



BOTANICAL SOCIETY
OF OTAGO



Newsletter Number 99 July 2023

BSO MEETINGS AND FIELD TRIPS JULY — NOVEMBER 2023

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

12th July, 5:20pm: Naturally uncommon ecosystems in Otago. Speaker: Scott Jarvie, Otago Regional Council. Naturally uncommon ecosystems are defined as having a total extent of less than 0.5% (i.e., <134 000 ha) of Aotearoa New Zealand's land area. These ecosystems are rich in threatened species, but many are poorly understood and nearly two thirds are classified as threatened, primarily from human associated threats, with a large proportion of these ecosystems being found on private land in lowland and coastal regions. This talk provides an overview of naturally uncommon ecosystems in the Otago region and discusses recent work to establish programmes to monitor extent and condition, focussing on inland saline (salt pans) and coastal turfs. In addition to the overview on naturally uncommon ecosystems, I will briefly touch upon work for a regional threat classification for indigenous vascular plants in Otago.

22nd July, 9:00am: Taieri River Track. We'll follow the track from Taieri Mouth to the John Bull Gully picnic area for lunch (4 km), and then return. The track passes through several vegetation types, including estuarine salt marsh, carr (wooded fen), podocarp forest, and open shrubland. A highlight will be stands of regenerating kahikatea, as well as Hall's totara, tree ferns, and miro.

The track is in good condition but is undulating, and cuts downhill to the picnic area alongside the river. Bring good walking shoes, water and lunch, and clothing for the weather. Meet at Botany car park at 9:00 a.m.; expected return by 3:30 p.m. 37km drive each way. If the weather is very poor on the Saturday, we'll switch the trip to Sunday. Contact Lydia Turley (lydiamturley@gmail.com) 021 062 3602

16th August, 5:20pm: Advancing the inland saline ecosystem. Speaker: Cathy Rufaut^{1,2}, joint work with Dave Craw¹, Dhana Pillai¹ and Steve Read¹ (1: Geology Department University of Otago, 2: QEII National Trust).

Early botanists surveying Otago's inland saline sites for potential reserves noted their association with disturbance. Initial studies that followed made reference to replicating erosional processes to improve habitat condition. Some years later, DOC Alexandra set up scalped trial plots that had peeled back the layer of weedy vegetation. In 2021, we picked up the baton and developed the concept of induced erosion further as a method for rejuvenating inland saline habitat and controlling weed threats to native halophytes. This talk will present the rationale behind "scraping" saline sites, the processes involved in Otago surfaces developing high salinity and alkalinity, and an update from the trial sites we have established on private land.

19th August. Inland salines of the Maniototo. Leader Cathy Rufaut. On this trip we will visit some of the last remaining examples of inland saline and see some of the work Cathy and her team are doing to help restore and protect these naturally uncommon ecosystems. Please check the website for more details closer to the date.

13th September, 6pm. Baylis Lecture: Down in the Weeds. Speaker: Carol West. Location: Archway 4, University of Otago.

My journey with environmental weeds began with Botany Division, DSIR and *Clematis vitalba* in 1984, in the days of the Noxious Plants Act. It then continued throughout my roles in the Department of Conservation with a host of weed species, the Biosecurity Act, policy and strategy development, Standard Operating Procedures and science advice spanning the entire country and occasionally diverting overseas. I'll cover some highlights/key points from this journey.

About the speaker: Carol West was awarded the Allan Mearns in 2022 for contributions to the study and preservation of New Zealand's flora for more than forty years. This talk will focus on one aspect of those contributions – management of environmental weeds.

19th September, 9:00 am: 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 Sept.

11th October, 5.20pm: New Zealand's amazing diversity of Lichens - ways to Enlichenment! Speaker: Marley Ford, Private Consultant. Lichens are a conspicuous part of New Zealand's ecosystems, but a group not well known by many. Working towards curing 'lichen blindness' this talk offers an introduction into the symbiotic world of lichenized fungi. From mountains to the sea, lichens can survive anywhere... even space? In New Zealand we have 10% of the world's lichen diversity with more than 2050 species. Many more are undescribed or unreported. Of our currently recognised species over half are classed as "Data Deficient" - meaning we know little about their distribution, abundance, and ecology. Further, New Zealand currently has no full-time lichenologists and only a handful of people working on them at all. From sexy pavement lichen to one named after Jacinda Arden – these enigmas are all around us! Find out what a lichen is, what they do and how you can go about identifying them, plus an outline of where to find the best and most current lichen resources in New Zealand.

14th - (15th) October: Lichen & Fungal Foray to Knights Bush. This 230 ha property bordering the Clutha River conserves some of the last remaining native forest from the lakes to the sea. There are hundreds of lichens for your Enlichenment amidst regenerating and old-growth kanuka, silver and black beech, ancient totara and matai on the southern slopes, regenerating podocarp/broad-leaf forest on the river flat and kowhai/divaricating shrubs on the sunny north faces. Spring will bring a flush of other unique fungi and David Orlovich will be on hand to help explore and identify them, while Allison Knight and Marley Ford will share their lichen expertise. Tracks are steep and could be slippery. 4WD is recommended and carpooling is needed as parking is limited. There is limited accommodation for those who wish to stay overnight. To book email Allison Knight: allison.knight.nz@gmail.com by 10th October.

- Thanks to Liv Sisson for the lichen pun

8th November, 5:20pm: The behaviour of mushroom populations. Speaker: Lydia Turley. Mushroom-forming fungi are important components of ecosystems. We can observe mushrooms, but the rest of the fungus is not so easy to observe. How much information can we extract from collections of mushrooms? What can genetic data tell us? Come hear about some of the challenges in studying fungi and how maths can help.

11th November, 7:30am: Tautuku Adventure. This is an adventurous trip to the Lenz Reserve at Tautuku in the Catlins. We will follow local experts along trapline routes through mixed old growth and regenerating podocarp forest. There is potential for exciting plant sightings. This trip requires a high level of fitness; we will be covering up to 10km of very rough routes through dense forest. Bring tramping boots, wet weather gear, lunch, water, and first aid kit. Contact Gretchen Brownstein (brownsteing@landcareresearch.co.nz). Meet at Botany Carpark 7:30am to carpool (drive time: 2hrs one way, ~300kms return trip). Return 7pm.

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

CONTENTS

BSO Meeting and Field Trip Schedule	2
Committee Notes	5
Chair	5
Secretary	5
Treasurer	6
Editor	6
News and correspondence	7
Exploring the fungal underworld	7
Articles	7
Mature and regenerating podocarps in Burns Reserve, Dunedin	7
Trip and Talk Reports	10
Field trip to Kuriiti Creek, Hampden, February	10
An excursion to Tūhura Otago Museum, February	11
The coastal sand dunes of Otago, a talk by Teresa Konlechner, March	13
Field trip to the Rock and Pillar Range, March	16
Field trip to Burns Scenic Reserve, April	17
Minutes of the Botanical Society of Otago AGM, May	19
Photographic competition results, May	20
Committee and BSO Contacts	22
BSO Membership Form	23

Cover photograph by Rach Baxter: "Grandly standing above forest giants: Leucogenes grandiceps Paparoa". Winner of the 2023 photograph competition, Plants in the Landscape section.

FROM THE COMMITTEE

Chairs notes

Gretchen Brownstein

Trips/Talks – We held nine field trips and 10 talks last year. Thank you to all our leaders and speakers! It takes a lot of work to organise these events, but it is great to get together with other like-minded folk to discover new places and plants and discuss the latest thinking on all things botanical. And stopping to inspect an interesting plant has the dual purpose of learning something new while catching one's breath. I really enjoyed all the discussions I had while exploring the bush. One of the things I like is that BSO members aren't shy about asking questions, to such an extent that I've taken to warning our speakers to leave enough time for questions and expect to be grilled (in a good way). I hope that everyone has enjoyed the trip and talk programme this last year and had a chance to learn something new.

Photo competition / Calendar – 2023 is the 17th annual photo competition. Over the years, the quality of entries has been amazing, making the job for the judges Peter Johnson, Rod Morris, and Kelvin Lloyd (who have judged nearly every competition) harder and harder. John Barkla has produced 13 editions of our BSO calendar using (for the most part) photos submitted for the competition. It was so sought after last year that we sold out in early November, with the last couple being hotly contested items (I heard there may have been some attempts at unauthorised pricing)!

Newsletter / Website – Lydia Turley, newsletter editor, continues to produce our wonderful triannual newsletter (another of BSO's much sought after outputs). Stella Fish, our new web editor, has done a great job keeping the website up to date. Lydia and Stella work hard to keep all our members informed and entertained. We greatly appreciate the effort they put in.

Committee – As always, without the committee, none of the above would be possible. Sadly, Mary Anne has decided to step down from treasurer after 10 years in the role. Many big thanks to Mary Anne for doing a wonderful job keeping our accounts tidy and up to date! I really enjoy working with John,

Mary Anne, David L, David O, Angela, Lydia, Sharon, Matt, Taylor, Stella, and Allison. We all bring unique skills and combined we make the trips, talks, photo competition, drawing competition, calendar, website, and newsletters we all enjoy happen.

Membership – Our membership is continuing to grow, with many new members this year. As of writing this (early April), there are 64 paid up members, but if everyone from 2022 re-joined we would have 104 members! So firstly, pay up! Secondly, keep submitting photos, writing articles, coming to talks and trips, but most importantly, keep asking questions and discussing and growing our botanical community.

Here's to another year of happy botanising!

Secretaries notes

Angela Brandt

I'd like to thank our committee members who have stood down this year for their contributions to the BSO, especially Mary Anne Miller for her many years of service as our Treasurer. It's especially thanks to her that the accounts are in order and we've maintained our registration as a recognised charity. But more than that, she's been such a welcoming, enthusiastic, and knowledgeable member of the committee - she will be sorely missed.

I'm thrilled to extend a welcome to the new members of our committee - John Knight as our new Treasurer and Jo Sinclair. It's wonderful to have new eyes and fresh perspective on how we operate as a committee and how we can best serve our society members.

Thanks also to our continuing committee members, without whom we couldn't bring such an impressive array of talks, trips, and newsletters to you each year. It's a pleasure to continue serving with them all.

New members

A warm welcome to new members Clara Hardy, Jennifer Lawn and Laura Shallcrass.

Thanks to Laura Shallcrass for her generous donation. To our existing members, thanks for your continuing support.

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				2023	2022		
				\$	\$		
CAPITAL	Current Assets						
	Everyday account			8,218	7,820		
	Audrey Eagle Publishing Fund			13,437	12,859		
	Business OnLine Saver Account			5,781	5,720		
	Accounts receivable			0	0		
	Inventory			90	92		
	Petty Cash			10	15		
	Current Liabilities			0	0		
	Working Capital			27,536	26,506		
Membership	Total Paying Members			59	77		
	Life Members			1	2		
	Complementary Newsletters			27	26		

Editors notes

Lydia Turley

Thanks, as always, to our wonderful contributors for exciting reports on the autumns adventures. If you have seen or done anything of botanical interest, please consider writing an article or short note to share in the newsletter. I do love hearing about the adventures people go on and the botanical questions they ask themselves.

We have some lovely pictures from the BSO photographic competition. My personal favourite is Stella's clever fish/bear/*Ganoderma* on page 22. Remember to come on trips and take photos all year so that you have pictures to enter in the competition next year!

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. Please keep formatting to a minimum. Send your feedback, comments or contributions to lydiamturley@gmail.com. Copy for the next newsletter is due on 12 October 2023. 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.

NEWS AND CORRESPONDENCE

Exploring the Fungal Underworld

David Orlovich will give his Inaugural Professorial Lecture *Exploring the Fungal Underworld* on Tuesday 18th July 5:30-7:30pm. All are welcome.

Location: Castle 1 Lecture Theatre, University of Otago Dunedin campus



Hypholoma (Photo: Lydia Turley)

ARTICLES

Mature and Regenerating Podocarps in Burns Reserve, Dunedin

Alex Wearing

Whilst walking through the coastal podocarp forest on the flanks of Burns Reserve¹ during the Botanical Society fieldtrip on 15 April 2023 I was impressed by the size of the emergent podocarps, rimu (*Dacrydium cupressinum*), miro (*Prumnopitys ferruginea*), and Hall’s totara (*Podocarpus laetus*). I reflected on the fortuitous survival of the podocarps from 19th century logging and farming. Clusters and isolated crowns of podocarps make for an arresting view from Gerry’s Rock. But in the forest, there was

only limited regeneration of podocarps. I consulted botanical reports on the original core area of Burns Reserve (Allen 1978), and on a proposed extension (which subsequently took place) to the north of the visited area (Lee, 1986). Both accounts commented on the sparse nature of podocarp regeneration. Allen (1978 (survey undertaken in 1976), p. 22) noted that “Apart from some miro seedlings and saplings in the NE corner of the reserve [not visited for this article], podocarp regeneration is confined to occasional Hall’s totara.” Lee (1986, p. 3), writing about the now northern section of the Burns Reserve noted that “apart from totara, little podocarp regeneration was seen.” I was

interested to see if podocarp regeneration had changed since these assessments were made and undertook a second visit to Burns Reserve on 1 June 2023.

On my second visit I measured the diameter at breast height (dbh)² of all the mature podocarps I could see from the marked route from Bryan’s Stile to Gerry’s Rock (Table 1). I also searched for podocarp seedlings, saplings, and poles in a band approximately 10 metres wide either side of the route. I then descended the rock bluffs

Species	dbh (in centimetres)
Rimu, <i>Dacrydium cupressinum</i>	99, 97, 94, 94, 93, 89, 88, 48, 44
Halls totara, <i>Podocarpus laetus</i>	91, 59
Miro, <i>Prumnopitys ferruginea</i>	63, 54+44 ¹ , 37

Table 1: Measurement of diameter at breast height (dbh) in centimetres for mature podocarps seen from the marked route between Bryan’s Stile and Gerry’s Rock, Burns Reserve, Dunedin. 1 = double leader.

Species	dbh (in centimetres)
Rimu, <i>Dacrydium cupressinum</i>	87, 69, 64, 61, 59, 54, 54, 51, 51, 35, 18+19 ¹
Hall’s totara, <i>Podocarpus laetus</i>	5
Miro, <i>Prumnopitys ferruginea</i>	63, 53, 50, 49, 49, 37, 37, 8

Table 2: Measurement of diameter at breast height (dbh) in centimetres for mature podocarps seen on the slope north and downslope of Gerry’s Rock, Burns Reserve, Dunedin. 1 = double leader.

and steep slopes to the north of the large area of Easter orchid (*Earina spp.*) on Gerry's Rock. At the base of the steep rocky slope and further downslope I sampled a cluster of podocarps (Table 2). I counted and measured all the podocarp seedlings, saplings, and poles that I came across whilst measuring the podocarps in this cluster^{3,4}.

For the marked route podocarps (Table 1) the seven largest rimu were of similar dimensions suggesting they were established during a single recruitment phase. The two smallest rimu were located close to the transition between podocarp-hardwood forest and kanuka (*Kunzea robusta*) forest suggesting possible establishment sometime after European settlement. All the rimu whether growing on tree mounds or amongst rocks had impressive surface roots. Past and recent soil loss around the bases of some trees was evident. Three of the rimu were tilted to the north, with greater crown development on the north side of the tree. One rimu had substantial trunk dieback. Spiral bark in some trees might provide a clue to as why these trees were not logged. The double leader miro may represent survival after a damage event and/or growth in persistent gap. There were several nails in the trunk of the largest Hall's totara.

For the podocarp stand north of and downslope of Gerry's Rock (Table 2) there was one rimu that had a dbh considerably larger than the other rimu sampled, and which was in the lower range of the marked route population. The rimu with dbhs of between 51 cm and 69 cm may constitute a younger population, but in the absence of tree ring counts, it is not possible to discount the influences of site factors on growth rates. The two smallest rimu were growing on platforms on lower levels of the steep rocky slope, and these challenging locations are likely to have impacted on growth. Miro at this site may have had episodic recruitment, but any explanation must be tentative in the absence of tree ring counts.

Only one 88 cm high - and damaged - Hall's totara seedling was seen in the banded transect podocarp forest section of the route to Gerry's Rock. In the kanuka dominated forest on the approach to Gerry's Rock there was one 300 cm high Hall's totara pole, and 78 cm and 75 cm high Hall's totara seedlings. There was one 171 cm high rimu sapling growing at a vulnerable site right by the marked route, and one 40 cm high miro seedling.

On the slope north of Gerry's Rock amongst the cluster of mature podocarps there were two rimu saplings (290 and 280 cm high), two miro saplings (450 and 250 cm high), five miro seedlings (59, 47, 38, 27, and 22 cm) high, and two Hall's totara saplings (150 and 102 cm high).

Podocarp regeneration is occurring, but it still sparse.

The possible explanations for sparse podocarp regeneration are likely to be many and varied. Light levels at the ground surface in much of the podocarp forest are low. In some areas crown fern (*Blechnum discolor*) and other fern cover inhibits regeneration. Light gaps often have dense patches of regenerating shrubs and small trees. There is a lot of leaf and branch litter. Branchfalls probably kill some podocarp seedlings. Most of the Hall's totara seedlings and saplings - which can cope with physical damage - showed signs of central stem and lateral branch damage. Possum and goat browsing may also be a factor. The 'best' regeneration occurred by the marked route (more light and more open ground) at the podocarp-hardwood to kanuka forest transition, although regeneration potential at this location is currently constrained by the prolific spread of Darwin's barberry (*Berberis darwinii*).

I exited by a marked route that eventually reaches the Settler's Memorial at the end of Signal Hill Road. Notable on a side route off the main route was the largest rimu (126 cm dbh) seen on my two visits. This tree had an enormous spreading canopy and was probably iso-

lated for part of its life, with subsequent regeneration of the forest around it.

The last section of the route to the Settler's Memorial, south of an exotic plantation, is close to the ridge crest. I came across one miro (56 cm dbh), and lots of young Hall's totara trees, and seedlings, saplings, and poles. I measured a sample of ten Hall's totara. The dbh measurements ranged 7 cm to 46 cm, and there seemed to be two cohorts. Further investigation is necessary to determine the characteristics of Hall's totara in the southern part of the reserve, and to seek out rimu and miro.

Allen (1978, p. 22) noted that "Native vegetation is reasonable condition, although regeneration of most species is low." This does not apply to all species in 2023, but it still seems to apply to podocarps, except possibly at a few localized sites. The future podocarp composition of Burns Reserve could have a greater proportion of Hall's totara.

The topographic diversity of the Burns Reserve as a whole, has resulted in considerable diversity, even allowing for substantial past depletion and modification. Burns Reserve certainly merits further botanical exploration. It would also be worthwhile to accurately determine the age of the largest trees. More comprehensive survey of the entire reserve would provide a better indication of its composition and character⁵, of the status of forest regeneration (especially of the canopy dominant species) and provide a better test of the contention that the regeneration situation now is not much changed from the late 1970s/mid 1980s. The proximity of Burns Reserve to Dunedin is a bonus.

Notes

1. The story of Burns Scenic Reserve, its creation and later additions, the years when it was forgotten, and the recent raising of its profile and founding of the Friends of Burns Reserve is outlined in Munro (2022).

2. The dbh measurements are indicative rather than

definite. A second person to check the position of the tape on the blind side of the tree would have been preferable.

3. The second area had the remains of a fence line marking a former boundary between forest and farmland. The reserve now extends downslope of this fence line, which is attached to two of the mature podocarps.

4. Also at this site were some impressive tall spreading kanuka (*Kunzea robusta*). I saw an Easter orchid growing on a rock within the area with a podocarp canopy. Also, noted and probably a consequence of location close to a former boundary, was a large adult and seedlings of - native, but not native to Dunedin - rangiora (*Brachyglottis repanda*) and several seedlings of introduced holly (*Ilex aquifolium*).

5. For example, Lee's 1986 survey notes that poka (*Elaeocarpus hookerianus*) is occasional in one area.

Acknowledgement

I would like to acknowledge informative discussions on Burns Reserve with Jim McQuillan.

References

- Allen R.B. 1978. Burns Park S.R. (Signal Hill). Scenic Reserves of Otago Land District. *Biological Survey of Reserves. Report 4*. Department of Lands and Survey, Head Office, Wellington. Pp. 20-25.
- Lee, W. G. 1986. *Botanical Report on Possible Extension to Burns Park Scenic Reserve*. Botany Division, DSIR, Dunedin
- Munro, B. 2022. A forgotten wilderness. *Otago Daily Times, The Weekend Mix*, 20 August, 4-5.

REPORTS

Field trip to Kuriiti Creek, Hampden, 11th February 2023

Gretchen Brownstein

Three keen members spent a lovely few hours exploring a privately owned bush block above Hampden on Kuriiti Creek. This block is a recent purchase for the Hepburn/Hart family and they are keen to figure out what is present so they can look after it. The whole block is 36ha but taking it at classic botanical pace, we covered only a small portion. We parked at the top in the pasture (mix including *Dactylis glomerata*, *Lolium*, *Agrostis*) and walked down a rough track towards the creek. While there are the usual weedy plants dominating (gorse, broom, thistles, blackberry), in amongst them were seedings of pittosporum and red mapou. From the track there are good views of the surrounding slopes containing a mixed kanuka and broadleaf/podocarp forest; with binoculars we were able to pick out marble leaf, cabbage tree, wineberry, and kowhai in the canopy. Tui and fantails kept us company as we made our way down to the edge of the bush, here we spied coprosmas: *Coprosma rhamnoides*, *Coprosma rotundifolia*, *Coprosma propinqua*, and something we all quietly decided to just call a *Coprosma propinqua* X. At the bottom of the slope is Kuriiti Creek, which runs through the middle of the block. The cool damp shade next the creek felt lovely after the hot sun. We rock hopped up and down a few reaches of the creek inspecting the banks for ferns (*Blechnum penna-marina* and *Blechnum chambersii*), little herbs (*Urtica sykesii* and *Hydrocotyle heteromeria*), and sedge. After lunch on the shady creek edge, we explored further up the creek. Here we found reasonable sized miro, kowhai, and tūrepo trees. In places,

the understory is thick with regenerating shrubs and trees, but in other spots its clear the pigs are making an unwelcome mess. By mid-afternoon, we decided it was about time to call it a day, but for one last adventure we decided bush bash our way back up to the main track because why not? After climbing through a tangle of *Rubus cissoides* and *Ripogonum scandens* we emerged back on the track and walked back up the hill to the car, snacking on blackberries to keep our energy up. We all agreed this a rather special place.



View down the track, the creek at the bottom and the ocean in the distance.



Kanuka with a thick understory of coprot, mahoe, seven finger.

An excursion to Tūhura Otago Museum, 15th February

Warren Jowett

It was a Bot Soc talk with a difference to start the year – a visit to a tropical rainforest! It was at Tūhura Otago Museum. We were welcomed by museum staff On Lee Lau, Dr Tony Stumbo, Rosemary Coppell and Danielle Lomas – it was after closing time so we had the place to ourselves (the after-hours alarm even sounded, by accident, during our visit, too – which was a humorous highlight noted by a couple of members).

We received a thorough briefing from the staff and soon learnt that we were about to enter “another world”. To ensure that we weren’t bringing unwanted organisms from outside the secure environment of the rainforest we left bags in a locker—we also had to check on leaving that we did not take any of the residents out with us. Allison Knight passes on this note for Bot Soc members visiting in future: “It’s well worth checking out the cabinet under the label “Botany” on the wall on the way to the Tropical house. It contains beautifully laid out drawers displaying a wide range of botanical specimens, including seaweeds and lichens.”

Danielle, the rain forest gardener, explained the challenges of gardening in the rainforest (Fig. 1) – unfortunately I missed the talk, having been

distracted by the butterflies. Maureen Howard “enjoyed hearing about Danielle’s daily routine care of the plants, selecting plants that could provide the services they needed for the butterflies as well as coping with the temperature differentials.” I did however learn that the air temperature remains about 28°C and the humidity 75%. No fertiliser is added to the soil – just water. I was out of my depth in identifying the plants –there are over 70 species of tropical plants in the forest – although it was good to see plants such as Hoya, fiddle-leaf fig and Monstera growing in what resembled their normal environment, instead of surviving in pots in someone’s lounge. The banana tree was in fruit which was covered – no doubt to keep the parakeets out.

But the stars of this rainforest experience had to be the butterflies (Fig. 2), which have come from South America and Southeast Asia. Maureen seemed to have an ability to attract the butterflies to land on her clothing and skin (Fig. 3). She wondered if it was the organic Soapnuts detergent that she used – or maybe it was the colour of her clothing?



Fig. 1: On Lee Lau, Danielle Lomas, and BSO members on the forest floor



Fig. 2: One of many butterfly species flitting through the rainforest

Tony Stumbo is the Living Environments Officer with responsibility for the fauna of the tropical rainforest. He hails from Minnesota and came to the University of Otago to do a PhD in Zoology – his speciality was parasitology. The lights went out as we were talking and instantly a

number of large butterflies began chasing each other around. Tony explained that these were magnificent owl butterflies and that they are crepuscular and usually only fly around at dawn and dusk. It was part of their mating ritual – it is the males that are doing the chasing. They drop out of the chase as they tire and it is the “last man standing” who wins the prize of a mate.



Fig. 3: A butterfly perches on Maureen Howard

Tony takes pride in the rainforest and its inhabitants and his work was recognised when the Museum was recognised for its high standards and appreciation of animal welfare with the Tropical Forest becoming the first and only butterfly enclosure in Australasia to achieve accreditation by the Zoo and Aquarium Association (ZAA) in 2017. The accreditation recognises “that the animals are being fed appropriate, nutritious food; that they have a living environment that provides variety and choice; that they enjoy good health and are disease-free; that their behaviour is normal; and that they experience comfort, and appear happy and interested in their surroundings”. These are key to the ‘positive welfare’ focus of the ZAA. An audit had

noted that the Museum showed “commitment above and beyond welfare regulations and continually works to enhance the husbandry for the animals in its care”.¹

Other animals present in the rainforest include zebra finches and parakeets – which were resting in their cages when we visited – carp, terrapin turtles – Nona and Shelley – and tarantula – safely housed in their glass enclosure.

The second part of our field trip was a visit to the Museum’s dry collection store, which holds internationally significant collections of birds, mammals and invertebrates in a climate controlled, air conditioned environment. We were shown examples of the botanical collection which On Lee and Rosemary are identifying and digitising. Stella Fish noted that “it was wonderful to peer inside the miscellaneous box with all its bits and bobs. It makes you wonder what treasures are hidden in those spaces.” Allison “was most impressed by the way that lichens behind the scenes were being preserved in all the glory of their 3-D form by being carefully nestled in hollows carved out of blocks of styrofoam.”

The collection is an impressive and important resource of the Museum which does not have a high profile. The sheer diversity of the collection and its international flavour, as well as the extinct NZ animals (including huia and kuri) and the challenges in displaying the range of specimens – “from the most minute native butterfly to enormous skeletons of sea creatures” [John and Marilyn Barkla] – made a big impression on the members attending. Sharon Jones’s “favourite specimens were the bat skeletons and skins that were hiding on the dimly lit shelves in the dry collections store. Not botanical I know! But they were so tiny and intricate, not to mention the long tail bat is now thought to be extinct so it felt like a very special opportunity to be so close to them.” Only 1% of the museum’s 1.5 million objects in its collection is on display at any one time – a fact which made the biggest impression on John and Marilyn. Sha-

ron's "favourite tip came from the paper collections curator [Rosemary] regarding good practice when it comes to adhering specimens/samples in books – use linen tape or archival glue to ensure the sample remains undamaged by nasty adhesives."

Thank you to Gretchen and Angela for organising such an interesting field trip and to the museum staff who were our helpful and well-informed guides.

1. <https://otagomuseum.nz/blog/museum-acknowledged-for-high-standard-of-animal-welfare/>

The Coastal Sand Dunes of Otago, a talk by Teresa Konlechner, 8th March

Alex Wearing

Teresa Konlechner (School of Geography, University of Otago) gave a comprehensive and well-illustrated talk on the coastal sand dunes of Otago. She described the physical character and ecology of Otago dune systems, drew attention to gaps in existing knowledge, and suggested some appropriate actions to stop the ongoing decline of Otago's sand dunes.

Sand dunes form on coastlines where there is shelter from strong waves, sand sources, on-shore winds, and dune-binding plants. They provide a diversity of places and spaces for plants and animals to live, including specialist dune plants.

Active dune systems are the result of ongoing or very recent movement of sand by wind. They are naturally uncommon. In New Zealand this type of landform has decreased by over 80% since human settlement. Active dune systems are one of New Zealand's most threatened ecosystems.

The vegetation zonation pattern of dune systems comprises the strandline (a narrow band at the toe of the foredune where wash material

accumulates), the foredune (divided into front face, crest, and back face), and backdunes. The front face of a foredune is usually the most dynamic area of any dune system. Sand-binding plants are most vigorous on the front face. Backdunes tend to be more stable¹.

Dune plants must cope with several environmental stresses, such as burial, abrasion, salt spray, deflation, drought, submergence, and temperature extremes. They must also contend with many introduced herbaceous, grassy and woody early successional species. Between dunes, other plants establish in dune hollows and slacks².

The characteristics and composition of Otago's sand dunes before human settlement cannot be ascertained with certainty. Currently, most of Otago's sand dunes are stable, dominated by invasive and/or introduced species. They have experienced extensive transformation since the mid-19th century. Many sand dunes systems have massive backdunes, which would not have been present before the arrival of European settlers.

There are 76 sand dune systems along the Otago coast, of which 15 are Waitaki District, 34 in Dunedin City, and 27 in the Clutha District. In the 1990s Otago's sand dunes covered 1039 ha, comprising 2.7% of New Zealand's dunelands.

Otago sand dunes retain a diversity of landforms and the potential for geomorphological processes indicative of resilient and functionally intact dune systems. They are geomorphologically and ecologically distinct from dunes in other parts of New Zealand. Examples of Otago sand dune systems are: prograded barrier (Long Beach), headland spit (Pleasant River), composite (Allans Beach), transgressive (windblown) barriers (Sandfly Bay), and mainland beach (Tavora Reserve).

Notwithstanding their landform diversity, assessments show that Otago sand dune systems

are highly modified and in decline. Between the 1950s and 1990s there was a 41% decrease in the area of Otago's sand dunes. This decline is ongoing. No Otago dune systems are intact and unmodified.

Otago's sand dunes are dominated by marram grass (*Ammophila arenaria*), which was introduced in the late 19th century to prevent sand movement. Marram grass invades rapidly. It alters dune shape, size and dynamics. Open semi-stable dune systems dominated by the indigenous pikao (pingao, golden sand sedge, *Ficinia spiralis*) are changed to high, stable dune systems dominated by marram grass, that often facilitate colonization by many additional - often introduced and invasive - species. In recent years pikao has been reintroduced or reinserted in some dune systems. Because of plantings there is a wider distribution of pikao than in previous decades³. Planted pikao is thriving, but is vulnerable to rabbit browsing, competition from other plant species, over-growing by other plant species (especially tree lupin, *Lupinus arboreus*), dune stabilization, and coastal erosion. Also occasionally present is the sand tussock (hinarepe) (*Poa billardierei*).

Dune-building species that can tolerate low to moderate burial include *Gentianella saxosa*, *Pimelia lyalli*, *Euphorbia glauca* (shore spurge), and *Coprosma acerosa* (sand coprosma).

Large active dune systems comprise a mosaic of habitats with associated communities of plants. For example, deflation surfaces and stonefields provide suitable habitat for *Colobanthus muelleri* and *Raoulia hookeri* var. *hookeri* (scabweed).

An 1884 account of the Murdering Beach and Long Beach described unbroken lines of sandhills covered by a strong wiry grass (= pikao), which effectively held the sand against the strongest winds.

Otago dunes in the late 19th century was characterized by vegetation removal, destabilization

and dune migration. Fires were frequent. Curio-hunters excavated dunes for Māori artifacts. Grazing and trampling by stock removed vegetation and damaged dunes. In the 1880s there was a period of dune stabilization facilitated by the widespread planting of marram grass. From the 1930s onwards, there was further plantings of marram grass, and tree lupin and radiata pine (*Pinus radiata*).

Sandfly Bay, between 2004 and 2020, experienced massive marram grass expansion and dune stabilization. This has led to a loss of potential habitats for individual dune systems, and a loss of potential habitat diversity and complexity. There has been a decrease in the transfer of sand from beach to dunes. Higher and steeper dunes can pose access problems for seal lions (*Phocarctos hookeri*) and the yellow-eyed penguin/hoiho (*Megadyptes antipodes*).

The decline of pikao in Otago sand dune systems is ongoing. It disappeared from many Catlins beaches during the 1990s. In 1999, Tahakopa Beach had the largest population of pikao in Otago, but much of it was gone by 2017.

Teresa Konlechner considered the ways in which, and to what extent Otago sand dune systems been modified with respect to vegetation habitat associations and species distribution, by reference to analogous relatively undisturbed dune systems occurring on Stewart Island and in Fiordland. At Smoky Beach, Rakiura (Stewart Island), the sand dunes are relatively open, and sand can pass through the entire system. Vegetation on the backdunes is nourished by fresh sand. Prominent species are pikao, sand tussock and New Zealand flax/harakeke (*Phormium tenax*).

Teresa Konlechner said that it should be possible to apply to Otago knowledge obtained during the Rakiura Dune Restoration Programme, 1999-2021. Pikao was planted by the Department of Conservation. At Doughboy Bay there has been a transition from a prograded marram

grass dominated foredune barrier to a nebka⁴ field, and a porous transgressive pikao dominated dune system with distinctive geomorphic and ecological characteristics. Moderate wind exposure, with some downward sand drift, assisted in the renewal of the indigenous flora. There was manual control of marram grass and tree lupins. A phased patchwork approach was effective in reducing the development of blow-outs.

There are opportunities for dune restoration, but according to Teresa Konlechner the window is closing. Many species are still present in Otago, but all remaining populations of indigenous dune plants are vulnerable. Some species have been lost from Otago, but Southland dune systems are a source of plants for reintroduction.

There is need for a comprehensive regional survey of the flora of active dunes. Current data is patchy, and there is lack of data for key habitats and species. It is also necessary to determine the appropriate degree of dune mobility.

Several challenges were identified by Teresa Konlechner. These include lack of funding, lack of time (i.e., decline is ongoing), lack of availability of people (especially people with appropriate knowledge and skills), lack of continuity in management and effort, gaps in knowledge^{5,6,7,8}, and a lack of a national perspective, understanding and prioritization. It is also necessary to consider the possible impacts that promoting the development of active dune systems may have on other dune communities, such as dune slacks and coastal turfs, and indigenous plant species that have found spaces and places on stable dune systems that allow them to persist in a transformed local landscape dominated by combinations of farming, forestry, and dwellings. There is also a need to consider the likely impacts of sea level rise and the increased frequency and severity of storm events, and the resulting increase in rates of coastal erosion. Many active dune systems will have limited opportunities for landward migration. Either the physical geography is not suitable, or

the human geography of occupation, land-use and property values limits locational shifts. There will have to be a balance between the requirements of the flora of active dunes and the need for coastal protection. But despite these caveats there are real opportunities restoration of active dune systems and for the protection of dune plant - and animal - species.

Teresa Konlechner's talk ably demonstrated the botanical, ecological, and aesthetic attractions of the coastal sand dunes of Otago, and the need for more effort with respect to collecting data with respect to the status and flora of active dune systems. Immediate action may be necessary to influence geomorphological and ecological processes to promote landforms, surface processes, species composition and ecological characteristics that are a closer approximation to pre-human settlement dune systems. Hesitation will lead to the deterioration, degradation and loss of more dune systems. There has been talk of a managed retreat with respect to human occupation and use from sections of the New Zealand coast. But there needs to be a managed advance with respect to protection, renewal, and enhancement of New Zealand's active dune systems. Hopefully, Otago will be to the fore in this regard.

Notes

1. On backdunes, sand stabilizers are found. Indigenous stabilizer species include sand convolvulus (*Calystegia soldanella*), pohuehue (*Muehlenbeckia complexa*); introduced species include tree lupin (*Lupinus arboreus*) and iceplants (*Carpobrotus spp.*). These plants help build up soil humus levels. Once completely stabilized, back dunes can be invaded by non-dune species.
2. In slacks, the base of the hollow is closer to the water table and the sand is moister and more stable.
3. Pikao is planted along, or close to access points to beaches (where people can see the differences in form, texture, and colour between pikao and marram, and their different sand-trapping capabilities), and in more isolated locations (where human dis-

turbance is less likely).

4. A nebka or nabka field comprises usually hummocky sand dunes that form around vegetation, which are formed and shaped by the action of wind.

5. Assessment of the relative influences on sand burial and salt spray on vegetation zonation.

6. It is not known, for example, what was the pre-human settlement impact of marine mammals and birds on geomorphic, soil and ecological characteristics and interrelationships.

7. An increase in the frequency and severity of storm events, and sea level rise and has increased coastal erosion at some sites. This can lead to the formation of scarps on foredunes that prevent penguin access to nesting sites and could potentially impact on the distribution of penguins in the Otago region.

8. Different beaches have different types of sand. Texture (size, shape, roundness) resulting a regional variation in dune morphology which is likely to influence vegetation establishment and development.

Field trip to the Rock and Pillar Range, 25th March

Angelina Young

Early on a March morning six plant pilgrims from far and wide congregated at the foot of the Rock and Pillar Range to make their way to Big Hut, led by John Barkla. John kicked off what was to be a day full of wondrous sights (from the minute to the grand) by sharing with us the name Taiari Pet, referring to the fascinating lenticular cloud formations often seen above the Taiari Plains.

It soon became clear that John was a veteran of this particular walk, as he steamed ahead with great purpose towards the peaks, which promised to reveal some real treasures in the form of rich alpine cushionfield, herbfield, and snow banks. Left in our wake were typical grey-scrub species of the region such as: *Discaria tou-*

matou, *Olearia bullata*, *Melicope simplex*, *Corokia cotoneaster*, *Griselinia littoralis*, *Coprosma propinqua*, et al. As we rose steadily in altitude we managed to do some decent botanising, taking in the gradual - but definitely discernible - transition from tussock grassland to regenerating woody shrubland, with species such *Coprosma cheesemanii* and *C. perpusilla*, *Veronica odora*, *Podocarpus nivalis*, *Dracophyllum*, all apparent in quite dense patches just beneath the surface of *Chionochloa*, visible only at close range in what to the untrained eye seems to be a landscape dominated solely by tussock. We came across a really nice specimen of *Schoenus pauciflorus*, which we spent an inordinate amount of time admiring, in part to get our breath back for the continued climb (1000m ascent). It really was quite a lovely plant though, it must be said.



(Photo: Angelina Young)

Tussock grassland inevitably gave way to a rich tapestry of low growing alpine specialists - we hardly knew where to stand.. and one member adopted a delightful grasshopper-like gait in an attempt not to crush plants underfoot. Some stunted species of note: *Abrotanella patearoa*

(only present in this area, on the Rock and Pillar and Lammerlaw Ranges, as the name suggests), *Kelleria villosa* subsp. *barbata*, *Dracophyllum muscoides*, *Aciphylla hectorii*, *Anisotome imbricata*, *Carex wakatipu*, *Caltha obtusa* (with striking seed pods, a bit like Star Anise), *Celmisia ramulosa* var. *tuberculata* with its tiny and immaculately recurved leaves hiding telltale bright white tomentose undersides (also its silvery sister-species - *Celmisia argentea*), and on a shrubby note: *Myrsine nummularia*, *Veronica propinqua*. Only a few examples of the mind-boggling array present.



(Photo: Angelina Young)

Non-vascular beauties noted on the day included *Thamnolia vermicularis*, *Entoloma perzonatum*, and the intriguing *Lichenomphalia*. A botanical description of the latter left the author's head reeling. Suffice it to say, if you wish to know what it is, know that it is perfectly itself.

The last word might have to go not to a plant at all, but to *Hemideina maori* (Mountain Stone Wētā). Of the four groups of Wētā (Giant, Tree, Cave, and Ground Wētā), this is the single ex-

ample of a Tree Wētā that lives above the treeline (thank you Alan Mark). Many were obliging enough to be gawped at and photographed, and their ability to withstand winter left us pondering the mysteries of life, death and (apparent) resurrection.



(Photo: Angelina Young)

Trip participants:

John Barkla
Jennifer Lawn
Andrew Vikhert
Dhana Pillai
Graeme Ure
Angelina Young

Burns Scenic Reserve Trip, 15th April

Moiria Parker

Leader Robyn Bridges, Gretchen Brownstein, John Barkla, Marilyn Barkla, David Lyttle, Marcia Dale, Moira Parker, Karen Byers, Rosemary Leader, Jennifer Lawn, and Alex Wearing

After a week of wet, dreary weather, it was a treat to meet up on a sunny morning for the Bot Soc trip to Burns Reserve. From the Botany Dept we drove up Signal Hill Road to the parking spot where we met local resident Jim McQuillan. Jim has a keen interest in this area of native bush on DoC land with no public access and gave us a short introduction to the 87ha Scenic Reserve. It was the efforts of local residents in 1907 concerned about the extent of

deforestation that led to government purchase of the land in order to preserve some of the remaining native bush. Burns Scenic Reserve extends from the west end of Ravensbourne below the Signal Hill memorial to the middle of St Leonards. However there is no formed public access from these suburbs and as a result the bush has been largely forgotten.

From Signal Hill Road, we took a steepish gravel road, before turning off into farmland and our access to the bush through property belonging to Bryan Scott. We passed new plantings of *Kanuka robusta*, *Griselinia littoralis* (broadleaf) and *Pittosporum tenuifolium* (kohuhu) which were thriving in their polythene cylinders to prevent rabbit browsing. Stiles at either end kept the stock out with the addition of unusual hinged doors on the lower stile to prevent any adventurous sheep clambering through.

From here we could look over the bush to the

viewpoint Gerry's Knob with Otago Harbour and the Peninsula beyond. Emergent podocarps were visible towering above the canopy. The narrow track, well marked with yellow flagging tape, descended steeply into the bush among a mixture of broadleaved trees including *Fuchsia excorticata* (tree fuchsia), *Melicytus ramiflorus* (mahoe), *Schefflera digitata* (pate), *Pseudowintera colorata* (horopito), *Coprosma* species, *Cyathea smithii* (soft tree fern) and climbers such as *Ripogonum scandens* (supplejack), *Metrosideros diffusa* (white rata vine), *Muehlenbeckia australis* (pohuehue) and *Parsonsia heterophylla* (New Zealand jasmine).

As we descended the slope the canopy increased in height. The damage from recent high winds resulted in foliage lying on the ground which allowed us to identify *Prumnopitys ferruginea* (miro) and *Dacrydium cupressinum* (rimu). Standing in the bush it was difficult to see the tops of these emergent trees and even



The group at the start of the track leading downhill into the bush. (Photo: Moira Parker)

the trunks with their tell tale patterns on the bark this trip. were not easily seen from the track.

Several kanuka branchlets host to *Korthalsella salicorniodes* had broken off in the wind and provided a close up look at this tiny dwarf mistletoe.

In the wet ground along the track there was plenty of variety among the ferns with 4 species of filmy ferns and 16 other fern species including *Leptopteris hymenophylloides*. The highlight for me was the number of *Cyathea smithii* (soft tree fern) growing among the broadleaved trees and how tall they were, some estimated to be 5-6m in height.

On the final section of the track among the kanuka we noticed patches of *Berberis darwinii* (Darwin's barberry) seedlings, but further up the slope saplings were present and on the ridge some sizeable shrubs of this pest plant. Jim McQuillan is keen to find a means to tackle the Darwin's barberry so as to prevent this invasive pest plant from spreading in the Reserve.

On reaching Gerry's Knob we were exposed to the strong Northerly wind and a wonderful view. Marcia was particularly interested to see the layout of bush gullies on the other side of the harbour as these habitats are the last strongholds of Peninsula possums. After a quick snack most of the group headed downhill to see the spectacular *Earina autumnalis* on the rocks below.

From the high point the group scrambled along and down 20m to a steep rocky outcrop with short, 3m tall, Kanuka and 1m wide patches of *Earina* underneath. The *Earina* was just finishing flowering, but its lovely scent was still hanging in the air.

The species list compiled by the group included 4 filmy ferns, 3 tree ferns, 16 other fern species, Podocarps rimu, totara and miro, and the orchids *Earina mucronata* and *Earina autumnalis*. We shall have to do another trip to add the bryophytes and lichens, as we ran out of time on

Most of the group had not previously visited Burn's Reserve, in fact didn't even know that it existed, and it was great to have Jim as our guide for the morning. Now when I look across the harbour from Highcliff Road to a large green rectangle above Ravensbourne and St Leonards I'll know what's hidden below.

For anyone wishing to learn more about the chequered history of Burns Reserve, I recommend this Aug 2022 article in the Otago Daily Times: <https://www.odt.co.nz/lifestyle/magazine/forgotten-wilderness>

Minutes of Botanical Society of Otago AGM, 10th May 2023

Chair: Gretchen Brownstein

Apologies: None given

Meeting called to order at 5:43 pm

Reports

Minutes of the 2022 AGM and the Chair and Treasurer's reports were emailed to members in advance of the AGM, and digital copies were presented at the meeting. The minutes and Treasurer's reports were accepted as read (Moved J. Barkla, seconded A. Knight). Our membership stands at 59 paid members and 2 Life members as of end of March. Our finances are doing well, with again more money in hand than last year.

Thank you to Mary Anne Miller

Many thanks to Mary Anne for serving as Treasurer since the BSO was started back up in 2000. The committee presented a collected bouquet and thank-you card with gift to Mary Anne as she passes the baton.

Election of Officers

The following were nominated from the floor

and elected unopposed.

Chair - Gretchen Brownstein

Vice Chair - John Barkla

Secretary - Angela Brandt

Treasurer - John Knight

Committee members:

Lydia Turley

David Orlovich

Sharon Jones

Allison Knight

David Lyttle

Matt Larcombe

Stella Fish

Jo Sinclair

Other Business

There was no other business and the meeting adjourned at 5:49 pm.

Photo competition results, 10th May

Plant Portrait: "*Clematis foetida*" by John Knight (page 20)

Plants in the Landscape: "*Leucogenes grandiceps* Paparoa" by Rach Baxter (cover)

Mosses, Fungi, Lichens and Liverworts: "*Agroclybe parasitica*" by David Lyttle (page 21)

Members choice: 3-way tie between

"*Ganoderma ursula* surveys a Fiordland forest" by Stella Fish (page 22)

"Red apothecia adorn the grainy splash cups of the Red-fruited pixie cup lichen, *Cladonia pleurota*." by Allison Knight (page 21)

"Masses of *Durvillaea* on the coastline of The Snares heave in the swell, occasionally revealing humanoid faces." by Stella Fish

Judges special prize: "*Ganoderma ursula* surveys a Fiordland forest" by Stella Fish



Species needs renaming: *Clematis foetida* Raoul, should be renamed *Clematis euodia* (sweet smelling Gk) or *hedyosmus* (L) - Tuapeka West (Photo: John Knight)



Agrocybe parasitica: Fruiting bodies of the fungus growing on trunk of living elderberry (Photo: David Lyttle)



Crown jewels: Red apothecia adorn the grainy splash cups of the Red-fruited pixie cup lichen, *Cladonia pleurota*. Raindrops splashing up help disperse the spores. Great Barrier Island (Photo: Allison Knight)

Botanical Society of Otago

Patron: Alan Mark

Website: <http://www.bso.org.nz>Email: bso@otago.ac.nz**Committee 2023-2024**Chair: **Gretchen Brownstein**Vice Chair: **John Barkla**Secretary: **Angela Brandt**Treasurer: **John Knight**Newsletter Editor: **Lydia Turley**Website Editor: **Stella Fish**Publications (Native plants of Dunedin): **David Lyttle**Publications (Lichens): **Allison Knight**University Liaison: **Matt Larcombe**Botanical art: **Sharon Jones**Committee: **David Orlovich**Committee: **Jo Sinclair**BrowsteinG@landcareresearch.co.nzmjbarkla@xtra.co.nzBrandtA@landcareresearch.co.nzjohnknight.otago@icloud.comlydiamturley@gmail.comsls.fish@outlook.comdjl1yttle@gmail.comallison.knight.nz@gmail.commatt.larcombe@otago.ac.nzsharon.jones388@gmail.comdavid.orlovich@otago.ac.nzsowjo313@student.otago.ac.nzPlease submit copy for next newsletter to Lydia Turley by 12th October 2023**This Newsletter was published on 29 June 2023.****ISSN 0113-0854 (Print) ISSN 1179-9250 (Online)***Ganoderma ursae surveys a Fiordland forest (Photo: Stella Fish)*



Membership 2023

Title: Name:

Postal address (work or home):

E-mail address:

Phone: work: () home: ()

	Please tick one box			
	Emailed Newsletter		Hardcopy Newsletter	
Student	\$10		\$20	
General	\$20		\$30	

Subscription Rate (the one ticked above): \$

Donations welcome: \$

Total: \$

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

☐ **Internet Banking:** Account No: 03 0905 0029158 00 (Westpac)

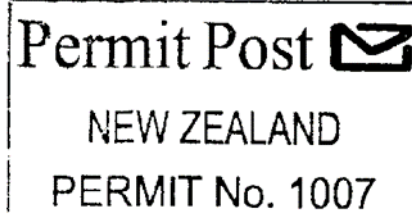
Code: 2023 sub

Reference: *your name*

If a new subscription or details have changed from last year, please send a completed form to the Treasurer at the address below or to bsso@otago.ac.nz

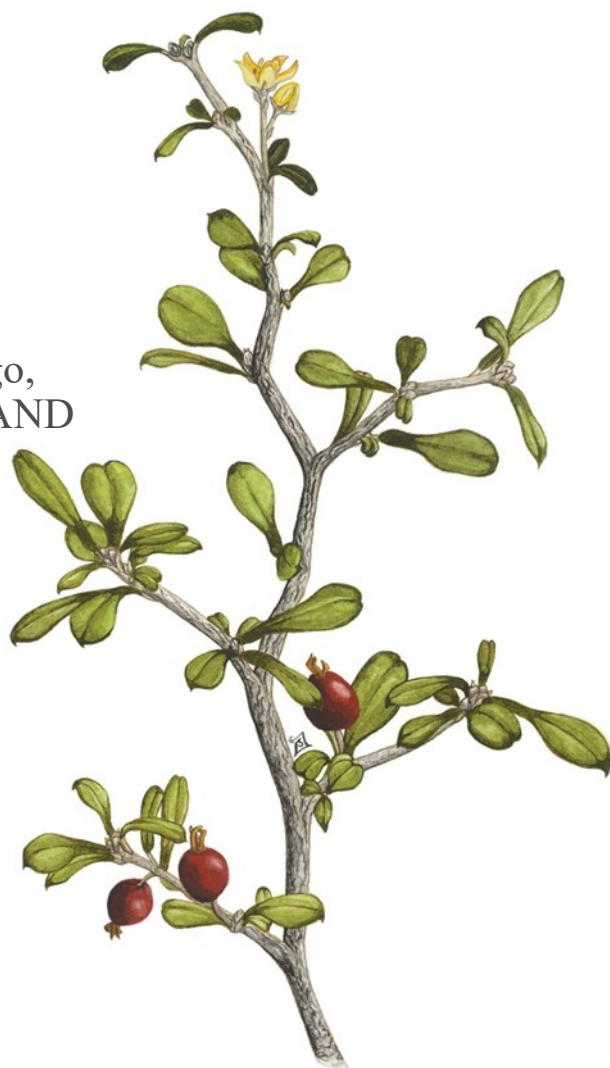
BSO Treasurer,
% Department of Botany
University of Otago
P O Box 56
Dunedin 9054
New Zealand

BOTANY DEPARTMENT
UNIVERSITY OF OTAGO



Botanical Society of Otago,
c/o Department of Botany, University of Otago,
PO Box 56, North Dunedin 9059, NEW ZEALAND

Right: Corokia cotoneaster branch (Artist: Sharon Jones)



BOTANICAL SOCIETY

OF OTAGO