



# BOTANICAL SOCIETY

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## OF OTAGO

### Newsletter Number 61 December 2010

#### **BSO Meetings and Field Trips**

- 7 December, 11:30 a.m. Old Man Range with French Botanic Society.** Members are invited to join the French Botanical Society on their trip up the Old Man Range, guided by Mark Hanger. They aim to be at bottom of the Symes Rd by 11:30 a.m. and are coming from Lake Ohau that morning. Contact: Mark Hanger, 021 680 524, markhanger@naturequest.co.nz. David Lyttle will be taking a 4WD vehicle from Dunedin. If you'd like to car-pool contact him at: 454 5470 or djlyttle@ihug.co.nz.
- 10 December, 12:15 p.m. Meet the French Botanic Society at the Dunedin Botanic Gardens.** Another chance to meet the French Botanical Society. Bring a picnic lunch to the azalea garden, just through from the toilets in the upper Botanic Garden. Contact: Mark Hanger naturequest@ihug.co.nz, 489 8444 or 021 680 524.
- 16 December, 6:30 p.m. End of year Dinner.** Asian Restaurant 43 Moray Place  
Contact Bill Wilson rdwilson-dn@xtra.co.nz.
- 29 December – 7 January, Summer Camp at Boyd Creek, Southland** in conjunction with Wellington Botanical Society. We will be based at the Southland Boys High School hut at Boyd Creek in the Eglington Valley. Botanising possibilities include Lake Marian, Gertrude and Hollyford Valleys, Milford Sound, Key Summit, Eglington Valley, Hutt Creek, Knobs Flat and Boyd Creek tops. Check the Wellington Bot Soc website in October for more details: <http://www.wellingtonbotsoc.org.nz/> or contact Mick Parsons: mtparsons@paradise.net.nz, phone (04) 972 1142.
- 22 January, 9:00 a.m. Field trip to McPhee's Rock, Rock and Pillar Range.** A great chance to experience some wonderful alpine vegetation on the outskirts of Dunedin City. Leader Bill Wilson, rdwilson-dn@xtra.co.nz.

**4 March 12:00 noon–2:00 p.m. Botanical Society Barbeque.** BBQ to welcome new botany/ecology students and new BSO members. At the front lawn, Botany House Annex, Great King Street (across the road from the main Botany building). Sausage sandwiches and drinks provided free by the Botanical Society of Otago. All BSO members welcome!

**Meeting details:** Talks are usually on Wednesday evening, starting at 5:20 pm with drinks and nibbles (gold coin donation), unless otherwise advertised. Venue is the Zoology Benham Building, 346 Great King Street, behind the Zoology car park by the Captain Cook Hotel. Use the main entrance of the Benham Building to get in and go to the Benham Seminar Room, Room 215, 2<sup>nd</sup> floor. Please be prompt, as we have to hold the door open. Items of botanical interest for our buy, sell and share table are always appreciated. When enough people are feeling sociable we go out to dinner afterwards – everyone is welcome to join in. Talks usually finish around 6:30 pm, keen discussion might continue till 7 pm.

**Field trip details:** Field trips leave from Botany car park 464 Great King Street, unless otherwise advertised. Meet there to car pool (10 c/km/passenger, to be paid to the driver, please). 50% student discount now available on all trips! **Please contact the trip leader before Friday for trips with special transport, and by Wednesday for full weekend trips.** A hand lens and field guides always add to the interest. It is the responsibility of each person to stay in contact with the group and to bring sufficient food, drink and outdoor gear to cope with changeable weather conditions. Bring appropriate personal medication, including anti-histamine for allergies. Note trip guidelines on the BSO web site: <http://www.botany.otago.ac.nz/bs/>.

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## Chairman’s Notes

David Lyttle

This year is drawing to a close but there are still plenty of activities to look forward to. There is a trip to the Old Man Range in December with the French Botanical Society and the end of year dinner for BSO members at the Asian Restaurant on the 16<sup>th</sup> December. The joint Summer Camp with the Wellington Botanical Society to be held at Boyd Creek from the 29<sup>th</sup> December to 7<sup>th</sup> January promises to be a great event with many interesting plants to see and places to visit.

The members “Show and Tell” in July brought forth an interesting selection of contributions. Geoff Roger’s presentation on the calibrating the growth rates of bog pine (*Halocarpus bidwillii*) by counting the growth rings on polished specimens of wood was notable as it gave another method of looking at environmental and climatic changes. In the September Baylis Lecture our speaker Phil Garnock Jones presented a very coherent and logical argument on the principles of modern taxonomy leading to the conclusion that unless the taxonomy of the Northern Hemisphere genus *Veronica* is significantly revised, our *Hebes*, *Chionohebes*, *Parahebes*, *Hebejebeies* etc should be placed this genus.

We will be losing the services of one of our long serving Committee members Mike Thorsen who is leaving to take up a position on St Helena and Island in the middle of the Atlantic Ocean most well known as the place of exile of French emperor Napoleon. In addition to being a very good botanist who has always been very willing to share his knowledge Mike has made major contributions to the BSO organising the photo competition and the production of the BSO calendar. Many thanks Mike for all you have done for the Society. We wish both you and Fran all the best in this new venture and hope to see you back at some stage.

I was disappointed that it was necessary to cancel the field trips planned for September to Thisbe Stream, Catlins and October to the McPhee’s Rock, Rock and Pillar Range due to the weather the September trip coinciding with one of the worst storms to hit the South in many years. Although some of our members are very hardy souls there is a limited amount of botanising one can do in the rain/sleet/high winds that occur during these weather events. We plan run both these trips in next years programme as both places are well worth visiting.

## Editor's Notes

*David Orlovich*

**Please submit copy for next newsletter by 18 February 2011.**

**Editor's guidelines:** Try to aim for a 0.5–1 page of 14 pt Times for news, trip/meeting reports and book reviews, and 1–5 pages, including illustrations, for other articles. Electronic submission (by email to the editor: david.orlovich@otago.ac.nz) is preferred.

Send photos as separate files and remember to include photo captions and credits.

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

## Correspondence and News

### The XVIII International Botanical Congress.



The XVIII International Botanical Congress will be held in Melbourne, Australia from 23–30 July 2011. It is being held under the auspices of the International Union of Biological Sciences (IUBS), through the International Association of Botanical and Mycological Societies (IABMS) of the IUBS.

The Convention promises to be an intellectually stimulating and socially memorable occasion and will cover all fields of botanical science, including research on plants, algae and fungi.

Venue: Melbourne Convention and Exhibition Centre, Australia

Expected attendance: Approximately 4000 delegates

Website: <http://www.ibc2011.com/>

Congress Contact: ICMS Australasia on [info@ibc2011.com](mailto:info@ibc2011.com)

### University of Canterbury summer course: Practical Taxonomy for Field Biologists.

Practical Taxonomy for Field Biologists (BIOL305) is an intensive, short summer course designed to meet the need for training in the collection, preparation, and identification of botanical specimens.

Venue: Mountain Biological Field Station at Cass, Canterbury

Dates: 27 January – 4 February 2011

This course will be of interest to amateur botanists, members of the workforce (e.g., Crown Research Institutes, Department of Conservation, Local and Regional Councils, Botanic Gardens, horticulturists and teachers) and biology students who need to acquire or upgrade taxonomic skills and are interested in field ecology, conservation, biodiversity and

biosystematics. The course is targeted at participants with various entry levels: from students with a limited plant knowledge to experienced career professionals.

Visit <http://www.biol.canterbury.ac.nz/bio305> or contact Dr. Pieter Pelsers [pieter.pelsers@canterbury.ac.nz](mailto:pieter.pelsers@canterbury.ac.nz), (03) 364 2987 ext 45605).



The Botanical Society of Otago's 2011 calendar is on sale now

\$20 ea. (or two for \$36)

(add \$2.50 for mail orders)

Available from the Botany Department Reception, University of Otago  
For electronic payment email the Botanical Society of Otago  
([bso@botany.otago.ac.nz](mailto:bso@botany.otago.ac.nz))  
with your name and address and payment details will be sent  
All proceeds to the Botanical Society of Otago [www.botany.otago.ac.nz/bso/](http://www.botany.otago.ac.nz/bso/)

### **Lala Frazer wins the Coastal Otago Conservation Award**

In recognition of her three decades of work to conserve Otago's environment Otago Botanical Society member Lala Frazer was awarded the Coastal Otago Conservation Award during Conservation Week in September. Lala, also a founding member of both

the Yellow-eyed Penguin Trust and Save The Otago Peninsula (STOP), has and will continue to be a tireless campaigner for the protection and future of native plants and animals on the peninsula, good on you Lala and well-deserved.

### **Network Awards recognise Otago plant conservation champions.**

Both Sir Alan Mark and the Orokonui Ecosanctuary were recognised at the recent New Zealand Plant Conservation Network annual conference in Christchurch. Sir Alan together with Colin Ogle took out the Networks lifetime achievement award

for their work protecting native plant life. The Orokonui Ecosanctuary received the community award. All of those honoured have been described as New Zealand's leading guardians of our country's native plants.

### **Sir Alan Mark receives the Charles Fleming Award for Environmental Achievement.**

The 2010 Charles Fleming Award for Environmental Achievement has been awarded to Emeritus Professor Sir

Alan Francis Mark FRSNZ, Emeritus Professor of Botany at the University of Otago, and member of our Botanical

Society. Emeritus Professor Sir Alan Mark is regarded as New Zealand's leading environmental scientist and conservationist. During his long (ongoing) research career he has explored and illuminated the ecology of southern ecosystems, in particular tussock grasslands, wetlands and alpine communities, through many highly influential publications. In announcing

the awards Dr Garth Carnaby, President of the Royal Society of New Zealand, said they recognise the tremendous contribution that scientists in New Zealand are making and the high calibre of this country's researchers.

### BSO Audrey Eagle Botanical Drawing Competition, 15 Sept 2010

Five artists submitted 8 entries of a very high standard this year. They were judged by Audrey Eagle assisted Lorene Cecconi from the Otago Art Society Audrey was delighted that so many had taken up the challenge of illustrating little known and seldom drawn native species. Both judges were impressed at the diversity and high standard of all the entries and wanted to commend them all.

First prize of \$100 went to Alexa DiNicola for her drawing of *Microsorium pustulatum* young and mature fronds. The judges were so impressed by the precision, balance and clarity, and the illustration of key features, that the overall excellence of the picture over-rode the fact that it was not a particularly uncommon subject. Audrey also thought that it

would reproduce well in the Botanical Society Newsletter

Two very different drawings tied for second equal, winning \$50 each.

Cushla McMillan's colour painting of the orange-eyelash lichen *Teloschistes chrysophthalmus* illustrated nicely something common, tiny and very seldom drawn.

Melanie Stephen's drawing of the beautiful filmy fern *Hymenophyllum flabellatum* was also a striking, well balanced, presentation of a seldom drawn subject., with attention to key identifying features.

Prizes were presented at the Baylis Lecture and the pictures were on display in the foyer of the Botany Department for the following week.



Garvie Mountains looking north. Photo by David Lyttle.

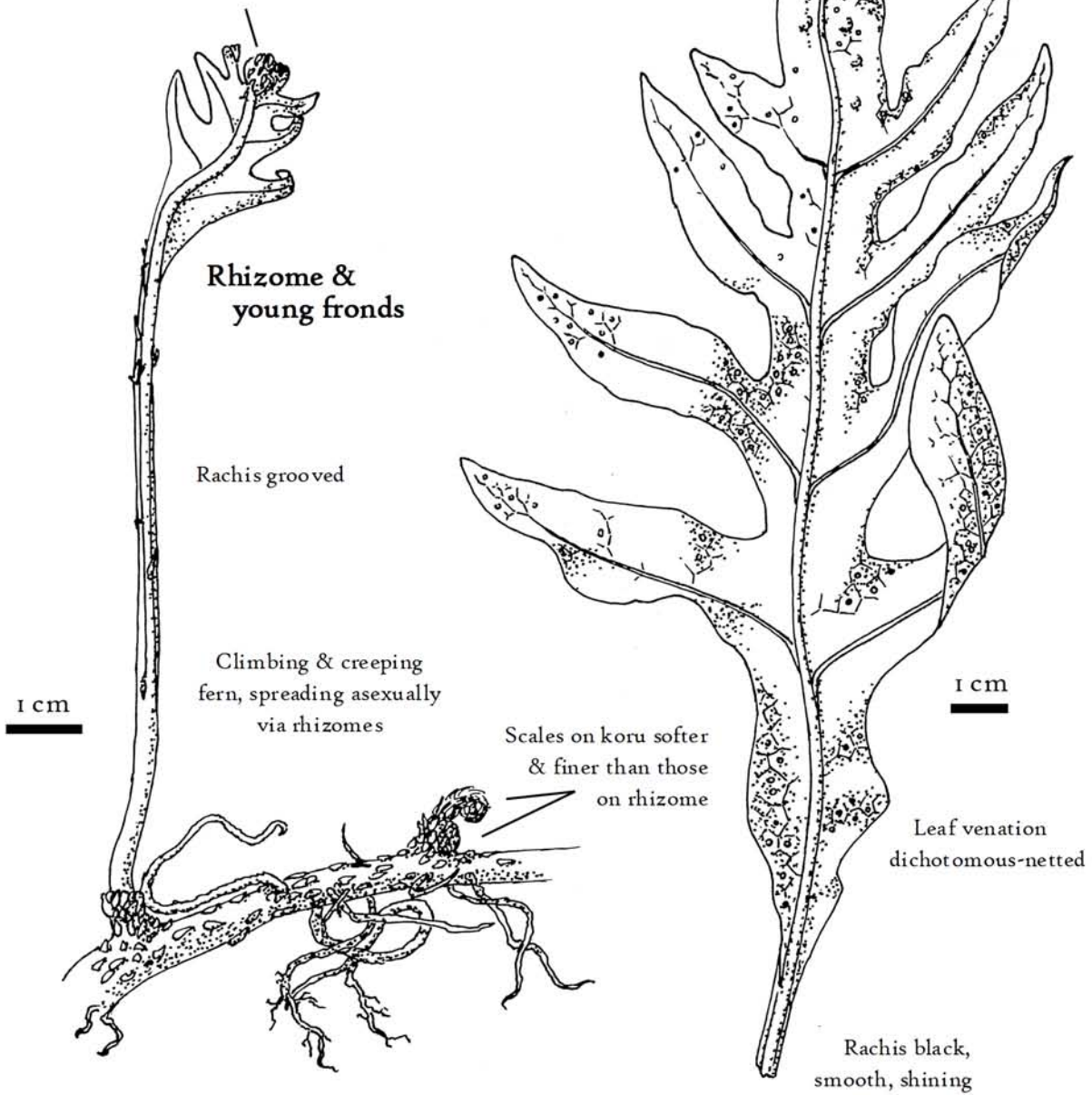
***Microsorum pustulatum***

17/9/2009 Dunedin Botanic Garden, main slope:  
herbaceous layer of *Melicytus-Pittosporum* bush

Member of  
Polypodiaceae:  
note naked sori

Young fronds & rachises  
fresh green, scaly beneath

**Mature frond**



**Rhizome & young fronds**

Rachis grooved

Climbing & creeping fern, spreading asexually via rhizomes

1 cm

Scales on koru softer & finer than those on rhizome

1 cm

Leaf venation dichotomous-netted

Rachis black, smooth, shining

## New Zealand's indigenous vascular plant checklist 2010

Peter J. de Lange & Jeremy Rolfe

New Zealand Plant Conservation Network

A4, 131 pages, soft cover

ISBN: 978-0-473-17544-3



A new indigenous vascular plant checklist for the New Zealand Botanical Region is now available from the New Zealand Plant Conservation Network. The checklist builds considerably on that published by the Network in 2006, providing a comprehensive summary of the New Zealand indigenous vascular flora. As before, it documents the levels of endemism, chromosome counts, threat status, and provides a full listing of families, genera, species and lower ranks (a total of 2414 taxa), but it also includes significant improvements on the 2006 listing. A comprehensive introduction details the nature of the New Zealand flora and the New Zealand Botanical Region, discusses phylogenetic relationships in the flora and the arrangement of taxa listed, and provides summary statistics on several aspects of the flora. The checklist of the vascular flora is rearranged to accord with current understanding of plant phylogeny,

as documented by the Angiosperm Phylogeny Group. To aid finding species in the re-arranged phylogenetic list, a cross-referenced alphabetical list is provided. Both versions of the list are also cross-referenced to a detailed and fully referenced concordance documenting and explaining names that have changed since the 2006 listing. The concordance also provides a detailed assessment of 192 species aggregates and information on newly recorded or accepted species, providing an up to date assessment on the progress being made by plant biosystematists to describe our flora. Additional sections provide comments on some other taxa whose names have not changed and also names which have been rejected.

The revised checklist is a 'must have' for any person with an interest in the New Zealand flora or its biogeography. Designed to be used as a quick off-the-shelf reference, the checklist has been prepared for the Network in cooperation with the Department of Conservation by Peter J. de Lange and Jeremy Rolfe, who have published a number of books dealing with the New Zealand indigenous flora, and who co-authored, with John Sawyer, the 2006 checklist.

*The checklist is available from the Network shop on-line at: [www.nzpcn.org.nz/shop\\_products.asp](http://www.nzpcn.org.nz/shop_products.asp). The price for Network members is \$18 (including post and packaging); non-members (\$25).*





## Articles

### Notes on the fern *Pleurosorus rutifolius* and its present distribution in Central Otago.

*John Douglas, Alexandra.*

The blanket fern (*Pleurosorus rutifolius*), is native to both New Zealand and Australia and can be found growing in crevices and fissures on limestone, basalt, schist and greywacke rock outcrops from near sea level to at least 900 m altitude (Cockayne 1928). In New Zealand, the species has been recorded from coastal to montane locations from the North Island and east of the main divide in the South Island from latitude 38 degrees 30 minutes (Hawke's Bay) to 45 degrees 30 minutes (Allan 1961). This latter South Island latitude is at Roxburgh and from my own observations, is further south than the present distribution of the fern.

In Central Otago it has been historically recorded from Ophir (Blacks), between Cromwell and Tarras, the Dunstan

Mountains (Bendigo), and the western end of Cairnmuir Mountains (Cornish Point, Cromwell Gorge). Although *Pleurosorus rutifolius* has been found at a number of widely scattered sites in New Zealand over at least 150 years very few new sites have been added in recent times eg; the rock bluffs east of Alexandra and the rock bluffs of Mt Difficulty above the Kawarau Gorge. The Mt Difficulty and Cromwell sites were found during field visits to various high country stations as part of the tenure review process. The restriction of the fern to "hot rock" habitats that do not attract the attention of plant collectors contributes to the low reporting of new sites as frequently suitable sites have been overgrown with exotic vegetation and are considered to have little botanical value.



*Pleurosorus rutifolius*, Manuherikia Bridge. Photo by John Douglas.



*Pleurosorus rutifolius* showing sori.  
Photo by John Douglas.

The plant, normally summer green, becomes inconspicuous by mid-summer as the fronds (often only 2 cm long but can get up to 8 cm long) start to wither and then tend to shrivel up, though much depends on the weather. Most ferns have fronds with small hairs while a few seem to lack any hairs on their fronds. August/September is a good time to go looking for this rare fern as it is coming into growth.

One of the benefits of living in Alexandra is the unique surrounding valley and mountain landscape with a wide range of habitats supporting a considerable number of different flora and fauna species that is right on your backdoor. Back in 1998 I came across *Pleurosorus rutifolius* just beside the Manuherikia No 3 Bridge on the outskirts of Alexandra. Later on I located another 4 sites nearby including one that has the biggest colony of the fern that I have come across. Over these last 12 years I have now come across *Pleurosorus rutifolius* on Bridge Hill (4 sites), on the true left side upper section of the Roxburgh Gorge (3 sites), the odd site on the Knobby Range close

to the Roxburgh Gorge (3 sites), rock bluffs east of Alexandra from Graveyard Gully to Tucker Hill (10 sites), the odd large rock outcrop off from Little Valley Road (12 sites) next to the Lower Manorburn Dam (2 sites), Ida Valley side of Crawford Hills (2 sites) and along beside the Otago Central Rail Trail from the Manuherikia No 3 Bridge to the Manorburn Bridge over a distance of 3 km, 30 sites.



Lower Manorburn site. Photo by John Douglas.

This adds up to a total of 66 sites. A few of these sites contain just a single fern though most would have 3–4 ferns per site, which would correspond to a population size of well over 200 individuals. The only common denominator where the fern is found is in the compass arc 200 degrees SSW to 360 degrees N in either rock crevices, rock ledges of under hanging rock faces or under large rock boulders. The fern is very rarely exposed to the direct sun all day. Some sites are exposed to direct late afternoon sun, while other sites are in the shade of either pine trees (*Pinus radiata*), broom (*Cytisus scoparius*), briar rose (*Rosa rubiginosa*), thyme (*Thymus vulgaris*), dry rock fern (*Cheilanthes sieberi* subsp. *sieberi*) or hot rock pellaea (*Pellaea calidirupium*). The liverwort *Plagiochasma rupestre*

may sometimes be found growing close alongside the fern.

The stronghold of *Pleurosorus rutifolius* could be considered to be the rock bluffs east of Alexandra, especially those beside the Otago Central Rail Trail. It is likely that more locations will be found scattered in the rocky territory of the Knobby Range / Crawford Hills / Raggedy Range from above the Roxburgh Gorge / Manuherikia River as far back to Little Valley and to overlooking the Ida Valley. This is a vast area of rock outcrops with numerous suitable rock crevices and ledges and if surveyed would very likely increase the present known distribution of this rare fern.

Other interesting plants often associated with *Pleurosorus rutifolius* include; *Cheilanthes sieberi* subsp. *sieberi*, the native dry rock fern, unlike the majority of other ferns, grows either in open dry and sunny situations or dry rocky places. It is found throughout Central Otago, including the Roxburgh Gorge, Tucker Hill, Conroy's and Falls Dam. In drought conditions, the fern appears to be dead only to be revived after been wetted by rain. If growing in rocky places, it grows to 6 to 10 cm tall, but in the open can grow to 15 cm tall.

*Pellaea calidirupium*, the native hot rock Pellaea, is found in inland rocky habitats in areas of low to moderate rainfall. It grows in crevices and on ledges on exposed or semi-exposed rock outcrops. Fronds may sometimes grow to 30 cm long but only in the

more sheltered situations. It has creeping and slowly spreading rhizomes that may form large colonies. The leaves are glossy green. It is found at scattered locations over much of dry Central Otago.

*Plagiochasma rupestre* is a small liverwort that is widespread around the world. The thallus is 3–5 mm × 5–10 mm, ribbon like, purple tipped, green to light green in colour, often forming large colonies that can be many centimetres across. It grows on dry rock faces, bedrock and crevices on soil sheltered from the rain. In Central Otago it has been found at Lake Wakatipu, Luggate and Alexandra.

Amongst the many exotic plants that you encounter when looking for *Pleurosorus rutifolius* are scattered remnants of the original native vegetation; *Carmichaelia compacta* (Cromwell broom), *Corokia cotoneaster*, *Gaultheria antipoda* (bush snowberry), old shrubs / trees of *Olearia lineata* and *O. odorata*, *Pimelea aridula* (native daphne), small stands of *Kunzea ericoides* (kanuka), *Sophora microphylla* (kowhai), *Melicytus* sp. and *Helichrysum intermedium*.

Allan HH 1961. *Flora of New Zealand* Vol. 1. Government Printer, Wellington. 1085 pp.

Cockayne L 1928. *The Vegetation of New Zealand* 2nd ed. Leipzig. 456 pp.

## **Additional observations on the fungus *Chondrostereum purpureum* in the Dunedin area.**

*David Lyttle*

*Chondrostereum purpureum*, the fungus responsible for silver leaf disease, was reported in the last issue of the *BSO Newsletter* (60, 22–23). It is a major problem in the stone fruit orchards of Central Otago. Typical symptoms are the silvering of leaves followed by the dieback of affected branches. The pathogen causes ill-thrift of the tree and loss of production and will eventually kill the affected tree. The fungus initially infects trees through pruning cuts or wounds. Pruning at times when fruit bodies are not shedding spores and removing affected branches before the entire tree is infected are the most effective measures for controlling the disease.

The pathogen appears to be reasonably widespread in the Dunedin area and I have observed it on cherry plum (*Prunus*) and apple (*Malus*) trees on my own property. Typically it causes dieback of entire branches and usually kills the host tree though trees may re-establish from root suckers. It seems to be particularly devastating on apple trees. The host range includes poplars, willows, silver birches, eucalypts and roses. It is likely that hawthorn (*Crataegus monogyna*) is also a host though I have not observed symptoms on this species. Death of the host seems to promote the production of fruiting bodies and these often appear on cut stumps and dead branches in the autumn.

## **Lost and found: Records of uncommon plants from the Otago Peninsula.**

*David Lyttle*

On a recent trip to Sandymount I located specimens of two uncommon plants. The first of *Raukaua anomalus*, was listed from Sandymount by the Dunedin Naturalists Field Club in 1932 and a single shrub was again recorded by Brian Rance in 1986. The genus *Raukaua* in New Zealand contains three species, *Raukaua anomalus*, *Raukaua edgerleyi* and *Raukaua simplex*. Previously these three species were included in the genus *Pseudopanax* but the genus *Raukaua* was reinstated in 1997 (Mitchell et al. 1997). Several other species of *Raukaua* are found in Chile and Tasmania. *Raukaua anomalus*, unlike

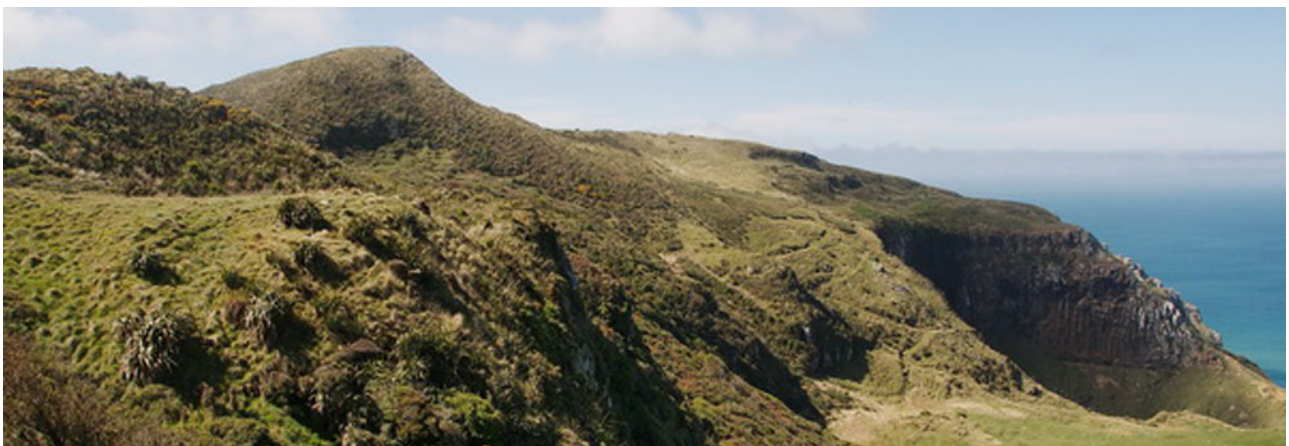
its immediate relatives, is a divaricating shrub and its inflorescence is a simple umbel. *Raukaua anomalus* is found sporadically at various localities round Dunedin but is nowhere common. The Sandymount specimen is a wind-shorn divaricating shrub indistinguishable at a distance from *Coprosma propinqua* which is common in the area. The shrub is not particularly accessible and can only be identified by close examination so it is not surprising it has been overlooked for 24 years.



*Raukaua anomalus*. Sandymount.  
Photo by David Lyttle.

The second find was an intergeneric hybrid between *Helichrysum lanceolatum* and *Anaphalioides bellidioides*. This particular hybrid has an interesting history. It was described by Petrie in 1890 and named *Helichrysum purdiei* before its hybrid origin was recognised. The collection location was cited as Dunedin Harbour. It was recorded from Portobello in the 1932 catalogue of the Dunedin Naturalists Field Club. It is a trailing lianoid shrub resembling its parent *Helichrysum lanceolatum*. The

capitula, which are borne in small tight clusters, were not fully opened and also resembled those of this parent. The named cultivar *Helichrysum* 'Graeme Patterson' is another hybrid between *Anaphalioides bellidioides* and the local endemic *Helichrysum intermedium* (= *H selago* var *tumidum*) which is restricted to Cape Saunders and Sandymount. The original plant was collected from Cape Saunders. Two more species also present at Sandymount that could possibly enter the mix are *Helichrysum filicaule* and *Anaphalioides hookeri* (formerly known as *Gnaphalium hookeri*). Modern phylogenetic studies have revealed a New Zealand clade in the Australasian gnaphalioid Asteraceae that consists of species included in *Anaphalioides*, *Ewartia*, *Helichrysum*, *Leucogenes*, *Rachelia* and *Raoulia*. Not surprisingly many so called intergeneric hybrids have been recorded over the years. These delight horticulturalists but tend to irk and frustrate professional taxonomists.



Sandymount, Otago Peninsula. Photo by David Lyttle.

## References

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- Johnson PN 2004. *Otago Peninsula Plants. An annotated list of vascular plants growing in wild places*. Save the Otago Peninsula (STOP) Inc., Portobello. Dunedin
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- Mitchell AD, Frodin DG, Heads MJ 1997. Reinstatement of *Raukaua*, a genus of Araliaceae centred in New Zealand. *New Zealand Journal of Botany* **35**, 309–315

## Plant profile: *Lepidothamnus intermedius* (Kirk) Quinn

Hannah Harland\* and John Steel

*Lepidothamnus intermedius*, the yellow silver pine or mountain pine, is a slow-growing podocarp more common on the West Coast and Stewart Island, but can range as far north as the Bay of Islands. Like many of our podocarps, identification can be a bit tricky for the larger trees as they tend to hide their heads 15 metres or more up in the canopy so it pays to look round for juveniles or adults that have branched off near the base—a common feature with this species. The bark is thin and flaky and varies in colour through dark brown, grey brown to a weathered grey usually broken by the reddish patches left when bark flakes fall off.

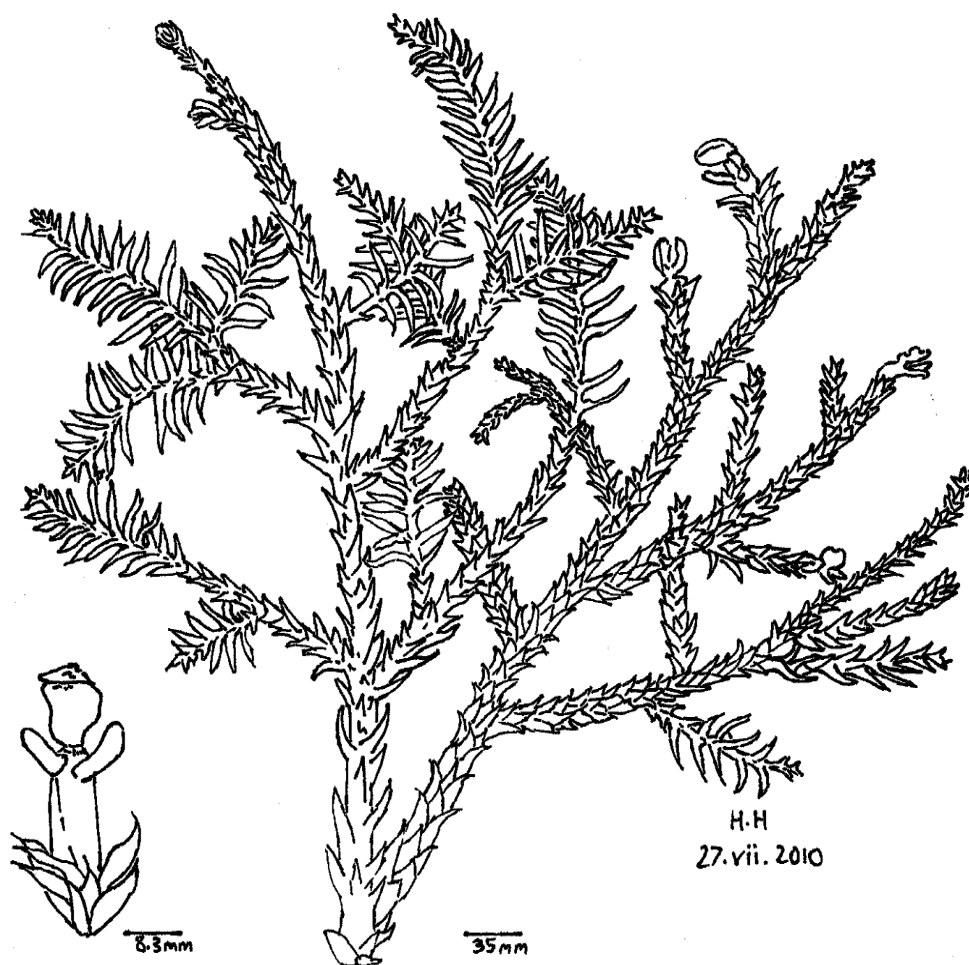
Its best feature is the marked difference between adult and juvenile leaves, which commonly occur together on the same branchlets. The latter, about 1 cm long, stand out from the stem in two rows approximately in the same plane, whereas the former are scale-like, about 5 mm long and in roughly four rows round the stem. Younger trees especially can be quite scruffy and drab, but those specimens that hold

to a single trunk develop an elegant, domed crown and it is worth trying to find a good example. They prefer wet, boggy areas and swamp forests, often of low fertility, from sea level to about 1000 metres.

There are only three species in the genus, one of which is endemic to Chile and the other two are found only in New Zealand. *L. intermedius* hybridises with *L. laxifolius*, the ground-hugging pygmy pine, occasionally seen in the garden centres as ‘Green Cascade’.

Once highly valued for its straight-grained wood and durability, which made it ideal for boat building and outdoor use, it is now fully protected.

\* Hannah Harland is a first year student of the Department of Botany at Otago and her drawing of *Lepidothamnus intermedius* was her entry for the 5<sup>th</sup> Audrey Eagle Botanical Drawing Competition.



*Lepidothamnus intermedius*. Drawing by Hannah Harland.

## Meeting and trip reports

### Orokonui Ecosanctuary Workshops—Revealing new worlds to the uninitiated

*Alyth Grant*

BSO botanists have reached a new group of potential enthusiasts this year—the membership of the Orokonui Ecosanctuary. In a new venture for the Ecosanctuary, a series of talks and workshops was organised to which BSO botanists have made a generous and valuable contribution. David Orlovich, Maia Mistral and Allison Knight have all led workshops on fungi, mosses and lichens, with John Steel on ferns still to come. (The huge

bounty of offerings during the Science festival led to the postponement of the last of the “Tiny Taonga” series, but we look forward to that in next year’s programme.)

For many of the participants in these workshops it was an entirely new experience to examine the finer details of lichens, mosses and fungi under microscopes (generously loaned by the Botany Department of the University).

Those with years of experience behind them in laboratories have probably forgotten their first wonder, but I had never seen living cells before, and was entranced. Even going out into the field armed with pocket lenses after having learned what to look for from helpful Powerpoint displays was a revelation in seeing. Moving round the Ecosanctuary has consequently become a much more intense experience for me. I was astounded at the number of different fungi we found in one

morning on the fungi foray, and the variety of mosses and lichens at my feet. I now look down as much as up when walking through the bush. I may never become any sort of expert, but watching the excitement and delight of Alli and Maia in discovering the wealth of specimens in what seemed like an ordinary patch of Kanuka forest was highly infectious – enough to make me want to join the Botanical Society and go off to Fiordland in the summer to learn some more.

### **Botany Colloquium winners.**

The winners of the prizes at the Botany Postgraduate Research Colloquium 5 presented their talks to an attentive audience at BSO on 20<sup>th</sup> of October.

The prize winners were Rebecca James, Sharon McKenzie and Ben Myles.

*Will ocean acidification affect the carbon physiology of macroalgal communities?*

Rebecca James<sup>1</sup>, Chris Hepburn<sup>2</sup> and Catriona Hurd<sup>1</sup>

<sup>1</sup> Department of Botany, University of Otago, Dunedin

<sup>2</sup> Department of Marine Sciences, University of Otago, Dunedin

The oceans have absorbed up to one third of the anthropogenically released CO<sub>2</sub>. This large input of CO<sub>2</sub> into the oceans reduces the pH of the seawater and adjusts the availability of the three main species of inorganic carbon present: carbon dioxide, bicarbonate and carbonate. It is commonly assumed that algae are not limited by carbon, however this has never been tested with New Zealand macroalgal communities. If macroalgae are not limited by carbon, then the change in the inorganic carbon species caused by ocean acidification should have little affect on their photosynthetic ability. Seven macroalgal communities around

Otago were selected according to their wave exposure. The macroalgal community composition was determined at each site and carbon stable isotope signatures of all species present within the sites were measured. These measurements show us the main type of inorganic carbon that the macroalgae use. The carbon usage was compared between wave exposed and wave sheltered sites, to examine whether water motion has an affect on the carbon usage of macroalgae. This information is then used to investigate whether different macroalgae community types will be affected by ocean acidification in differing ways.



*Investigating the identity of Hypochaeris Mosaic Virus*

Sharon McKenzie, Paul Guy.

Department of Botany, University of Otago, Dunedin

Hypochaeris mosaic virus (HMV) naturally infects *Hypochaeris radicata* and *Leontodon autumnalis*, which are both in the tribe Cichorieae, family Asteraceae. The geographical distribution of HMV has been recorded in Canada, Australia, and Germany. This is the first record of HMV in New Zealand. HMV is currently classed as a furovirus, a classification that is questionable. It has been proposed that HMV shares a closer relationship with tobnaviruses rather than furoviruses. This study aimed to resolve this taxonomic dispute, and to describe some of the epidemiological and ecological traits of HMV as there currently exists little information about the virus.

In this study, HMV was found to react with Tobacco rattle virus (TRV; type member of tobnavirus) antigen in DAS-ELISA tests. This finding supports the placement of HMV in the genus Tobnavirus rather than in the genus Furovirus. Using transmission electron microscopy HMV was observed to consist of fragile, rigid rod shaped particles with a clearly defined central

canal. The mean diameter of viral particles was 22.9 nm. Lengths of particles ranged from 91.7–269.2 nm, with the most predominant lengths occurring between 250–270 nm. These properties are consistent with those of viruses in the genus Tobnavirus.

Evidence was found for seed transmission of HMV in *H. radicata* plants. Progeny of infected parental plants displayed obvious symptoms of infection such as chlorosis and chlorotic lesions. Infection of the plants was confirmed using DAS-ELISA. The finding that HMV is able to be transmitted through seed is significant as the mechanism of dissemination and perpetuation in the field was previously unknown.

Results from the DAS-ELISA test also suggest that HMV is present in the roots of *H. radicata*. The presence of the virus in the root tissue suggests that HMV may have either a nematode or fungal vector. Previous studies have recorded the presence of nematode species that are known to transmit tobnaviruses around the roots of plants infected with HMV.

*Towards an understanding of the New Zealand “beech gap”: phylogeographic evidence from Nothofagus menziesii chloroplast DNA*

Ben Myles<sup>1</sup>, Jon Waters<sup>2</sup>, David Orlovich<sup>1</sup> & Michael Knapp<sup>3</sup>

<sup>1</sup> Department of Botany, University of Otago, Dunedin

<sup>2</sup> Department of Zoology, University of Otago, Dunedin

<sup>3</sup> Department of Anatomy & Structure Biology, University of Otago, Dunedin

New Zealand has a wealth of endemic tree species, but for the vast majority we have little idea about the intraspecific patterns of population connectivity and diversity. Many of the taxa exhibit striking biogeographic disjunctions, that have often been explained by range fragmentation and/or long-distance dispersal events—but in the absence of molecular data these explanations remain difficult to substantiate. Here we investigate the phylogeography of the iconic “beech-gap” species *Nothofagus menziesii* (silver beech) using 2405 base pairs of DNA from five chloroplast markers: *accD-psaI*, *atpB-rbcL*, *trnE-T*, *trnL-F*, and *trnL*. Nine haplotypes are recovered from the 44 populations (63 individuals) sampled, and these exhibit strong biogeographic structure, with

large regions often dominated by a single haplotype. Of particular interest is a phylogeographic split detected between northern and southern South Island haplotypes, consistent with glacial isolation across the “beech gap”. Molecular dating and ancestral area analysis methods are employed to help elucidate species history. Broadly, molecular clock analysis of the chloroplast markers—constrained by fossil data—implies that the most recent common ancestor to the nine *N. menziesii* haplotypes dates back to the late Miocene. However, despite a deep history of evolutionary diversification within the species, it seems that much of the South Island distribution can be explained by recent expansion from glacial refugia.

### A brief trip to northwest Arkansas

Many members will know Dr Steven Stephenson, who first came to New Zealand from Fairmont State College in West Virginia. Dr Stephenson now works at the University of Arkansas, calling Fayetteville in northwest Arkansas home. Dr Stephenson has given several talks to the BSO, and either led or participated in several field trips, the last of which was to Allison Knight’s bush at Tuapeka West. Dr Stephenson is a world expert in plasmodial slime moulds, also known as myxomycetes or myxogastrids. He is also an accomplished plant ecologist, with an interest in mycorrhizal fungi. In late October this year I was lucky enough to have the opportunity to visit Dr

*David Orlovich*

Stephenson and some of his colleagues and students in Arkansas, so I thought I’d tell members about the trip. I was invited to give a Department seminar and also a lecture to the *Advanced Mycology* class, and I presented some of my research on ectomycorrhizal fungi in New Zealand, including work done with Otago Students Melanie Stephen, Suzy Draffin and Suli Teasdale on work at John and Allison Knight’s bush and on the West Coast. The professor who took the advanced mycology class was Dr Fred Speigel, a protostelid expert and Chair of the Department of Biological Sciences, whose daughter studied at Otago several years back. Dr Speigel accompanied Dr Stephenson, Suzy,

Rob Daly and me on a trip to the West Coast back in 2004 when we discovered the ectomycorrhizal canopy roots in the silver beech trees, so the audience included several people with some knowledge and interest in New Zealand (in fact another professor in the audience said he had a tuatara skeleton in his lab!). PhD student Maureen McClung, who is now studying the effect of declining oak forests on bird populations in Arkansas, completed a Postgraduate Diploma of Science in Ecology at Otago in 2002, so you should be getting the impression by now that I found a surprisingly large number of connections between New Zealand and northwest Arkansas, a great deal of fondness for our place, and a strong desire from many people to visit here! This was in part facilitated by the long-standing links Drs Stephenson and Spiegel have to New Zealand, but also the simple attraction our unique environment holds.

Fayetteville airport is about an hour flight north-east of Dallas, and flying in to it at this time of year was really beautiful as the leaves on the trees are all turning shades of reds, oranges, browns and yellows. I'm told the fall colours were a bit dull this year, and that the intensity of the colours is determined by a complex set of factors including the length and warmth of the previous summer. Nonetheless it was very pretty for a fall-colour novice like me! The weather at the time I visited was perfect—days in the mid-20's (Celsius!) and nights getting down close to 0°C. It is pretty hot and humid



Dr Steve Stephenson showing off his moist chamber collections in the lab

in the summer, but the winters rarely get too far below zero in this part of the country, and snow only lasts for a few weeks each year on average. The University of Arkansas was founded in 1871, only two years after the University of Otago, so it has a long history and the general feel of the place is that it is well established. They have a great tradition where the names of all graduates from the University are engraved in the sidewalks around campus. I met with numerous graduate students, including Paola Barriga who is studying the relationship between ants and the plant genus *Cecropia*, which has hollow stems and provides a home (and specialised food bodies) for the ants in Ecuador. Strangely some species of *Cecropia* don't associate with ants, and one aspect of her work is to find out why. I met student Laura



*Lycogala epidendrum* growing on a fallen log at Devil's Den.

Walker, who is embarking on an ambitious project to discover the diversity of myxomycetes in soil using new high-throughput DNA sequencing technology. The importance of soil myxomycetes in regulating soil bacteria (myxos eat bacteria!) is only just beginning to be appreciated, so Laura's work will be met with great interest by those wanting to better understand how nutrient cycling happens in soils. In talking with Laura about the diversity of soil organisms, it became very obvious that the immediate future of this type of research lies in high-throughput DNA analysis (called "pyrosequencing"), and I am certainly going to explore this type of analysis for mycorrhizal

research back here. Luckily Otago has the capacity to do this analysis, so getting funding to use the machines is the main hurdle to overcome. Katie Winsett, who just completed her PhD on the myxomycete *Didymium*, gave me a great tour around campus. Katie is actively looking to visit New Zealand and expand her expertise into mycorrhizal research.

My visit was concluded by two days of field trips, first to Devil's Den, part of the Ozark National Forest. Devil's Den was a sandstone plateau that has been eroded over time to create a hilly area deeply divided by crevices and caves. The forest there was a mixture of several species of oak, sweet maple,



Overlooking a battlefield at Pea Ridge.

elm and liquidambar. I was hoping to see a lot of mushrooms fruiting in the forest, but the weather had been unseasonably dry and the mushroom season hadn't arrived yet. We did find a lot of slime moulds though, and I couldn't help but notice that the large amount of woody debris on the ground seemed to give the slime moulds a place to fruit. The second day in the field was to the north of Fayetteville, at a place called Pea Ridge. It too was a mixed oak forest, and with a notable amount of cedar growing there too—in fact, the locals believe the cedar population is increasing, and Dr Stephenson has a project to determine the age structure of the cedar. Pea Ridge was on the route taken by Native

Americans who were forcibly driven into Oklahoma in the early 1830's along the "Trail of Tears", and was also the site of a civil war battle in 1862 where Arkansas confederates fought Union soldiers from Missouri. I gather Missouri had already joined the Union, but there was much resistance to this in that state as well as in Arkansas, so when the battle was won by the outnumbered Unionists it made sure Missouri remained under Union control. It was pretty amazing to think that what is now a beautiful forested area interspersed with fields divided by unique split-rail fences was once the site of a battle of 26,000 soldiers. The Elkhorn Tavern housed a makeshift hospital and I met a very entertaining

local who told all sorts of wild stories including one about amputated limbs being thrown out the window to wild hogs who ate the limbs and spat out the bullets!

I left northwest Arkansas with my head buzzing from all the interesting discussions I had with students and staff at the University, a great appreciation of the beauty of the oak

forests and a real excitement to return. I met a lot of people who were thrilled to learn more about New Zealand and those that had been here already certainly indicated a desire to come back again! I was looked after very well by Steve and Barbara Stephenson and thank them both for their warm hospitality and for the opportunity to visit their hometown.

**The scree buttercup, *Ranunculus piliferus*, flowering at Mid Dome on Saturday 27<sup>th</sup> November 2010.**



Photo by David Lyttle.

## Botanical Society of Otago: PO Box 6214, North Dunedin 9059, NZ

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### Committee 2010–2011

Chairman: **David Lyttle**

[djlyttle@ihug.co.nz](mailto:djlyttle@ihug.co.nz)

Secretary: **Allison Knight**

[alli\\_knight@hotmail.com](mailto:alli_knight@hotmail.com)

Treasurer: **Rebecca James**

[jamre398@student.otago.ac.nz](mailto:jamre398@student.otago.ac.nz)

Communications: **Robyn Bridges**

[robyn.bridges@otago.ac.nz](mailto:robyn.bridges@otago.ac.nz)

Program Manager, Trips: **Mike Thorsen**

[mthorsen@doc.govt.nz](mailto:mthorsen@doc.govt.nz)

Web & Newsletter editor: **David Orlovich**

[david.orlovich@otago.ac.nz](mailto:david.orlovich@otago.ac.nz)

Committee:

**John Barkla**

[jbarkla@doc.govt.nz](mailto:jbarkla@doc.govt.nz)

**Max Crowe**

[croma101@student.otago.ac.nz](mailto:croma101@student.otago.ac.nz)

**Tina Summerfield**

[tina.summerfield@otago.ac.nz](mailto:tina.summerfield@otago.ac.nz)

**Bastow Wilson**

[bastow@otago.ac.nz](mailto:bastow@otago.ac.nz)

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