement Village on Highgate. And I also had the pleasure of attending Ann's 99th birthday celebration last year, at Balmacewen No7, with four of her woman friends, where I captured the photograph that accompanies this article.

In conclusion, I wish to offer Ann all of the best for the future; she's an example to us all. Thank you.

Breeding system of a rare limestone Gentian

Janice M. Lord, Botany Department, University of Otago

Introduction

Rarity can come in a variety of forms. Some currently rare species were possibly previously quite widespread, such as Cook's Scurvy Grass (*Lepidium oleraceum),* whereas other rare species have likely always been uncommon, for example due to having

a specialist niche. Limestone habitats are known worldwide for possessing a high diversity of specialist species. New Zealand limestone habitats support 152 calcicolous (limestone specific) plant species, which are likely to have always existed in a network of naturally uncommon small populations. Just 60% of New Zealand's calcicolous flora has been formally described taxonomically (Rogers et al. 2018) but a much greater proportion is ranked as Data Deficient or Threatened compared with the entire flora (48% vs 14%; Rogers et al. 2018). It is therefore concerning that the population ecology and reproductive biology of very few of these species has been studied, as breeding system and degree of reliance on pollinators are important considerations in the management of small populations.

This study experimentally examined the breeding system of the threatened limestone endemic *Gentianella calcis* subsp. *waipara,* at its southern most location in the Earthquakes Scientific Reserve, North Otago, where it occurs along the edges of limestone bluffs and ravines. The Earthquakes Gentian is sometimes referred to as a distinct taxon, *Gentianella* aff. *calcis* subsp. *waipara,* in recognition of morphological differences and its considerable disjunction from *G. calcis* subsp. *calcis sensu stricto* (Glenny 2004).

The aim was to determine whether this taxon was capable of self-pollination without the intervention of pollinators, and whether any effects of inbreeding depression on seed quality could be detected following self-pollination.

Methods

Five large focal plants were selected that could be safely accessed and which had a large number of opened and unopened flowers. On April 1st 2016 three treatments were applied to separately marked groups of flowers on each focal plant: *open pollination*- flowers were not manipulated; *bagged*- unopened flowers were enclosed in an organza bag (Fig 1) to prevent cross pollination and test for autogamous self-pollination; *supplementary cross pollination* - pollen from a flower with mature anthers on a separate individual was applied to marked open flowers with visible stigmas. For some plants with large numbers of flowers, replicate flowers were subjected to each treatment.

Fig 1: A pollinator exclusion bag on a focal plant of Gentianella calcis *subsp.* waipara *at Earthquakes Scientific Reserve.*

Floral visitors to two plants were monitored during daylight hours over two days using a time lapse camera (GardenWatch Cam) that took images at 5 second intervals.

After 4 weeks, all bags and marked seed capsules were collected. For each plant x treatment combination, the number of large seeds (containing a plump embryo) vs small seeds (containing a small embryo or no embryo) was counted. Two-way analysis of variance was used to test whether total seed number per capsule differed among plants and among treatments. A Chi-squared test of independence were used to determine if the number of seeds with plumb embryos was non-randomly associated with pollination treatment.

Results

Video footage showed numerous small flies and/or native bees visiting open gentian flowers during sunny periods, however for some plants and for some time periods very little pollinator activity was seen. Unfortunately, the videos were not of sufficient quality to identify flower visitors with any certainty.

Individual seed capsules contained between one and 46 seeds. Some bags were unable to be located as they had presumably blown away. Some capsules had already begun to open but most contained at least 20 seeds (Table 1). There were no significant patterns among treatments or among plants for numbers of seeds per capsule (all model terms $P > 0.05$). For all five focal plants, bagged (autogamous self-pollinated) flowers set fewer large seeds than flowers given other treatments and for four plants their bagged flowers set no large seeds. Hand cross pollination yielded 100% large seeds in

all cases bar one. The percentage of large seeds resulting from open access pollination was highly variable ranging from 6.67% to 100%. Hand cross pollination in most cases resulted in fewer seeds per capsule than open pollination but a similar proportion of these seeds contained plump embryos compared with those from open pollinated flowers. A Chi-squared test found that significantly more large seeds were produced from hand cross pollination than expected and significantly fewer large seed produced following bagging (χ^2 = 94.68, P < 0.001, d.f. = 2; Fig. 2).

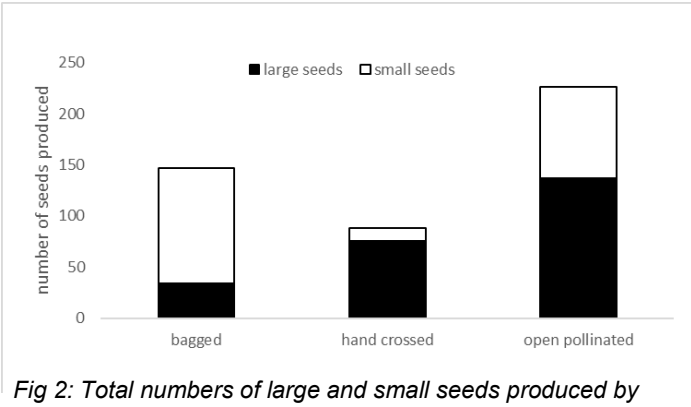

Fig 2: Total numbers of large and small seeds produced by five Gentiana calcis *subsp.* waipara *plants following experimental pollination treatments.*

Discussion

Little work has been carried out on the breeding systems or pollination biology of New Zealand's *Gentianella* species. Godley (1982) found high levels of seed set among subantarctic gentians and attributed this to self-pollination facilitated by the wind, however flies are active floral visitors in subantarctic environments, and moths may also be important (Lord et al. 2013; Buxton et al. 2019). Webb & Littleton (1987) found that *G. saxosa* and *G. serotina* could produce seeds following hand self-pollination but appeared incapable of autogamous self-pollination. Bischoff (2008) concluded that *G. corymbifera* showed a strong bias towards outcrossing but could still produce some seeds when bagged or hand self-pollinated. She found that this species was pollinated mainly by large Tachinid flies at high altitudes on the Remarkables Range, however Primack (1983) recorded flowers of the same species at lower altitudes being visited by native bees, *Lycaena* butterflies and Syrphid flies as well as Tachinidae. Heine (1937) similarly recorded native bees, numerous flies, beetles and a *Notoreas* moth visiting flowers of *G. patula.* Simpson & Webb (1980) suggested that native bees were important pollinators for most New Zealand gentian species.

The results presented here, though very limited, suggest that *Gentianella calcis* subsp. *waipara* is capable of autogamous self-pollination but may suffer from inbreeding depression. Plants may also be pollen limited in some cases by a lack of insect visitors to open flowers. Hand cross pollination appears to be a feasible technique for obtaining healthy seeds from isolated plants. However, as this study included only five plants, not all seeds were able to be collected, and no germination trials were attempted, these are preliminary results. Further work is required on the pollination biology of this species and other rare limestone endemics.

Plant	Treatment	num large seeds	num small seeds	total seeds	% large seeds
"East"	bagged	31	2	33	93.93
	crossed	22	0	22	100
	open	46	0	46	100
"Mid"	bagged	0	55	55	0
	crossed	20	0	20	100
	open	29	0	29	100
"Rags"	bagged	0	7	7	0
	open	0	33	33	0
	open	1	14	15	6.67
	open	1	6	7	14.28
"SWbank"	bagged	0	16	16	0
	bagged	0	16	16	0
	bagged	0	10	10	0
	crossed	3	13	16	18.75
	open	0	21	21	0
	open	52	0	52	100
"topSW"	bagged	3	7	10	30
	crossed	29	0	29	100
	crossed	1	0	1	100
	open	8	15	23	34.78

Table 1: Seed counts from individual capsules on each focal plant. Treatments were: bagged - flowers bagged to exclude pollinators; crossed - flowers hand pollinated with outcrossed pollen; open – flowers unmanipulated. Large seeds contained plump embryos. Small seeds contained small or no embryos and are assumed to be less viable.

Acknowledgements

This study was in collaboration with Graeme Loh, Department of Conservation and could not have been carried out without his detailed knowledge of the Earthquakes site and its flora.

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Kerbside Forest

Stella Fish

It's 9 am on a Saturday; anticipation has been building for the botanical adventure awaiting you on today's field trip. Your concrete car park surroundings are dull in comparison to future forests. But within metres of you is an adventure, on a smaller scale but no less interesting. Walk to Union Street car park entrance, where a pipe mouth opens from the crumbling kerb, water trickling into the gutter.

The Kerbside Forest (Photo: Stella Fish)

Closer examination reveals an *Epilobium ciliatum* above a carpet of *Lunularia cruciata* complete with its characteristic crescent gemmae cups. A *Trifolium repens* lives up to its epithet, creeping towards the pavement.

The other side of the pipe has masses of *Sagina procumbens*, spreading from its rosette centre in all directions. Tucked among its leaves is its thread-like relative, *Sagina apetala*. A purple-tinged *Solanum nigrum* located above them and below several mosses fringe the pipe and gutter, providing a substrate for adventurous seedlings.

It can be easy to overlook sites like this - after all, it measures 40 cm - but there are at least eight species and possibly more! How long will these plants remain before they're washed away or sprayed? What new species will establish? Which will grow taller, the *Epilobium* or the *Solanum*? Have a look before your next Botanical Society trip.

Book review: *Tree Sense. Ways of thinking about trees.*

Warwick Harris

Edited by Susette Goldsmith

Massey University Press 2021

This digest-sized paperback book of 253 pages published by Massey University Press, came to me as a pleasant surprise as a Christmas present in 2021. The book is compiled by Dr Susette Goldsmith, an independent writer and editor of non-fiction, who has a base at the Stout Research Centre, Victoria University of Wellington.

Following Susette's Introduction there are two Parts. The first Part, titled "Needful Dependency" includes contributions by seven authors, namely Elizabeth Smither, Philip Simpson, Anne Noble, Kennedy Warne, Meredith Robertshawe, Glyn Church and Jacky Bowring. Part Two, "Greening the Anthropocene", includes five contributions, the first and last written by Susette Goldsmith, the others by Colin Meurk, Huhana Smith and Mels Barton. The book is enriched by reproduction of illustrations by the late Nancy Adam.

Because readers will differ in their responses to the various chapters, according to their locations, occupations, and experiences that relate to trees, I do not attempt to comment on all chapters. I make particular reference to the chapter by Mels Barton titled "Our Lost Trees". Mels gives values provided by trees in urban areas of London, New York and Melbourne for carbon storage and annual benefits that relate to "land values, quality of life, public health,

hazard mitigation and regulatory compliance".

This is especially relevant to plans just being implemented by the Dunedin City Council, for the greening of the main strip of Dunedin City. Absence of trees along the strip show that over the years many have not been replaced when damaged by vandals and cars or died from natural causes. I hope that trees chosen for street planting are selected for their suitability as street trees and not primarily by their native origin.

Susette's book has prompted me to sense more intensely the trees at the front and back of our house and on Wilson Avenue. This sensing is largely from the comfort of my armchair, the views providing a diversion from the TV screen. Out the back is the view of the rear lawn composed mainly of a variety of weeds with white clover and penny royal the dominants. The lawn is bordered by beds of many decorative plants, dominantly dahlias, rhododendrons and roses, alpine plant rockeries, as well as fruit trees, a vegetable garden, and a small glass house.

Running along the back of our section is a tall Hoheria hedge grown and trimmed by our back neighbour to a height of 3.5 metres. He trims the hedge, unseen, twice each year. The trimmings from the top and our side of the hedge fall on to our garden from where I gather them up and mulch them through a rotary motor mower before adding them to the compost bin. The hedge provides welcome shelter from unpleasant southerly winds and, when mulched, forms good compost.

Along our side of one neighbour's fence is a row of tree ferns salvaged from a planting of native plants in our back section, predominately tussocks, kanuka and a low stature kowhai. The kowhai has found a home in a local church garden where it now grows and flowers vigorously. The tussocks dug up took a while to compost, and the kanuka provided a small amount of firewood.

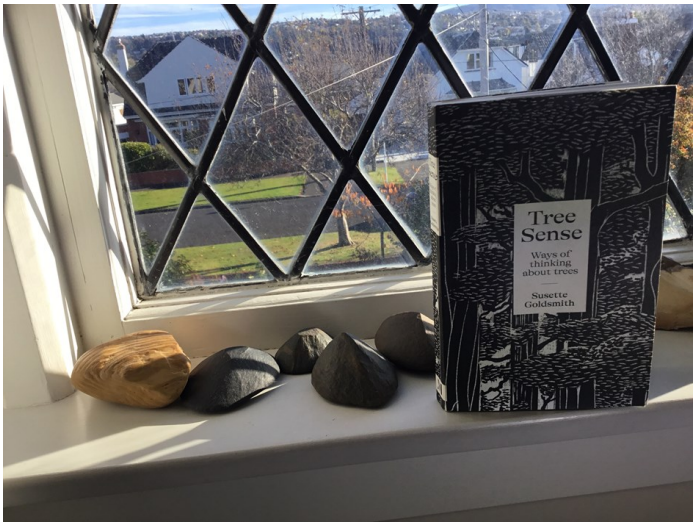
Some salvation from frowned upon removal of native plants comes from views of kowhai trees growing in the neighbour's back yard. Each year, at peak flowering, these kowhais are occasionally visited by bellbirds and tui, but much more frequently throughout the year starlings, blackbirds, and sparrows roost in them.

Running along the other side of our back yard is a wooden fence erected to replace an old dilapidated fence partly pushed down by the trunk of a large cabbage tree. A gap was cut through the new fence to let the trunk of this tree expand further. It has already grown to once again put pressure on the fence. The tree sheds multitudes of dead leaves that fall on both sides of the fence. I pick up those landed on our side of the fence, bundled them up and tie them together with one of the leaves to be ready as fire starters in our wood burner. The neighbour, as I do, gathers the leaves up before mowing the lawn, but then disposes them in an EnviroWaste bin. This is likely the final destination of most dead cabbage tree leaves in Dunedin.

View across one neighbour's fence. A kowhai tree stands above other vegetation. Tree ferns line the fence, exotic perennial plants occupy the foreground. (Photo: Warwick Harris)

Functional corner of the backyard. The trunk of the neighbour's cabbage tree expands through the fence. (Photo: Warwick Harris)

Returning to the comforts of the living room, a view out to the avenue across the front garden first falls on a flowering crab apple tree. Now, at the change from Autumn to Winter, this tree has almost shed the last of its leaves. Unfortunately, it and all the other crab apples on the avenue begin to shed leaves as soon as they unfold in Spring. These leaves mostly gather in the gutter. On our side of the avenue the leaves are periodically swept down by torrents of water from Forbury Road to block up the sump outside our gate. Several enquiries to the Council have not answered my question as to what is the source of the water pumped up to Forbury Road. Clearing the sump is rarely carried out by the Council so regularly I shovel leaves swept down to the sump into our EnviroWaste bin together with other gutter rubbish. These days discarded surgical masks are a regular component of the shovelled rubbish.



View from inside to avenue Flowering Crab Apple. Tree Sense *stands besides ventifacts. (Photo: Warwick Harris)*

When Wilson Ave was formed, circa 1935, in space cleared by the demolition of Sheil Brick Works, *Malus* flowering crab apples were planted as the avenue trees. It seems that when original trees needed to be replaced *Prunus* cherry plum trees were used as replacements or a space left. Several of these spaces have been left in recent years, the dead trees removed, and their stumps ground out.

Just down the road along Forbury Road is Wycolla Ave lined with cherry plum trees. Now, in late autumn-early winter, they are still covered in richly coloured leaves, but presumably these leaves will be shed en masse soon. I wonder if Council will be prompt in gathering them up thereafter?

At present the most interesting avenue tree in Wilson Avenue is a flowering crab apple hosting a mistletoe. I am not familiar with the native mistletoes or the one introduced, so I do not venture an identification, but it certainly is at home in the Avenue.

Fruits of the mistletoe on a flowering crab apple tree on Wilson Ave. (Photo: Warwick Harris)

Life on a Log: little things mean a lot

Stella Fish

Lying across a stream gully is a log. Nothing special, you'll find fallen logs in all manner of places, but something about this one caught my eye. Nearly every inch was carpeted with mosses, lichens, liverworts, fungi or vascular plants and even my cursory glance spotted changes in their distribution. While I'm still not certain of what exactly made this log so special compared to the surrounding ones it did mean my Friday mornings were spent poring over its every inch, attempting to document what grew and what grew where. This seemingly simple task took several months, microscopy work, and the revelation that in winter moss can freeze.

To begin to become acquainted with this log I needed to do two things. Firstly, identify it, which was done by looking at remaining scraps of bark and surrounding vegetation, which suggested it was *Kunzea robusta*, a common and widespread tree. Secondly, choose where to sample, I decided upon 4.50 meters of the log starting from the bottom where it ended abruptly to the top where after 4.50 metres it disappeared under several ferns. With this

out of the way I could begin sampling and along with noting species and their location, decay measurements were also taken.

Overall, 37 species were recorded from this one log, from the largest specimen, a *Coprosma rhamnoides*, to the smallest, a slime mould. The sampling revealed three areas of interest - the *Ptychomnion* carpet, the mixed *Canalohypoterygium* and *Plagiochila,* and the dry fungus-covered underside.

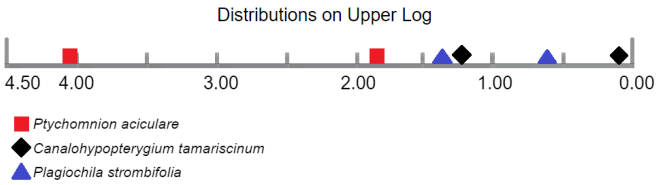


Fig.1 *Line diagram showing the start and end of three major log species on upper log*

The dendroid *Canalohypopterygium tamariscinum*, a personal favourite of mine, and *Plagiochila strombifolia* covered the beginning of the log and were not found anywhere else. This section coincided with the greatest levels of decay, with the measuring peg going entirely through the log at some points.

The next part of the log was dominated by a dense weft of *Ptychomnion aciculare*, one of our common mosses. Towards the middle of the log, a *Coprosma rhamnoides* has partially fallen, leaving a cleared space around its root which marks the only break in the *Ptychomnion*. This moss mass at first seems impenetrable but a closer examination revealed the liverwort *Hymenophyton flabellatum,* the lichen *Sticta flix,* and the moss *Achrophyllum quadrifarium* growing on top or within it. Which plants were there first I'm not sure, but who knows whether they'll continue to survive within the *Ptychomnion*. Along with the vegetative differences compared to the lower reaches of the log, the wood beneath the *Ptychomnion* was only slightly or not at all decayed.

While the focus has been on the upper areas of the log the underside was characterised by its own distinctive vegetation. Drier and with less light the decorticated underside was mostly covered by a white fungus dotted with the flabellate *Symphyogyna hymenophyllum*. No other mosses, lichens, liverworts or vascular plants have yet to colonise these under reaches.

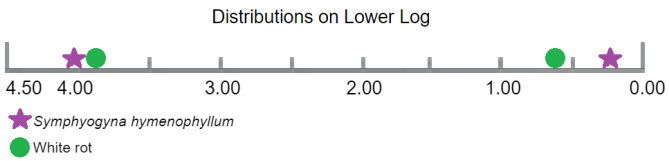


Fig.2 *Line diagram showing the start and end of two major log species on lower log*

This article represents a moment in time for this log's community. As it continues to rot away who knows what species will be gained or lost. Will the *Ptychomnion* continue to expand its reach? Will the *Coprosma rhamnoides* fall entirely? Will the log even be here next time I visit?

It's a *Bryum*! It's a *Funaria*! No, it's *Chenia*!

Jessica Paull

My summer project was to produce a vegetation survey of the bush outside the Marine Studies Centre in Portobello. This survey is to (hopefully) be used by future ecology students for many a year to come, so my goal was to produce a decent species list that also gave non-vascular plants some representation. Ecology is about understanding the interactions between species and their environment, and I'm of the mind that this should include all species—not just those that are easiest to see.

I gave a valiant effort, though I know I have barely scratched the surface of the true species diversity in the area. With my specialisation being in bryophytes, much of my extra effort naturally went in that direction. Of 234 recorded plant species, I was able to document 43 different bryophytes. A pitiful sum, but unfortunately the best I could do with 10 weeks in between everything else. From these bryophyte samples, however, four new additions to the Otago Herbarium were made (*Chenia leptophylla, Crossidium davidai, Ochiobryum blandum* and *Trichostomum brachydontium*). One of which (*Chenia leptophylla*) has only been recorded in the South Island once before, by none other than (you guessed it) John Steel. And now, by me!

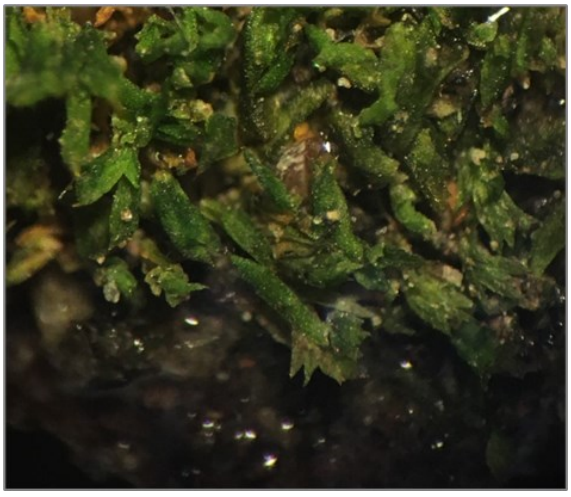
While I would like to say as a keen bryologist that I had sensed the moss from 50 m away, immediately knew what it was, and instantly recorded where exactly I had found it, I unfortunately cannot claim truth to any of these statements. Indeed, I do think I collected the moss by accident and only chanced upon its discovery because it was growing next to *Fissidens leptocladus*. Also, I only realised what a gem I had once I had taken the poor thing back to the lab after it'd been left in a paper bag for a week or two… anyways.

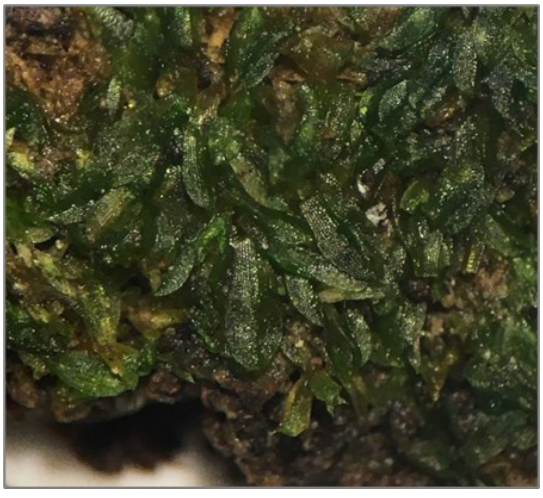
The specimen itself isn't the most inspiring in the field, so perhaps *Chenia leptophylla*'s rarity might have something to do with collecting bias.

All the Chenia leptophylla *I collected. There are potentially ~50 plants in this photo alone, given the small size of the moss. (Photo: Jessica Paull)*

The plant's true majesty is revealed once looked at under the microscope. The costa! The apiculus! The cell formation! Oh my oh my, it is a handsome specimen indeed. Rare and beautiful; the best of both worlds. I knew I had something special once I got the leaf under a microscope. There really is nothing else that quite looks like this. Still, the species is often confused for the more common *Tortula truncata*. However, the beautiful apiculus and costa can separate the two species to an informed eye.

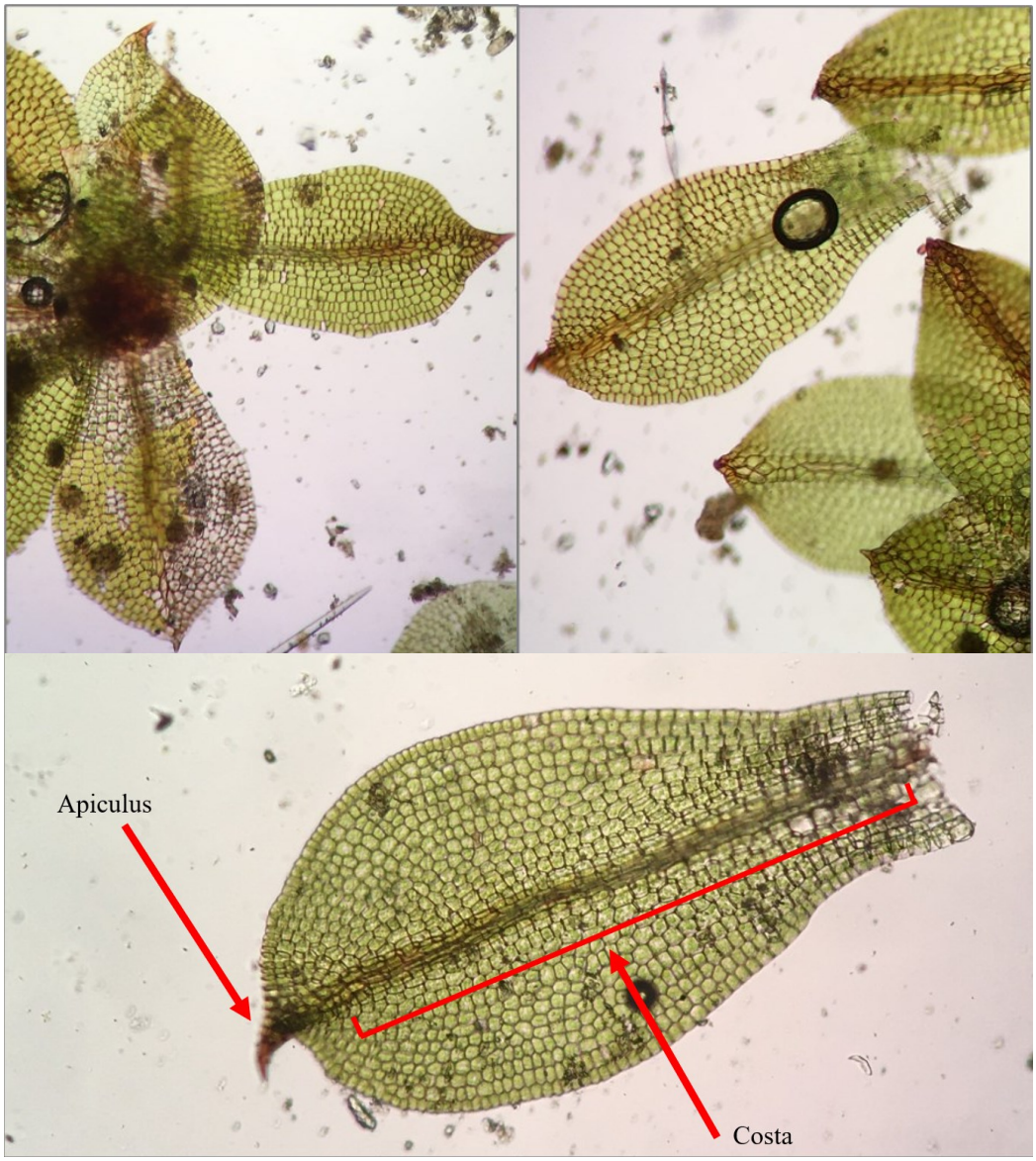
It's fairly well-known that endemism is less common in mosses than it is for vascular plants. Their evolution occurred during a time where much of the Earth's landmasses were still connected. However,





Chenia leptophylla *desiccated (left) and rehydrated (right). Mosses look quite different when they're dry!* (Photo: Jessica Paull)

based on the journal articles a quick google search could find, it seems to be "new" to just about everywhere[1]… so, where did it come from? *C. leptopyhlla*'s native range is Brazil, but only recently seems to be popping up in floras all over the world. Is there a Johnny Appleseed of moss spores, spreading *C. leptophylla* across the world? Or has it just been missed this whole time? My guess would be the latter, though the former option does sound apple-ing… sorry.



In any case, *Chenia leptophylla* has now been found in two South Island localities, Outram Glen in Taieri Gorge and the Portobello Peninsula. Did I know what it was when I found it? No. Am I still pretty chuffed to say that I found it at all? Most definitely. This is a good record to have, for beforehand it was considered to be restricted to the North Island in New Zealand.

Year Added	New to Flora	Source
1996	Cape Verde Islands	Frahm, J.P., Lindlar, A., Sollman, P. and Fischer, E., 1996. Bryophytes from the Cape Verde islands. *Tropical bryology*, pp.123-154.
1997	Taiwan	Chiang, T.Y. and Hsuº, T.W., 1997. Chenia leptophylla (C. Muell.) Zand.(Family Pottiaceae), a generic and species record new to moss flora of Taiwan. Taiwania, 42(3), pp.161-164.
2000	East African Islands	Muller, F., 2000. Additions to the bryophyte flora of Réunion (East African Islands). *Tropical Bryology*, pp.91-96.
2000	Hungary	ZANTEN, B., 2000. Studies on the cryptogamic vegetation of loess cliffs, IV. Chenia leptophylla (C. Müll.) Zander, new to Hungary. *Kitaibelia*, *5*, pp.271-274.
2002	Chile	Müller, F., 2002. New records and new synonyms for the southern South American moss flora. *Nova Hedwigia*, pp.445-450.
2003	Kenya	Chuah-Petiot, M.S. and Pócs, T., 2003. East African bryophytes XIX. A contribution to the bryoflora of Kenya. *Acta Botanica Hungarica*, *45*(1-2), pp.53-64.
2004	Austria	Essl, F. and Zechmeister, H., 2021. The checklist of alien and cryptogenic bryophytes in Austria. BIOINVASIONS RECORDS, 10(2), pp.419-424.
2021	North Carolina	DuMond, D.M., Aguero, B. and Amoroso, J.L., 2021. Chenia leptophylla (Pottiaceae) New to North Carolina. *Evansia*, *38*(3), pp.130-135.

[1] *Various articles around the world recording* Chenia leptophylla *as a new addition to the flora.*

REPORTS

Vegetation Maps for Dunedin City and Otago[1], a talk by Richard Ewans, 9th February 2022

Alex Wearing

Dunedin has an area of 3,314 km^2. It is much more than an urban area and surrounding hinterland. Dunedin has the largest and most diverse biodiversity of any New Zealand city. That this diversity is the result of people drawing administrative boundary lines on a map does not lessen the need to know, understand, and properly manage it. Dunedin's habitats range from coastal dunes to alpine fellfields. The vegetation cover comprises near-natural, semi-natural (indigenous and introduced), mostly introduced, and completely introduced elements.

The Dunedin City Council (henceforth DCC) commissioned Wildlands to make a vegetation cover map for Dunedin City in 2019. The Dunedin vegetation map (henceforth map) was completed in 2020. Richard Ewans[2] in a detailed and illuminating presentation described the map-making process, what the map shows, and its uses and limitations. He then outlined recent vegetation mapping work undertaken by the Otago Regional Council (henceforth the ORC).

Dunedin Vegetation Map

The map has been developed to complement and enhance data sets from regional and national agencies. It does not include urban areas. The map was created by manual digitization from recent aerial and satellite imagery. It utilizes and rationalizes existing information and mapping from published and unpublished reports and notes. Three primary classifications were used: broad-scale, ecosystem cover (Singers and Rogers, 2014), and fine-scale (Atkinson, 1985).

The minimum mapping unit is 0.5 ha, except for tussock grasslands (1.0 ha), ephemeral wetlands (0.1 ha), and permanent wetlands and rock outcrops (0.3 ha). Other typologies used in the mapping process are wetland type, main rock type for rock outcrops/complexes and screes/boulder fields, and cover origin (indigenous, exotic, or mixed).

The current map has 35 pre-defined broad classes. There are 49 types of 'exotic', 25 types of 'indigenous', and 22 types of 'mixed' vegetation. It was admitted that 'mixed' vegetation is a rather vague term.

The map can be used to show, for example, naturally uncommon ecosystems, locally important vegetation types, habitats at risk, the extent of wetlands and sand dunes, and - through updating over time - areas transitioning from introduced/exotic scrub to native broadleaved forest. It is possible to 'turn on' individual vegetation units in specific localities (e.g., ephemeral wetlands in the Sutton area, Strath Taieri). The map can be overlain with maps of land tenure and Queen Elizabeth II Open Space covenants.

Some cover values for different mapped vegetation types are podocarp/broadleaf forest <1%, 'native' forest (much of it kanuka) about 10%, tall tussock grasslands 18%, wetlands 1.4%, gorse and broom 2.5%, productive pasture 39%, and pine plantations about 10%.

The map will be used to help identify priority areas for protection and restoration, and to facilitate monitoring of the extent of indigenous ecosystems to support improved outcomes for indigenous biodiversity (i.e., for both plants and animals). Much of Dunedin's vegetation - and especially semi-natural and mostly introduced vegetation - is in a state of flux. Benchmarks are needed to track vegetation change. The map will dovetail into the forthcoming National Biodiversity Strategy and Action Plan (henceforth NBS&AP).

The map will provide information that can be utilized in consents and compliance processes, and the prioritization of field survey work and conservation effort. The map has already been used to model (1), possum abundance (University of Otago/Landcare Research), and (2) in-catchment revegetation prioritization (Landscapes Connections Trust - The Halo Project)[3].

The comprehensiveness and accuracy of the map is the result of the knowledge and expertise of the consultants who compiled it. It was acknowledged that there has not been much ground-truthing. There is also a lack of information on introduced/

exotic plant invaders, such as how many species are present, and their distribution and cover-abundance (in relation to indigenous species).

Linear features such as hedgerows and shelterbelts (features which are literally disappearing from many areas) were not mapped, nor were areas invaded by wilding pines. An additional data layer would be needed to map areas of vegetation with significant cultural values, such as discrete macrocarpa stands around former farmsteads on the Otago Peninsula, or the diverse 'Enchanted Forest at the Truby King Reserve, Seacliff.

The map is - in May 2022 – not available to view online, but the data can be requested on a case-by-case basis[3].

Otago Vegetation Map

The starting point for the ORC vegetation map (henceforth the Otago map) is the potential natural vegetation if humans had not arrived in Otago (Singers and Rogers, 2014).

The Otago map is based on land cover data and shows current vegetation ecosystems and fauna habitats, and the likely degree of vegetation change since human settlement, as well as providing a baseline for assessing significance. There are 22 habitat layers for 22 different fauna groups. The Otago map is tenure neutral.

The Otago map was made to aid the maintenance of the full range of Otago's ecosystems and to help the ORC to implement the NBS&AP, as well as indigenous fauna, freshwater and coastal management strategies, and to identify significant natural areas (assessment in context of the Resource Management Act).

Given that the ORC map is land cover data based, it probably misses some areas of that would be considered indigenous under local government district plans. It also sidesteps the messy reality that much of Otago comprise mixed/semi-natural/hybrid ecosystems. Some of these areas require a lot more attention with respect to conversation and/or problem plant management.

The potential natural vegetation approach may have reduced utility given the likely consequences of climate change in the next few decades. The Otago region may be transitioning to conditions that the environment has not experienced for many thousands of years. Also, an area that was forested in the past, could be reforested in the future, but the species pool is likely to be very different, and in most areas the return to forest, or perhaps more pertinently 'woody' vegetation will follow new trajectories, so it will a different botanic landscape with a different mosaic of vegetation, with - in many areas - a large component of introduced plants and animals. A changing climate will lead to very different intensities and return frequencies of fire and drought events, and new and different incidences of diseases. There is also the need to consider production-oriented landscapes.

The Otago map is available on the ORC website. The relevant page of the ORC website has information sections on how to use the map and data sources, and the map itself is user-friendly. The GIS data is not accessible, to protect some sensitive information, such as the location of gecko and skink populations.

Coda

The talk started with an epigram: "no map is perfect", but the maps ably described and explained by Richard Ewans represent a valuable good starting point. Both the DCC and ORC vegetation maps are maps in progress, and it is vital that future funding will be made available to eliminate any errors, correct omissions, and to update and add new information to the existing maps. Vegetation is dynamic, so should be web-based maps. It is to be hoped that these maps will be used as an accompaniment to, and not as a substitute for field inspection, with respect to assessment and decision-making.

Notes

1: The advertised title was A Vegetation Map for Dunedin City, but the talk also included an introduction to vegetation map of Otago made by the ORC.
2: A Biodiversity Advisor with the DCC at the time the map was made, but currently employed in a similar capacity by the ORC.
3: Email from Richard Ewans, 10 May 2022.

References

Atkinson, I. A. E. 1985. Derivation of vegetation mapping units for an ecological survey of Tongariro National Park, North Island, New Zealand. *New Zealand Journal of Botany*, 23, 361-378.

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Tautuku weekend field trip, 12th February 2022

Yannick Dorsman

Waist deep purei swamps, cob webbed rātā forests, or sprawled pest animal offerings may turn a normal intellect squeamish, but perhaps not the botanist or an 'ist' alike. And from what I have seen: throw them into the thick of it; intrigue and wonderment is all you will find.

The Tautuku weekend field trip was a culmination of various 'ahhs' and 'ohhs' as the knowledge of the natural world flowed. Much was taught and learnt among those welcomed on to the Tautuku Lenz Reserve. The 550-hectare reserve is comprised of southern rātā (*Metrosideros umbellata*) and kamahi (*Pterophylla racemosa*) forests, peat domes, and purei (*Carex secta*) swamps. A few notable fauna species within the reserve – the karearea (*Falco novaeseelandiae*), the fern bird (*Bowdleria punctata*), and the giant kokopu (*Galaxias argenteus*).

On Saturday at 10:30am we met at the entrance to the Lenz Reserve. The solemn Gavin White, Tautuku's man of conservation, led the way down the road 500 metres, a sharp left and directly into it... An hour had passed, and a mere ten metres achieved. One may be confused at the sight of this slow bunch but those first few steps into an unfamiliar location is very important, as it allows for the botanist to become grounded in the ecosystem's context.

At approximately 1:00pm we had moved about two kilometres and had lost the bryologist of the party to a unique corner of liverworts, mosses, and hornworts. At this time also the stomachs called for attention, time for lunch. We found ourselves sitting in a peat dome – the wire rush (*Empodisma minus*) creating an excellent cushion to sit upon.

Leaving the peat dome behind, we crossed through a thin section of southern rātā forest and then into a purei swamp. At first it was fun, observing some new plants which had not been seen insofar such as the bog mingimingi (*Androstoma empetrifolium*) or the weeping mapou (*Myrsine divaricata*). This then quickly escalated into something which could be compared to a scene from an Indiana Jones movie – manoeuvres around deadly pitfall traps, selectively grabbing onto solid vegetation only to find out its loose, etc.

Tautuku excursion (Photo: Karma Chau)

Once the gauntlet was conquered, we found ourselves 'a bit' muddy, in high spirits and ready to walk into the kamahi forests with its understory of kātote (*Cyathea smithii*) and wheki (*Dicksonia squarrosa*). We followed alongside the meandering river for some time, then took a left over a series of undulating rises and dips. Along the way various specimens of filmy ferns were marvelled over such as the *Hymenophyllum frankliniae* and the *H. dilatatum*, as well as ample consumption of the delicious edible berries of the *Coprosma propinqua*.

We end up with muddy shoes (Photo: Karma Chau)

The evening made way for a potluck dinner which presented ample delicious food, plant identification of the days more cryptic characters, and stories and tales of experiences not just related to plants. The following day we broke out into our interested

groups – a few went and did the Tautuku Estuary walk-way; a few conducted a couple of surveys to measure the effects of pest animals on palatable species between enclosed and non-enclosed plots; and a few went to an area to scope out arachnids and trees to climb, in the name of science of course.

I would say this BSO field trip provided enough intrigue and wonderment to create some memorable memories in a time where the serious conundrums caused by the members of the family *Coronaviridae* could be somewhat forgotten briefly, allowing us to focus on humbler endeavours – such as taxonomy, learning, and teaching relating to the natural world.

Tautuku trip: Keeping an eye out for the Catlins Cryptogams

Stella Fish

The Cryptogam Gang entered the Lenz Historical Reserve first, an interesting choice as we are infamous for our meandering ways. We had expected the remainder of the Bot Soc to rush past us led by enthusiastic tour guide Graeme. However, our passion, or maybe something else, managed to ensnare large parts of the group and with plenty of bryophytes to demonstrate that they weren't going anywhere fast.

Hanging Leifidium

The fallen logs and boggy ground were drenched in

Mniodendron comosum *fronds*

Schistochila

the dendroid mosses, *Canalohypopterygium tamariscinum* and tiered *Mniodendron comosum*. The tree trunks had several creeping liverworts, *Lepidolaena, Frullania* and Lejeuneaceae as well as wefts of *Ptychomnion aciculare* and a rather stunning *Leifidum* lichen. We were in our element, describing the difference between the Hypnodendraceae and the Hypopterygiaceae to gushing over epiphyllous liverworts. We couldn't remain at the beginning of the track forever and we were eventually herded along, however this just meant new cryptogams to enthuse about!

Schizaea *comb-shaped fertile frond*

Eventually, the first bog was reached and we split from the main group, picking our away across the uneven ground, regularly disappearing behind the *Dracophyllum*. At the East edge we came across the fern *Schizaea australis*, its comb-shaped fertile frond met with great delight. Moving into the forest we searched for the lichen *Bunodophoron australe*, hoping to see its special reproductive structure, the mazaedium. This was successful and before long we turned back, a shorter, but no less botanical, trip for the Cryptogam Gang!

Spring wildflowers of California, a talk by Angela Brandt, March 2022

Gretchen Brownstein

Due to the omicron wave, the March talk was changed at the last minute to an online zoom meeting. Lucky for us, Dr Angela Brandt (Manaaki Whenua Landcare Research) had just the talk in her "back pocket" ready to deploy: Spring wildflowers of California.

Angela did her PhD at Oregon State University on the community ecology of California grasslands, exploring recruitment potential of native annual and perennial species in areas impacted by invasive non-native grasses. She worked across three field sites in the University of California's reserve system (McLaughlin, Hastings, and Sedgwick Reserves) which due to the highly variable Mediterranean climate (year to year) and the high number of short-lived annual species, have highly variable species composition between seasons and years.

These grasslands are very diverse, with c.12 species on average per 0.5m^2, and include a few families, genera, and species that Kiwis would know from Aotearoa-New Zealand. For example, *Eschscholzia californica* (Californian poppy, Papaveraceae) are native to these grasslands. Also native are a whole suit of diminutive annual Lupin species, including *Lupinus nanus* (Fabaceae). It was lovely to see photos of *L. nanus*, *Castilleja exserta* (a hemiparisitic plant in the Orobanchaceae), and *Dodecatheon clevelandii* (shooting stars, Primulaceae) in their home territory (and made me a bit nostalgic as my first job real botany job was in Eastern Sierra Nevada, California).

Angela wrapped up her talk with a few photos from the 2020 fires which burned parts of the Hastings and McLaughlin Reserves. Interestingly, parts of these reserves had burned in both the prior fire season and in 2020, parts had only burned in one season, and parts didn't burn in either. As these areas are adapted to fire, some plants showed new growth within weeks. But exactly what these recovered communities will look like, given the number of invasive species present and climate change, is part of the ongoing research.

Thanks very much to Angela for a wonderful talk and to everyone for the lovely discussion afterwards.

Kaikai Beach photoshoot, 12th March 2022

James Crofts-Bennett

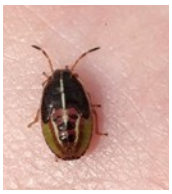
The Botanical Society of Otago was scheduled to visit Kaikai Beach on the twelfth day of the third month of 2022. By chance, I had been commissioned by local Christian rock band, "Inner Steel", for a photo shoot out on the same sandy dunes. We briefly crossed paths on the clay and rocky bluff towering over the beach. I took the chance to survey potential photo sites (depicted below). I had narrowed our potential shoot sites down to the Kanuka patch (capture that gothic forest style associated with a dark sound scape such as unblack metal), the riverbed (for easy framing) and the seaside cliff face (a well-trod path in album cover art for classical Christian rock). We cut down the hillside following old sheep tracks, careful to avoid the myriad thistles and rabbit holes.

We parted ways with the Bot/Soc as we reached the recently installed fence line. One of the band members was an amateur botanist in her free time and the vocalist had an education background, they briefly surveyed the field, taking particular interest in the plant life near a small culvert. I couldn't really decipher the botany talk from the godly praise nonsense, something about mosses and rushes? We also passed some ugly, thick bushes that were bristling with blue berries (photographs left). The way the berries clustered every branch brought out some primal revulsion within me, though the clients were much more enthused (gods bounty or some such) and greedily devoured them.

I mentally deleted the sight and slowly recovered my composure. We had reached the tree line for our first photo shoot. There was a steep dune carved by the Kanuka roots that offered a good eyeline for an opening in the tree line. As luck would have it, the Sun happened to be shining directly through said opening, so I had the band set up framing the light. I attempted to coach the band lead through pointing upwards, hoping to line his finger up with the light (That real godly stuff, ya know? Enlightenment and all that). Was hoping to get something like Socrates lecturing his executioners like that painting by Jacques Louis David (not really Christian but who's gonna know the difference, eh?). Between the inherent inability of humans to cooperate and trying to take a photograph directly into the Sun I think I was trying to do too much at once and the result was subpar (see below).

Naturally, the shot surfaced not in my futile efforts to control the shoot but during a candid moment when the subjects were not aware they were under scrutiny. Exasperated with the band, I took a moment to cool off and let the band members collect some focus. As I returned, they had gathered near a large, gnarled piece of driftwood. It wasn't the optimal framing (I had hoped to get them in the centre of the riverbed) but the natural composition of the shot before me was undeniable. If I hadn't just been witness to the band's "dynamic" personalities interacting, you would think I had caught them mid prayer, head bowed in reverence. Rather they were at the awkward phase of silence where friends who have recently argued are not sure they can comfortably talk with each other. Mixed with some tasteful asymmetry and well contrasting colouration and you have the perfect Christian rock album cover.

We quickly made head way through the remaining thicket, struggling with the constantly up-and-down dunes. We crossed paths with the Bot/Soc again, but we lost our band leader and had to quickly depart. While rummaging around in the Kanuka I came across some kind of sand mushroom and a cool bug. They looked interesting so I nabbed some shots for the scrapbook. We eventually made our way to the riverbed where our long-lost lead had escaped to. The lighting was great, so I attempted to get the band set up for some classic "everyone looking in random directions" snaps. It would have been easier to herd cats. Conflicting personalities abound, I am uncertain how these people were ever able to come together in any form of harmony. I guess a rock band works best when everyone is at odds?



We made our way down the beach towards the cliff face. I was already happy we had the shot, but we were already here, and we might as well "bask in gods glory", it was a beautiful day after all. The footing at the cliffs base was treacherous and not ideal for choreographed group photography, just as well we nailed it prior. I had a quick once over loose rocks and found some cool spiders and a funny looking butterfly. The Bot/Soc was making their way down the beach at this point, so we made for the dunes.

The last stretch of the journey was surprisingly perilous, the path at the base of the cliff was thin and perched above an extensive grove of giant

nettle plants (I photographed one, check it out below). Apparently, it's less a plant and some kind of monstrous jelly fish tree. Those nasty looking hairs are stingers (the band lead stressed this to me), falling in could be fatal (like getting stung by a whole lot of bees at the same time). I regretted wearing shorts at this point. We were mostly fine, just keeping a careful footing and not thinking about what could go wrong.

Once we reached the end of the grove, the giant nettles rose up the bank and menaced our party, forming a pincer attack. I struggled to navigate their grasping claws and one of the band members had to bail me out. She chucked me some form of primitive fabric shield, basically a wooden plank with a small metal clip for attaching a fabric scute (I think she was an anthropologist or something) so I could ward off the nettles.

We made our way back up the hillside, fairly uneventful. I stopped to catch my breath when the Bot/Soc reunited with our party. They had scaled the sheer cliff face to my horror. Once we gathered back at the entrance gate the band and the Bot/Soc exchanged notes on the site. I couldn't understand a word of it myself, but the place was nice enough. Had a generally alien feel about it, the sandy dunes covered with trees reminded me of late 90s scifi/fantasy, something about the way light filters through the Kanuka and bounces off the lighter coloured sand? Everything feels ethereal in that kind of lighting. I suck at endings, have this photo of another spider.

Botanical Quiz, 13th April 2022

Lydia Turley

Q: Who was there?

A: Not you! (Probably). Five people were quizzed, including a nice person who wanted to look around the building and was a great sport about being invited to join the quiz.

Q: What kind of questions were asked?

A: Topics ranged from Harry Potter to deforestation, from flags to Guinness world records.

Q: How are those topics botanical?!

A: You'll have to come to the next quiz we run to find out!

Q: How was it?

A: Some of the questions provided a challenge, but everyone agreed that the evening was fun and worthwhile, and we all learned something.

Q: How many mistakes did the quizmaster make?

A: Oops….

Leith Saddle, 7th May 2022

Matt Larcombe

This trip was led by Matt Larcombe and attended by 12 people and one dog. In two loose groups, we walked slowly up to the lookout and then on to the first highpoint towards Swampy Summit where we had lunch in the sun. Matt described some research that his students have been doing on the *Libocedrus bidwillii* (Pahautea) population in the area. The population is notable as one of the largest populations in the southeast and was impacted by a fire in 1914, when the upper slopes burnt. Matt and his students have established 20 permanent plots and labelled 517 trees including 244 *L bidwillii*. The population structure below the fire boundary (the cloud forest) is charactered by a lack of recruitment as is typical of this species due to shade intolerant juveniles.

However, above the boundary some 170 seedlings were recorded, demonstrating the importance of disturbance to the demographics of Pahautea. Matt's students have also been quantifying the flammability of the vegetation and found that the burnt community remains many times more flammable than the unburnt forest, demonstrating potential positive feed mechanisms that might have operated to reduce forest cover since human settlement of Aotearoa New Zealand.

Lots of other botanising was done, and six-year old Te Pō made the find of the day which was the Pahautea specialist *Hymenophyllum malingii*. Also, David Lyttle gave us a very nice demonstration of how to spot putative hybrids between *Gaultheria depressa* and *Gaultheria macrostigma*. One other thing Matt was interested in was how far up towards the summit Pahautea juveniles could be found. Although they occur along the track below the first lookout, they soon petered out as we climbed up towards the summit. However much everyone's surprise there was single 2m tall juvenile near the lunch spot on the highpoint, indicating that Pahautea has no trouble growing right up to the tops in this area. Thanks to all those who attended.

Hymenophyllum malingii *on a dead Pahautea (Photo: Lydia Turley)*

BSO AGM and Photo Competition, 11th May 2022

Alyth Grant

The AGM and Photo Competition of the Botanical Society of Dunedin was held in the Otago Pioneer Women's Memorial Hall on Wednesday May 11, at 7.30pm.

The meeting opened with the AGM of the Society, chaired by the President, Gretchen Brownstein. She reported on the healthy growing membership (77), and the past year's activities, which included - despite the Covid restrictions - 7 talks and 9 field trips. All the current committee members were confirmed, with the addition of Stella Fish to the committee.

Following the business, Peter Johnson, representing the three competition judges (including Kelvin Lloyd and Rod Morris), presented the 44 entries by 10 photographers in three categories. The category 'Wetland Plants' was a new one for this competition. There was a wide range of beautiful photos and interesting botanical specimens and species, doubtless providing the makings of another beautiful Botanical Society calendar. Both the competition and the calendar have been running for 15 years now. Peter gave appreciative and helpful comments about each photo.

The winning photos were as follows:

Plant Portrait: "Clinging to the Cliff", by John Knight, showing *Olearia oporina* on the edge of a cliff overlooking Puysegur Point *(see cover)*

Plant in the Landscape: "Stop! Take Care!" by Alyth Grant, showing the *Trentepohlia* covered cliff face by Split Rock at Split Rock, Otago

Wetland Plants: "Reflections" by Gretchen Brownstein, showing the Tataki wetlands

In addition an extra prize was awarded to Alyth Grant for "Lone Sheep (*Haastia pulvinaris)* on Black Birch Peak".

People's Choice Award: The high aesthetic qualities of the photos overall was evidenced by the fact that 31 photos of the 44 entered received at least one vote by the members. As four photos received an equal number of votes, it was decided to award four prizes to their photographers.

They were: "Bush Stream" (at Bull Creek) by Warren Jowett, "Clinging to the Cliff" by John Knight, "Rakeahua River" by David Lyttle and "Kid Me Not" by John Knight.

Reflections: Tataki wetlands (Gretchen Brownstein)

Stop! Take Care! (Alyth Grant)

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Please submit copy for next newsletter to Lydia Turley by 10th October 2022

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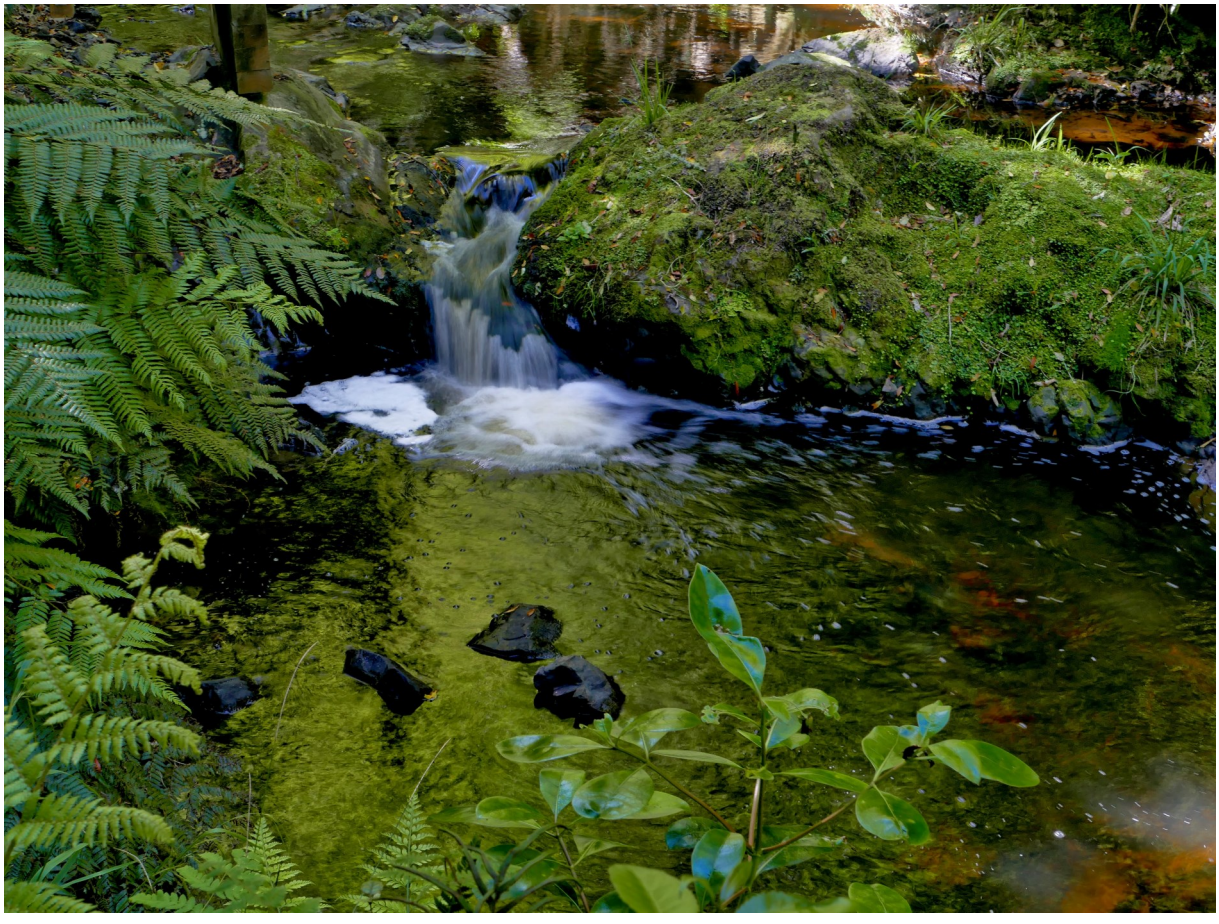

Bush Stream. *Photograph by Warren Jowett. Peoples Choice winner.*

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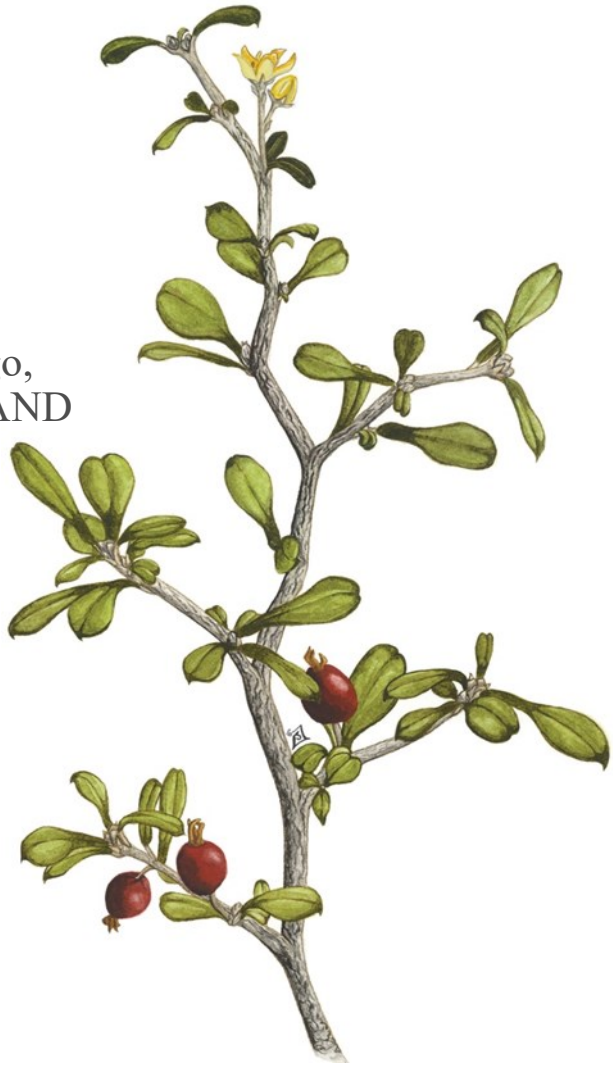

Right: Corokia cotoneaster *branch (Artist: Sharon Jones)*

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