



BOTANICAL SOCIETY

OF OTAGO

Newsletter Number 67 October 2012

BSO Meetings and Field Trips

3rd November Saturday Field Trip to Catlins Mohua Park is a 14 hectare private forest reserve owned by Fergus and Mary Sutherland. Eight hectares are varied native forest - mature podocarp, mature silver beech and secondary growth podocarp. Some of the special features of the native forest include the many matai, lowland ribbonwoods, kaikomako and small-leaved milkwoods. The native forest area is protected by a QE II open space covenant and is especially rich in bird life as a result of continuously maintained predator control. There are also three hectares of planted forest - the bulk of which is radiata pine, as well as a recently established deciduous woodland. The native forest on the property was preserved as a steading around the hill-top homestead of Tawanui's sawmill owner and manager: J. R. Wilson. The old homestead was built in the 1920's, and has a well established garden and lawn. Fergus and Mary have built four tourist accommodation eco cottages on the property and they also use it as a base for their Catlins eco tours. More information about Mohua Park, including a video, can be seen on their website: www.catlinsmohuapark.co.nz
Location: 744 Catlins Valley Road, Tawanui - sign-posted off the Southern Scenic Routes 10 kms south of Owaka. Meet 8.30 am at the Botany Dept Car Park, 464 Great King St. Distance 127 km. Return time 6 pm. Contact: Allison Knight, Ph: (03) 487 8265. For a plant list, map of tracks and more information see the BSO website.

14th November 5.20 pm. Interesting Local Lichens. Our speaker Lars Ludwig, will talk about his PhD research, focusing on the reproductive ecology of the rare but eye-catching subalpine lichen *Icmadophila splachnirima*. He will also present some interesting lichenological discoveries from the Dunedin area.

5th December End of year dinner at Harvest Court. Start time: 7:00 pm. Finish time 10:00 pm. always a fun and popular event! We have two special guests of honour, Mary Anne Miller and another popular, long-standing stalwart from the Botany Dept. This is your chance to thank them for all the wonderful support they have given the Botanical Society over the years. Meet and enjoy dinner and good company at the Golden Harvest Chinese Restaurant, Harvest Court Mall, 218 George St, Dunedin. Make sure you let Bill Wilson know if you'd like to come. Contact: Bill Wilson, phone: (03) 477 2282, email: rdwilson-dn@xtra.co.nz

8th/9th December Weekend Field Trip to the St Marys Range, North Otago. A trip led by David Lyttle. Contact [David Lyttle](mailto:David.Lyttle@xtra.co.nz), Ph: (03) 454 5470.

29 Dec – 7 Jan 2013 Trips around Arthurs Pass Wellington Botanical Society invites BSO members to join them at its annual “camp” at the Arthurs Pass Outdoor Education Centre from the afternoon of Saturday 29 December 2012 to the morning of Monday 7 January 2013. Information about the Centre and its location are on <http://www.apoec.org.nz/index.html>. Accommodation is in bunk rooms, at \$20 per night. The centre can sleep 45 people. Catering arrangements have yet to be settled. If you would like to register an expression of interest then let Rodney Lewington know on rodneyil@clear.net.nz. You will then be kept up to date as arrangements are finalised. Firm registrations with a deposit of \$200, will be called for in early October. A further payment will be required in the third week of December so as to cover most of the anticipated cost.

Wednesday 27 Feb 2013 Tales from the Southern Ocean A talk by John Barkla. John recently visited the NZ Subantarctic Islands and Australian Macquarie Island during an ocean voyage to and from the Antarctic Continent. His presentation will celebrate the lush and colourful subantarctic vegetation and the monochromatic world of Antarctica and its wildlife. At 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, Rm. 215, 2nd floor. Please be prompt as we have to hold the door open.

Wednesday 27 March 2013 High Arctic Hijinks; Flora, Fauna and Darkness A talk by Lorna Little. Lorna has visited the archipelago of Svalbard (72°N to 81°N) as part of her PhD studies. Her presentation will describe some her PhD work looking into flower colour, and will share some of the interesting botanical aspects of her fieldwork, as well as what life can be like in this Arctic region. At 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, Rm. 215, 2nd floor. Please be prompt as we have to hold the door open.

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, 2nd 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

We are rapidly approaching the end of another year. It has been a busy year for the Society as we have conducted very active programme of meetings and field trips. Highlights of the past month were the field trip to the DOC Chapman Road and Springvale reserves at Alexandra to see the native spring annuals. In the context of the New Zealand native vegetation these tiny plants are highly unusual and are now restricted to unfavourable sites such as saline soils where competition from exotic weeds is minimal. The visit to the Hocken Library to see the Bank's *Florilegium* proved very popular. As a bonus, illustrations by John Buchanan, the noted colonial botanist, artist and explorer, were on display.

On the 29-30th November a Symposium celebrating the works of John Buchanan will be held at Salmond College here in Dunedin. BSO members are welcome to attend. The details of this event and the programme are included in this newsletter. John Buchanan has several plants named in his honour, one of the more spectacular being the alpine buttercup *Ranunculus b Buchananii* found growing in profusion on Mt Burns.

There are two further meetings this year in October and November followed by the end of the year dinner in December. We are planning a field trip in November to Fergus and Mary Sutherland's property Mohua Park in the Catlins and another trip to the St Marys Range in North Otago where we hope to see the magnificent scree buttercup *Ranunculus acraeus* in flower. Both these field trips promise to be of exceptional interest to anyone who wishes to come.

Next January (dates 21st – 25th) the VII Southern Connection Congress will be held at University of Otago. A number of our members will be attending and presenting papers. The Congress will also serve as the occasion for the launch of Alan Mark's new book *Above the Treeline: A nature guide to the New Zealand mountains* on the 21st.

In February, the BSO programme for 2013 starts with a field trip to the Aramoana Salt Marsh on the 2nd followed on the 27th of the month by a talk by John Barkla entitled *Tales from the Southern Ocean*. John is an accomplished photographer and lecturer and his talk promises to be one of the highlights of the new year.

Now for a grumble – we keep doing all this marvellous stuff but we are finding it difficult to persuade people to write accounts of the talks and field trips for the newsletter. It is the Committee's wish that we keep our members informed of what we are doing and have as great a variety of different views and perspectives on our activities published in the newsletter as possible. Anyone who is willing to contribute trip and meeting reports, articles or photographs please get in touch with Lorna or me.

Department of Botany Student Colloquium

The University of Otago Botany Department holds an annual Colloquium organized by the post graduate students where students and staff talk about their projects. The BSO sponsors three student prizes in the expectation that the winning talks will be given a second airing to the Society at a later meeting. We do this for two reasons; to keep the BSO members informed on the botanical research that is being conducted in the University, and to encourage the students to present their work to

a lay audience in the hope that as their careers progress, they will always be able to communicate their science effectively to the public.

The guest speaker, Professor Keith Hunter gave a talk entitled “What controls phytoplankton productivity in the ocean”. The question that was asked was fairly simple i.e. does the availability of iron limit the growth of phytoplankton in the open ocean and the answer was equally simple – yes it does. However, arriving at that answer required the commitment of huge technical and financial resources for an expedition to the Southern Ocean to chuck about 4 tonnes of ferrous sulphate over the side of the boat, water sampling and analysis, satellite monitoring of chlorophyll concentration and a network of international collaborators. The justification for the massive expenditure on this type of research is that phytoplankton productivity determines the rate carbon sequestration by the ocean which is an important question in relationship to atmospheric CO₂ levels, ocean acidification, global warming and rising sea levels.

Following the theme of increasing atmospheric CO₂ levels and its effect on phytoplankton, Yuanyuan Feng presented a talk entitled “Long-term effects of CO₂ and temperature on the coastal diatom *Cylindrotheca fusiformis*” where she presented data from a laboratory based study on the effects of culturing this organism under different CO₂ concentrations and temperature conditions. For this talk she was awarded the prize for the best presentation by a PhD student.

Jocelyn Chua was given a special Judges Merit Prize for her presentation entitled “Gene expression indicates a zone of heterocyst differentiation with the thallus of the cyanolichen *Pseudocyphellaria crocata*”. This work was published online in the prestigious international Journal New Phytologist (Chua

JPS, Wallace EJS, Yardley JA, Duncan EJ, Dearden PK, Summerfield TC. 2012. Gene expression indicates a zone of heterocyst differentiation within the thallus of the cyanolichen Pseudocyphellaria crocata. New Phytologist 196: 862–872.) and a coloured figure from it will be used to illustrate the cover of the November 2012 print edition. I quote the New Phytologist commentator; ‘*The Summerfield team selected an elegant, new approach for exploring the sites of heterocyst differentiation and the areas of highest levels of nitrogen fixation within the cyanobacterial cell population of young and mature thalline areas.*’

The judges found it difficult to choose a winner for the best MSc presentation so awarded equal prizes to Maxime Corral for his presentation, “Effect of *White Clover Mosaic Virus* (WCIMV) on fitness and nutritional value of white clover (*Trifolium repens*)” and to Janine Wing for her presentation, “Burning tussock grasslands: implications for Amphipods (Crustacea: Amphipoda)”. As the titles indicate these were two very different projects. Maxime’s project examined the effect of WCIMV infection on the productivity of white clover. Janine’s project was looking at the usefulness of amphipods as biological indicators to monitor changes in tussock grasslands following burning.

Not to be outdone by the students, a consortium (which include several long-standing BSO members) lead by Janice Lord solved some long-standing puzzles with respect to the biology of the alpine lichen *Thamnolia vermicularis*. This lichen produces reproductive structures termed pycnidial conidiomata which account for its global dispersal and distribution, a fact that was reported in the 1850s but ignored by the English language literature for over 100 years. The lesson from this study is to trust your own eyes when looking at an organism you are

interested in and don't accept the literature as the revealed truth. Janice has written an article for this newsletter based on her talk.

Botany students travel to some strange and interesting places besides sitting at desks and working in laboratories; Hokianga (Jodi Wall), Tuapeka West (Suliana Teasdale) and various mountain ranges in Otago (Christa Miller, Janine Wing). The more adventurous go much further afield to expand their horizons; swimming with sharks on the Great Barrier Reef (Chris Cornwall) and dodging hungry polar bears on Svalbard (Lorna Little).

If you look past the arcane terminology and confusing acronyms that are inevitable features of this sort of scientific presentation there are some very high quality projects being undertaken that pose serious intellectual and technical challenges. A certain amount of human drama unfolds on these occasions as

the various individuals grapple with the challenges they face. Overall the projects were presented very well though a couple might still be considered works in progress. There was the odd suduko moment when, because of a combination of problems with experimental design or technical execution, it was unlikely that any useful outcome to a particular set of experiments would eventuate. I would like to congratulate the Department on the August Colloquium; the students organizing it did a very professional job. I was impressed by the diverse range of topics that were covered. Overall the standard of presentation was very high and I did not envy the three judges in their task in picking winners from the various presentations on some very disparate projects.



Botanical Society of Otago Chairman, David Lyttle (center) with Botany Department Colloquium Prize Winners. From Left; Jocelyn Chua (PhD student), Yuanyuan Feng (PhD student), Maxime Corral (MSc student) and Janine Wing (MSc student) (Photo from Maxime Corral)

Editor's Notes

Please submit copy for next newsletter by
12th February 2013.

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: lorna.little@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.

Message from the Treasurer

ELECTRONIC PAYMENTS

You may prefer to pay your membership by Direct Bank Transfer to the Botanical Society of Otago's bank account rather than pay by cash or cheque. We realise these days that direct debit transfer payments seem to be the 'norm' for most people.

If you choose to pay by direct debit/paypal please ensure you include:

Your Name in particulars/ reference **and** what you are paying for e.g. **Membership** or **Calendar**.

That way we can keep our database up to date.

Our Bank is Westpac Moray Place, Dunedin

Account No. 030905 0029158 00
Botanical Society of Otago

Many thanks

Jean Bretherton, Treasurer

Botanical Society of Otago 2013 Photographic Competition



Support the Competition
and the Calendar
Entries due March 20th
2013
2013 Calendars still
available

Correspondence and News

Above the Treeline: A nature guide to the New Zealand mountains



It is with some relief that the manuscript of Sir Alan Mark's new book *Above the Treeline: A nature guide to the New Zealand mountains* has been dispatched to the printers.

It is a guide to the natural history of the New Zealand Mountains. As well as our unique alpine plants, which constitute the majority of the book, this guide includes birds; frogs and lizards; butterflies, moths, grasshoppers, beetles and other invertebrates; and mosses and lichens. An informative introduction is followed by descriptions of more than 850 species, illustrated by approximately 1000 colour photographs. The book contains contributions by Brian Patrick, Rod Morris, Mandy Tocher, David Galloway and many others. Several BSO members have contributed photos to illustrate this book. It promises to be an important reference and field guide, and a celebration of the richness

of New Zealand's alpine environment. Alan tells me the book launch will be held on the 21st January at the Southern Connections Conference here in Dunedin.

Grant from BP

BP has generously awarded The Botanical Society of Otago \$100 worth of gift vouchers from their BP Vouchers for Volunteers 2012 scheme. This will help us show our appreciation for out-of-town speakers. Thank you, BP!

New Zealand's marine algae now online

(reprinted from *Trilepidea E-newsletter: No 106. September 2012*)

The New Zealand Plant Conservation Network has now added all New Zealand's marine algae to its website. This includes over 700 taxa of green, brown and red algae. This work was done with the help of Jennifer Dalen and Wendy Nelson, research scientists at Te Papa Tongarewa and NIWA, respectively.

Algaebase has also provided all their URL web links so these will be added in the near future along with links to Te Papa's online database.

These algae web pages are not yet complete and help is sought with illustrating all species. If you have information or images for any of these taxa please send it to the Network at: info@nzpcn.org.nz

For more information about macroalgae see Wendy Nelson's overview in the Macroalgae section of the Network website: nzpcn.org.nz Go to Flora>Non Vascular>Algae>seaweeds.

An Illustrated Guide to Common Grasses, Sedges and Rushes of New Zealand

Paul Champion, Trevor James, Ian Popay, Kerry Ford, August 2012. Paperback, colour photos, 208 pp **\$59.99** (MW Press offers a

10% discount to members of the Botanical Society of Otago).

This fully illustrated new guide has been published to meet popular demand; earlier guides to identification of grasses found in New Zealand are out of print, and this comprehensive new book also includes sedges and rushes.

This is a full colour identification guide for a wide audience, from the same publisher that produced *An Illustrated Guide to Common Weeds of New Zealand*. Features include an easy-to-follow format, with keys for each category (grass, sedge, rush) to aid identification, excellent colour photographs throughout, and a fully illustrated colour glossary.

[*An Illustrated Guide to Common Grasses, Sedges and Rushes of New Zealand*](#) covers both native and introduced species so will appeal to a wide audience from field professionals to keen amateurs.

Telopea



A few years ago, the *BSO Newsletter* published two taxonomic articles by Michael Heads, on *Hebe*, *Chionohebe*, *Leonohebe* and *Hebejeebie*. If anyone submits scientific articles, we publish them, after peer refereeing. We're a proper journal with an ISSN number, and we send copies to deposit libraries like we're supposed to. So, don't send your best work to *Nature*, send it to the *BSO Newsletter*.

Anyway, advertising aside, immediately we published Michael's first article we got messages from herbaria, botanic gardens and the like all over the world, asking to receive our Newsletter, and sending their scientific journals in return. We thank Michael for raising the profile of the BSO in one swoop (two, really). One of the journals they sent was *Telopea*, a major taxonomic journal published by the National Herbarium of New South Wales (yes, I know NSW isn't a nation, you'd better ask David Orlovich on that one). You can read exciting stuff like: A.E. Orchard (2012) Lectotypification of *Diodontium filifolium* F.Muell. (Asteraceae: Coreopsidae). *Telopea* 14: 59. We sent the copies to the University Science Library in due course. Like a number of scientific journals recently (most notably *New Phytologist*), *Telopea* has now gone electronic-only. However, the good news is that it's all free to everyone, from 2000 AD into the future: http://www.rbgsyd.nsw.gov.au/science/Scientific_publications/telopea

Proposed Data Repository: Prehuman Vegetation of New Zealand

Jamie Wood & Janet Wilmshurst Landcare Research, PO Box 40, Lincoln 7640, New Zealand

We are interested in gaining comments and suggestions from potential users of such a resource, as to what features they would like incorporated (i.e. how might you like to query the data and what functions would assist this), and any additional potential uses you may foresee for such a dataset. *Feedback from this scoping exercise will assist in the preparation of a funding application to the Terrestrial and Freshwater Biodiversity Information System scheme administered by the New Zealand Department of Conservation which will assist us to set up the online repository*

Proposal summary: What has happened to New Zealand's vegetation since humans arrived?

The settlement of New Zealand by humans approximately 750 years ago was the beginning of a period of rapid and dramatic ecological change. Fires lit by early settlers removed 40-50% of the native forests that dominated the land below treeline. Continued clearances through to the present have resulted in the proliferation of grasslands throughout the country. With so much loss and disturbance of New Zealand's native vegetation communities, fossil evidence (such as pollen and seeds) can provide a unique means for determining what our vegetation communities were like before humans arrived (palaeovegetation). Over the past century, a large amount of fossil evidence for New Zealand's palaeovegetation has been collected, but much of this is currently difficult to access.

What is the proposed repository?

We propose to provide an online repository for the secure, long-term storage of New Zealand palaeovegetation data. It will provide, for the first time, a place where data from across New Zealand can be collated and easily searched and summarised by interested parties, including the general public. The back end of the repository will be where

researchers can upload their data files via their own personal login, set confidentiality and accessibility settings to each data set, and provide ease of management through having all their data together in one place, or just to provide a backup to their own personal computer files. The front end of the repository will be a public online portal, where anyone can search, sort and summarise accessible data of specific interest to them. Similar sites have been set up for several continents around the world. A good example can be seen at <http://pollen.cerege.fr/fpd-epd/>

What features could be available on the online interface?

- Search records based on taxa, time periods, and geographic areas of interest.
- Produce figures showing national distribution of selected plant taxon at desired date
- Produce customised pollen diagrams for each pollen core site, by selecting desired site, plant taxa and time range

Produce animations showing changing distribution of selected plant taxon over a desired time period



Interested botanists with Wendy Nelson (Baylis Lecture, 2012) looking at macroalgae during the trip to Brighton (Photo: David Lyttle)



Codium sp. (left) and Hormosira sp. (right) at Brighton Beach (Photos: David Lyttle)

Articles

Wellington Botanical Society Jubilee Award 2011

Marcia Dale

Last November I applied for and was successful in receiving a grant from the Wellington Botanical Society Jubilee Award. The award is granted for fieldwork; artistic endeavour; publication; research; propagation or cultivation of NZ native plants for educational purposes and/or other studies that promote the better understanding of NZ's indigenous flora and vegetation. The main criterion is the furtherance of knowledge or the promotion of the intrinsic value of NZ's indigenous flora and vegetation.

My application was for artistic endeavour and I was informed that this was the first time the Award had been granted for such. My proposal was as follows:

“What I really love about our native flora are their diverse forms, colours and textures. The beauty encapsulated in the patterning of a single putaputaweta leaf excites me far more than a hundred thorny old rose bushes. I would like to paint highly detailed, artistic and beautiful portraits of our native flora.

When plant paintings are imagined one thinks mainly of botanical illustrations. These types of paintings are very useful for describing the features of a plant and can indeed be extremely beautiful, but I am proposing something very different. I would like to create beautiful works of art that celebrate the essence of a plant. I would achieve this by using oil paint on canvas to create bold colours, exquisite details and highly engaging creations. I would focus on little known species, no kowhai or pohutakawa flowers for me, but instead the delicate leaves of *Leptinella pusilla* or the adorably curled over flowers of *Pittosporum patulum*”.

After trawling through hundreds of plant images I finally narrowed down my selection to a photo taken by John Barkla, who generously allowed me to make use of his images. I am currently in the final stages of completing my painting, and hope to be able to show it in a future newsletter – but that will be entirely at the discretion of the Wellington Botanical Society as they will have full copyright over the completed image. In the meantime, here's one I did of an exotic plant – but appropriate for spring!



The case of the lost pycnidia: a lichenological mystery

Janice Lord, Allison Knight, Jennifer Bannister, Lars Ludwig, Bill Malcolm and David Orlovich

This is a story of how the combined efforts of a group of botanists and Botanical Society members with widely different backgrounds solved a 150-year old mystery. *Thamnolia vermicularis* is a globally widespread alpine/arctic lichen, easily identified by its white worm-like thalli. It occurs as two chemotypes that look identical but differ in their thallus chemistry; one fluoresces yellow under UV light (UV+), whereas the other does not (UV-). In the northern hemisphere the UV+ type predominates, while in the southern hemisphere the UV- type is dominant.

Modern lichen *Floras* describe *Thamnolia* as completely sterile, meaning it doesn't have any specialized reproductive structures producing spore-like dispersal units. Because it is supposedly limited to dispersal of thallus fragments via wind or animals, the fact that it is so widespread and that the two chemotypes occur intermixed in many parts of the world has been widely considered a biogeographic mystery.

The solution to this mystery started in the Otago Herbarium, housed in the Botany Department of the University of Otago, where Jennifer Bannister discovered structures on New Zealand *Thamnolia vermicularis* that looked like asexual reproductive structures called pycnidia. Careful sectioning and microscopic examination by Jennifer and Allison Knight revealed sunken pits filled with what looked like groups of conidia or conidiospores, which are single-celled dispersal units produced asexually via mitosis. They then sent samples to Bill Malcolm, well known for his beautifully detailed microscopic imagery. Was this a new discovery? Here the plot thickened!

Jennifer found a paper written in 1874 by Arthur Minks, illustrating reproductive structures of *Thamnolia*. Peter Bannister (BSO's first Patron) translated the German to reveal descriptions of apothecia (sexual reproductive structures) and pycnidia (asexual reproductive structures). Lars Ludwig, a current PhD student in the Botany Department, took up the literature trail with enthusiasm and uncovered several more mid-to-late 19th century references to reproductive structures on *Thamnolia*, mostly written in Latin or German. Clearly we had rediscovered a feature of *Thamnolia* that had been lost from the modern literature. How could this have happened?

Lars discovered two independent reports published in 1865 by Mudd and in 1874 by Arnold. Both showed that apothecia attributed to *Thamnolia* were actually produced by a parasitic fungus, which is now called *Thamnogalla crombiei*. The key fact here is that no one disproved the existence of pycnidia in *Thamnolia*, however they too were dismissed as parasitic in origin. Lars found that after 1920 all works maintaining the presence of pycnidia in *Thamnolia* were published in languages other than English. Until the 1970s reports on pycnidia in *Thamnolia* persisted in the German and French literature. The current prevalence of the opinion that *Thamnolia* is completely sterile dates from the 1960s, and since then has dominated the English-language literature in particular, apparently due to the repeated uncritical citation of a key monograph on *Thamnolia* by Culberson published in 1963.

So does *Thamnolia* have pycnidia, and how does this solve the mystery of *Thamnolia*'s distribution? Allison and David Orlovich used DNA sequence data to show pycnidial tissue was definitely *Thamnolia*, not a parasite. Alan Mark collected specimens from Alaska and Canada, and Stephan Halloy collected some in Peru. Allison then examined thousands of *Thamnolia* thalli in collections from a range of countries, and discovered pycnidia on most of them. Finally, here we had a dispersal mechanism that could

account for *Thamnolia*'s global distribution. Millions of microscopic cells can be dispersed much more readily and widely than magnitudes-larger fragments of lichen thallus.

More importantly though, the independent dispersal of single conidia of the two chemotypes goes some way toward explaining how the chemotypes can grow intermixed and intertwined in places like the Rock & Pillar Range, central Otago. Further DNA analysis by David also supported the growing international evidence that the two

chemotypes are in fact just variants of the same species, not separate species as once was thought. This being the case, the puzzling distribution of *Thamnolia* chemotypes suggests that a slight change in biochemical pathways during mitosis may enable a thallus to produce conidia expressing the alternative chemotype. The lesson from this story is to be curious, believe what you see, look for evidence and don't believe everything you read.

The full story will be published in *The Lichenologist*.



Thamnolia vermicularis growing on *Dracophyllum muscoides*, Rock & Pillar Range, Otago
(Photo: Janice Lord)

Meeting and trip reports

Visit to Hocken Library, 25 September 2012

Allison Knight

Anne Jackman and Natalie Poland, curators at the Hocken Library, put out a wonderful display of items of botanical interest for our visit, and were generous in their descriptions of them. Pride of place was the Banks's Florilegium, with over 100 of the enormous copper plate engravings of plants relating to New Zealand that were collected by Joseph Banks and Daniel Solander on their voyage around the world with Captain James Cook between 1768 and 1771. More contemporary art on display included paintings of fungi by such diverse artists as Rita Angus and a past member of the Dunedin Field Naturalists Society.

Thomas Morland Hocken 1836–1910 was a prominent Dunedin doctor, historian, collector and bibliographer. Dunedin is so fortunate that the Hocken Library treasures his collection and continues his tradition. There were two things from Hocken's own extensive collection that particularly appealed

to me. Firstly, some historic copies of the proceedings of the New Zealand Institute, which included some original articles by Charles Knight with reports and drawings of new lichen discoveries. Secondly, John Buchan's superbly illustrated book of New Zealand grasses, made all the more interesting through being told that he dipped the grasses in ink and pressed them to the page to get the exact proportions. Yet there was not a smudge to be seen, just fine clear lines showing exquisite detail, some of it from magnified views from down a microscope. The Buchanan symposium coming up at the end of November will be well worth attending.

For those who missed the visit, or who would love to see more, we hope that we will be able to arrange a visit to the Hocken Library again next year.

Many thanks to Anne & Natalie for going to so much trouble to put on such a fascinating and memorable visit for the Botanical Society.



Myosotis brevis at Chapman Road. (Photo: David Lyttle)



Pittosporum patulum, by Pippa Lucas
(Second Equal).

Audrey Eagle Botanical Drawing Competition

Allison Knight

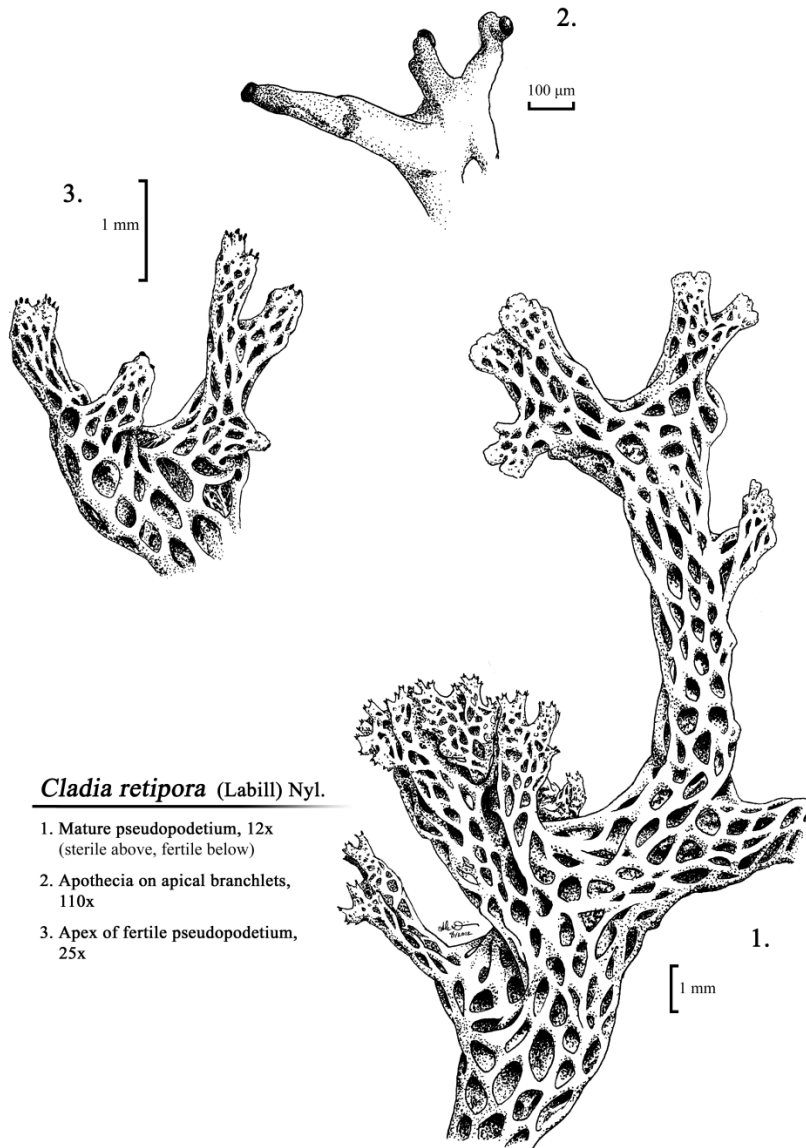
Judges Audrey Eagle and Lorene Cecconi were impressed by the high standard of the 6 entries in this year's biennial Audrey Eagle Botanical Drawing Competition. They found it so difficult to rank them that they have awarded two first-equal prizes and two second-equal prizes.

The top two drawings were *Celmisia lindsayi*, by Sharon Jones and *Cladia retipora* by Alexa DiNicola. These are two very different drawings in scale, technique and in

colour, yet both more than meet all the judging criteria. Besides having high artistic merit, they are botanically accurate, show extra detail of important identification features, have clear, precise lines, are well proportioned, with scale bars included, and are artistically laid out. The captions give botanical name, location and date and the accompanying botanical notes are thorough and neatly printed. *Cladia retipora* is a beautiful white lichen, yet is often overlooked in botanical surveys (as most lichens are). The clear lines of this black and white drawing make it ideal for printing in the Newsletter. *Celmisia lindsayi* only occurs from the mouth of the Clutha River to Waikaia, so it is one of the less common *Celmisia* species. Her drawing looks wonderful on the web in colour.

Second equal were *Microtis unifolia*, a widespread little native orchid, by Kathy Graham, and *Pittosporum patulum*, a nationally endangered endemic South Island tree seldom seen in the wild, by Pippa Lucas.

The judges' main tip for budding artists was that light and shading effects help to make the subject look more life-like and 3-dimensional, and it helps if the shading is done to make it look as if the light is all coming from one direction. Adding extra detail of flowers, fruits or special features, and placing them nicely on the page add merit to a drawing, as do neat captions and botanical notes. Helpful photographs and botanical details can easily be found on the New Zealand Plant Conservation Network website: nzpcn.org.nz, and there's a whole world of botanical art images and tips out there on the web. Audrey and Lorene congratulate the winners and look forward to seeing more beautifully and meticulously drawn and unusual entries in 2014.



***Cladia retipora* (Labill) Nyl.**

- 1. Mature pseudopodetium, 12x (sterile above, fertile below)
- 2. Apothecia on apical branchlets, 110x
- 3. Apex of fertile pseudopodetium, 25x

***Cladia retipora* (Labill) Nyl.**

- 1. Mature pseudopodetium, 12x (sterile above, fertile below)
- 2. Apothecia on apical branchlets, 110x
- 3. Apex of fertile pseudopodetium, 25x

Drawn 8/2012 from specimens RR1919 and RR6014, of Roger Rosentreter's lichen collection at SRP.

RR1919 collected on the Greenstone Track, by John & Abbie Sinskey (no date given).

RR6014 collected from a subalpine peat bog, in February 1989, by Anne Carter.

Habitat, distribution, and chemistry from Galloway, D.J. (1985). Flora of New Zealand: Lichens.

Cushion-forming, terricolous or muscicolous lichen of peaty soils, tussocks, low

vegetation, heaths, fellfields, & especially alpine peat bogs. Rarely also on rocks, logs, or sand dunes. Cushions up to 1 m in diameter.

Cortex white or yellowish, often blackening at tips; thick, cartilaginous (brittle when dry); K+ yellow, KC+ yellow, Pd-. Note self-similarity as reticulation size decreases. Inner medulla loose, arachnoid, visible through fenestrations. No distinct photobiont layer: discrete algal colonies scattered throughout inner medulla.

Primary thallus evanescent. Mature pseudopodetia break off at base. Fertile & sterile pseudopodetia minimally dimorphic. Apothecia minute, peltate, dark brown to black convex discs, borne on small apical branches.

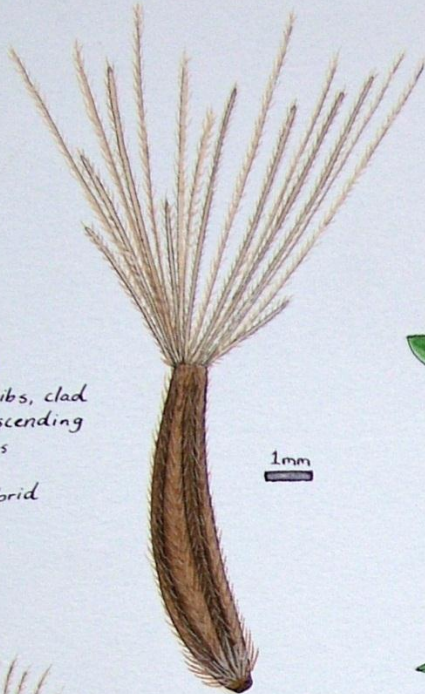
Celmisia lindsayi

4th March 2012 - Cannibal bay
Catlins, New Zealand

Achene

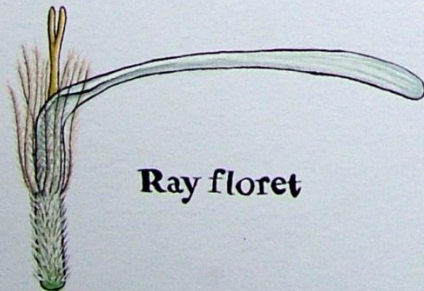
Prominent ribs, clad
in short, ascending
hairs

Pappus Scabrid



Disc floret

tubular with long, broadly
triangular teeth



Ray floret

Leaves all, or mostly, in tufts
at ground level

Leaves narrow-oblong to
sub-lanceolate to elliptic

Capitula
Solitary



Living leaves
forming distinct
terminal rosulate tufts

Celmisia lindsayi, by Sharon Jones. First Equal, Audrey Eagle Botanical Drawing Competition

Celmisia lindsayi

MAIN FEATURES

Leaves all, or mostly, in tufts at ground level. Capitula solitary. Pappus scabrid. Disc florets yellow.

Stems, branches and branchlets distinctly woody; leaves imbricate along branches and branchlets; living leaves sometimes forming rosulate tufts at tips of branchlets. Living leaves forming distinct terminal rosulate tufts;

Upper surface of leaves glabrous, or, at first, with very thin pellicle;

Lamina with distinct indumentum below;

Leaves narrow-oblong to sub-lanceolate to elliptic; Scape very sparingly hairy; Achenes with at least some hairs on ribs. Achene hairs rather sparse

SECONDARY FEATURES

Clad in long persistent, reflexed leaves; Lamina lower surface densely clad in appressed, white, satiny tomentum midrib dark, stout, prominent. Leaf apex obtuse to sub-acute. Leaf edges entire to remotely denticulate; narrowed to petiole;

Leaf sheath: glabrous; nerves parallel, usually prominent; Scape slender; sparsely hairy; lower bracts leaf-like; upper bracts linear;

Phyllaries linear; sub-floccose in upper half; midrib distinct; Ray florets linear; disc florets tubular with long, broadly triangular teeth.

Achenes \pm compressed; prominent ribs, rather densely clad in short, ascending hairs;

Pappus hairs white becoming rufous at the tip; barbellate.



Ceratocephala pungens, Chapmans Road Reserve. (Photo: John Barkla)

BotSoc field trip to Chapman Road and Springvale reserves, Alexandra

David Lyttle

The native spring ephemerals put on an excellent show for us on this fine, spring, Central Otago day. Waiting beside the Chapman Road for the group to arrive had me wondering what non-botanising people would think of the Chapman Road Scientific Reserve. What strange people would scientists be who could find anything of interest in this apparently desolate place? We were met by John Barkla and John Douglas who were to expose the small stars of the reserve to us and enlighten us as to the area's history. Early mining had stripped away anything obvious leaving only the scars of their activities behind for the off-road enthusiasts to challenge their machines and leave behind their rubbish.

This is indeed a rugged piece of land either side the Chapman gully with only a muddy stain to hint at any seasonal flow; on one side a dry flat area and on the other a steeper rocky slope typical of the area.

Once through the gate we were soon on our hands and knees admiring the minute forget-me-nots, *Myosotis brevis*, in full bloom yet nigh on invisible from any kind of height. Then it was the turn of the aptly-named *Myosurus minimus* subsp. *novae-zelandiae* and the tiny relative of the buttercup, *Ceratocephala pungens*. It wasn't long before we had chalked off most of the little rarities on the list and the group began to break up to explore the nooks and crannies on their own. The area is not short of exotics, but it seems they have to wait their turn and had only just begun to make their presence known giving the little annuals time to flower, set seed and disappear for another year as their flowering time is short. The dead and decaying branches are evidence that DoC have been busy dealing effectively to the wild rose and gorse.

The number of different environments in the area is deceptive. The idea that what appears to be a fairly homogenous landscape

is soon dispelled when many small spots, each with their own suite of plants, are revealed. Underneath a large rock is a cool shady home for the small *Asplenium flabellifolium* while above were some glorious clumps of the moss, *Polytrichum juniperinum*, covered in startling, bright-red splash cups. Further on I came across some *Melicytus alpinus* and while rooting about beneath its densely packed branches I found a gap in the rock below. It was dark and cool and the flat, vertical surface was quite damp and covered in another couple of mosses; this time the small *Fissidens megalotis* and *Fissidens curvatus* var. *curvatus*. Sadly the call to move on came and we had to move on leaving behind plenty more spots worthy of exploration at some future date.

After lunch just outside of town under whatever shade available, and surrounded by the dryland fern, *Cheilanthes sieberi*, John Douglas shared his knowledge of the intriguing little fern, *Pleurosorus rutifolius*. This was a first time for me. It is uncommon and apparently rather particular in its requirements being confined to the base of westerly-facing rocks in deep shade. Whilst admiring the somewhat incongruous clumps of a species of *Opuntia* happily at home on the rocky banks, I found a healthy specimen of another fern, this time, *Pellaea calidirupium*, tucked away in its own little crevice. All in all a very profitable lunch stop!

The Springvale reserve has also suffered at the hands of the mining fraternity, for which, I suppose, we should be thankful. Here again on the low-vegetated slopes the same spring ephemerals are quite at home. The wild rose, so abundant on our visit last year, have all been killed, which may be why I couldn't find the beautiful exotic *Vicia lathyroides* that I found sheltering beneath one last year: ah well, can't win them all, I suppose. This is a long sloping 6ha section crossed with steep sided gullies and leading down to a much wider gully with a fairly substantial water flow, but lacking the substantial rockiness of Chapman Road and,

for me at least, maybe a little less exciting. I was left wondering just how these things survived and evolved in historical times without the aid of the nasty miners to clear the land for them and the horrible rabbits that now keep the vegetation low so they are not smothered. In the end, it was a great day out and thanks must go to both John Barkla and John Douglas for making it so interesting and informative.

SPECIES LIST – SPRINGVALE RESERVE

A 6ha Department of Conservation reserve 7km north of Alexandra on east side of SH85 just south of its intersection with Springvale Road with a low-altitude, dryland community on saline/sodic soils and populated with ephemeral herbs including rare spring annuals. 2hrs 15 mins and 195 kms from Dunedin.

NSMS 260 G42 169° 25' E 45° 25'
S295503 180m

Undated = From Mike Thorsen species list
09 = from Craig Wilson (2009)

11 = Visit with Bastow Wilson and Rachael Lawrence-Lodge 5.x.2011

° = exotic

References:

Allen, R.B. (2000) *Inland Lepidium recovery plan 2000 – 2010: threatened species recovery plan*. 32. 25 pages. Department of Conservation, Wellington.

Wilson, C. (2009) Springvale NHF proposal – DOC DM 454033. *Unpublished report*.

LICHENS:

2011 *Xanthoparmelia viridis* 11

MOSSES:

2011 *Ceratodon purpureus* 11

2011 *Grimmia pulvinata* 11

2011 *Philonotis tenuis* 11

2011 *Triquetrella papillata* 11

2011 *Wijkia extenuate* 11

FERNS:

2011 *Azolla filiculoides* 11

ANGIOSPERMS;

DICOTYLEDONS:

2011 *Aphanes australiana* ° 11

Atriplex buchananii 11

2011 *Capsella bursa-pastoris* ° 11

2011 *Carduus nutans* ° 11

2011 *Cerastium fontanum* ° 11

Cerastium semidecandrum ° 11

Ceratocephala pungens 09 11

Cirsium arvense ° 11

2011 *Cirsium vulgare* ° 11

Crassula colligata

2011 *Crepis capillaris* ° 11

2011 *Cytisus scoparius* ° 11

Erodium cicutarium ° 11

Erophila verna ° 11

2011 *Galium perpusillum* 11

2011 *Geranium brevicaule* 11

2011 *Hypochaeris radicata* ° 11

2011 *Lemna minor* 11

2011 *Leontodon taraxacoides* ° 11

09 *Lepidium kirkii*

2011 *Leucopogon fraseri* 11

2011 *Malva neglecta* ° 11

Myosotis brevis 11

Myosotis stricta °

Myosurus minimus subsp. *novae-zelandiae* 09 11

2011 *Nasturtium officinale* ° 11

2011 *Navarettia squarrosa* ° 11

2011 *Onopordum acanthium* ° 11

Pilosella officinarum ° 09 11

09 *Plantago coronopus* ° 09 11

Plantago lanceolata ° 11

Raoulia australis 09 11

Rosa rubiginosa ° 11

Rumex acetosella ° 11

2011 *Rumex obtusifolius* ° 11

2011 *Salix fragilis* ° 11

Sedum acre ° 11

2011 *Sonchus oleraceus* ° 11

Spergularia rubra ° 11

Stellaria gracilentia °

Taraxacum officinale ° 11

2011 *Thymus vulgaris* ° 11

Trifolium arvense ° 11

2011 *Trifolium repens* ° 11

2011 *Ulex europaeus* ° 11

2011 *Verbascum thapsus* ° 11

2011	<i>Verbascum virgatum</i> ^e	11	2011	<i>Dactylis glomeratus</i> ^e	11
	<i>Veronica verna</i> ^e	11		<i>Elymus solandri</i> "channel"	
2011	<i>Vicia lathyroides</i> ^e	11	2011	<i>Holcus lanatus</i> ^e	11
	<i>Vittadinia gracilis</i>		2011	<i>Juncus articulatus</i> ^e	11
				<i>Lolium perenne</i> ^e	11
	MONOCOTYLEDONS:		2011	<i>Poa cita</i>	11
2011	<i>Agrostis capillaris</i> ^e	11		<i>Poa maniototo</i>	
2011	<i>Agrostis stolonifera</i> ^e	11		<i>Puccinellia raroflorens</i>	11
2011	<i>Aira caryophylla</i> ^e	11		<i>Rytidosperma merum</i>	09 11
2011	<i>Anthoxanthum odoratum</i> ^e	11	2011	<i>Schedonorus arundinaceus</i> ^e	11
	<i>Carex albula</i>		2011	<i>Typha orientalis</i>	11
2011	<i>Carex coriacea</i>	11		SPL – Springvale Reserve	
2011	<i>Critesion murinum</i> ^e	11		John Steel 7.x.2011	
2011	<i>Cynosurus cristatus</i> ^e	11			



Myosurus minimus subsp. novae-zealandiae at Springvale Reserve. (Photo: David Lyttle)

SPECIES LIST – CHAPMAN ROAD

A Department of Conservation scientific reserve west of Alexandra on east side of Chapman Road across Chapman Gully just south of its intersection with Earnsclough Road with a low-altitude, dryland community on saline/sodic soils and populated with ephemeral herbs including rare spring annuals. 2hrs 15 mins and 195 kms from Dunedin.

NSMS 260 G42 169° 23' E 45° 16'
S252437 180m

Undated = From Mike Thorsen's species list

12 = Visit with Otago BotSoc 16.ix.2012

^e = exotic

LICHENS:

2012	<i>Cladia aggregata</i>	12\
	<i>Xanthoparmelia viridis</i>	12

MOSESSES:

2012	<i>Ceratodon purpureus</i>	12
------	----------------------------	----

2012	<i>Fissidens curvatus</i> var. <i>curvatus</i>	12
2012	<i>Fissidens megalotis</i>	12
2012	<i>Grimmia pulvinata</i>	12
2012	<i>Hypnum cupressiforme</i>	12
2012	<i>Polytrichum juniperinum</i>	12
2012	<i>Triquetrella papillata</i>	12
2012	<i>Wijkia extenuata</i>	12

FERNS:

	<i>Asplenium flabellifolium</i>	12
	<i>Pteridium esculentum</i>	

ANGIOSPERMS;**DICOTYLEDONS:**

	<i>Aphanes australiana</i> ^e	
	<i>Apium prostratum</i> "Saline"	12
2012	<i>Arabidopsis thaliana</i> ^e	12
	<i>Atriplex buchananii</i>	12
	<i>Atriplex prostrata</i> ^e	
	<i>Centaurium erythraea</i> ^e	12
	<i>Cerastium semidecandrum</i> ^e	
	<i>Ceratocephala pungens</i>	12
	<i>Chenopodium ambiguum</i>	
	<i>Cirsium arvense</i> ^e	12
	<i>Cirsium vulgare</i> ^e	12
	<i>Conium maculatum</i> ^e	12
	<i>Coprosma propinqua</i>	
	<i>Crassula colligata</i>	12
	<i>Dipsacus sylvestris</i> ^e	12
	<i>Echium vulgare</i> ^e	12
	<i>Erodium cicutarium</i> ^e	
	<i>Erodium moschatum</i> ^e	12
2012	<i>Erophila verna</i> ^e	12
	<i>Galium murale</i> ^e	12
	<i>Hieracium lepidulum</i> ^e	
	<i>Hypochaeris glabra</i> ^e	12
	<i>Lepidium kirkii</i>	12
	<i>Lychnis arvensis</i>	12
	<i>Marrubium vulgare</i> ^e	12
	<i>Melicytus alpinus</i>	12
	<i>Melilotus indicus</i> ^e	12
	<i>Myosotis brevis</i>	12
	<i>Myosotis discolor</i> ^e	
	<i>Myosotis strictus</i> ^e	
	<i>Myosurus minimus</i> subsp. <i>novaezealandiae</i>	12
	<i>Oxalis exilis</i>	
	<i>Pilosella officinarum</i> ^e	12
	<i>Plantago coronopus</i> ^e	
	<i>Plantago lanceolata</i> ^e	12
2012	<i>Ranunculus glabrifolius</i>	12

	<i>Raoulia australis</i>	12
	<i>Raoulia beauverdii</i>	
	<i>Reseda luteola</i> ^e	12
	<i>Rumex acetosella</i> ^e	12
	<i>Sedum acre</i> ^e	12
	<i>Senecio quadridentatus</i>	
	<i>Sisymbrium polyceratium</i> ^e	
	<i>Solanum dulcamara</i> ^e	
	<i>Spergularia rubra</i> ^e	12
	<i>Stellaria gracilentia</i> ^e	
	<i>Taraxacum officinale</i> ^e	12
	<i>Thymus vulgaris</i> ^e	12
	<i>Trifolium arvense</i> ^e	
	<i>Trifolium micranthum</i> ^e	12
	<i>Trifolium ornithopodioides</i> ^e	
	<i>Verbascum thapsus</i> ^e	12
	<i>Verbascum virgatum</i> ^e	12
	<i>Veronica verna</i> ^e	12
	<i>Vittadinia gracilis</i> ^e	12

MONOCOTYLEDONS:

	<i>Aira caryophyllea</i> ^e	
	<i>Anthoxanthum odoratum</i> ^e	12
	<i>Bromus diandrus</i> ^e	
	<i>Bromus hordeaceus</i> ^e	
	<i>Bromus lithobius</i> ^e	
	<i>Critesion hystrix</i> ^e	
	<i>Critesion murinum</i> ^e	
	<i>Dactylis glomerata</i> ^e	12
	<i>Elymus solandri</i> "channel"	
	<i>Festuca filiformis</i> ^e	
	<i>Festuca novae-zealandiae</i>	
	<i>Holcus lanatus</i> ^e	12
	<i>Isolepis basilaris</i>	
	<i>Juncus effusus</i> ^e	
	<i>Juncus edgariae</i>	12
	<i>Lolium perenne</i> ^e	
	<i>Luzula banksiana</i> var. <i>rhadina</i>	
	<i>Parapholis incurva</i> ^e	
	<i>Poa cita</i>	12
	<i>Poa colensoi</i>	12
	<i>Poa maniototo</i>	12
	<i>Puccinellia distans</i> ^e	
	<i>Puccinellia fasciculata</i> ^e	
	<i>Puccinellia raroflorens</i>	12
	<i>Rytidosperma clavatum</i>	
	<i>Rytidosperma racemosum</i> ^e	
	<i>Schedonorus arundinaceus</i> ^e	
	<i>Typha orientalis</i>	12
	<i>Vulpia bromoides</i> ^e	
	<i>Vulpia myuros</i> var. <i>megalura</i> ^e	

SPL – Chapman Road Reserve

John Steel 16.ix.2012

SPECIES LIST – CRAIGIEBURN RESERVE

A joint Dunedin City Council and Dunedin Amenities Society Reserve between Tanner Road and Burma Road sloping south-south-west to Ross Creek which reserve it abuts. It comprises mixed broadleaf-podocarp forest with some mature rimu, mainly dry above becoming increasingly moist towards the creek bed; open grassland above is bordered by successive efforts at restoration along the existing forest edges.

NZMS 260 I44 170° 30 '
E 45° 51 'S 165824 150-190
m

Undated from visit with Forest and Bird Society 21.iv.2012

^e = exotic species.

References:

Hamel, A. (2008) *Dunedin tracks and trails: an illustrated guide to Dunedin walks tramps and mountain bike routes*. Silver Peaks Press, Dunedin.

FUNGI:

Daldinia dennisii

Leratiomyces erythrocephalus

LICHENS:

Cladonia darwinii

HORNWORTS:**LIVERWORTS:**

Symphyogyna hymenophyllum

MOSSES:

Camptochaete arbuscula

Echinodium hispidum

Neckera hymenodonta

FERNS:

Asplenium appendiculatum

Asplenium flaccidum

Asplenium gracillimum

Blechnum chambersii

Blechnum discolor

Blechnum fluviatile

Blechnum minus

Blechnum montanum

Blechnum procerum

Cyathea dealbata

Cyathea smithii

Dryopteris filix-mas^e

Histiopteris incisa

Hypolepis millefolium

Lastreopsis glabella

Leptopteris hymenophylloides

Microsorium pustulatum

Polystichum neozelandicum subsp.

zerophyllum

Polystichum vestitum

Pteridium esculentum

GYMNOSPERMS:

Dacrycarpus dacrydioides

Dacrydium cupressinum

Libocedrus bidwillii

Neocupressus macrocarpa^e

Pinus radiata^e

Podocarpus cunninghamii

Podocarpus totara

Prumnopitys ferruginea
Prumnopitys taxifolia

ANGIOSPERMS:

DICOTYLEDONS:

Acaena juvenca
Acer pseudoplatanus °
Achillea millefolium °
Aristolelia serrata

Barbarea intermedia °

Callitriche stagnalis °
Capsella bursa-pastoris °
Cardamine debilis
Carpodetus serratus
Cerastium fontanum °
Cirsium arvense °
Cirsium vulgare °
Clematis paniculata
Conium maculatum °
Coprosma areolata
Coprosma grandifolia
Coprosma lucida
Coprosma rhamnoides
Coprosma rigida
Coprosma rotundifolia
Crataegus monogyna °
Cytisus scoparius °

Digitalis purpurea °

Fuchsia excorticata

Galium aparine °
Geranium molle °
Griselinia littoralis

Hoheria angustifolia
Hydrocotyle moschata
Hypochaeris radicata °

Jacobaea vulgaris °

Kunzea ericoides

Lapsana communis °
Leptospermum scoparium
Leycesteria formosa °

Lophomyrtus bullata

Melicytus ramiflorus
Metrosideros diffusa
Muehlenbeckia australis
Mycelis muralis °
Myrsine australis

Nertera villosa
Nothofagus fusca

Parsonsia heterophylla
Passiflora tripartita var. *mollissima* °
Pittosporum eugenioides
Pittosporum tenuifolium
Plantago lanceolata °
Pseudopanax arboreus
Pseudopanax colensoi
Pseudopanax crassifolius
Pseudowintera colorata

Ranunculus repens °
Rubus cissoides
Rubus fruticosus °
Rumex obtusifolius °

Sambucus nigra °
Schefflera digitata
Senecio minimus
Sisymbrium officinale °
Solanum laciniatum
Sonchus asper °
Sonchus oleraceus °
Sophora microphylla
Spergula arvensis °
Stellaria graminea °
Stellaria media °
Stellaria parviflora

Taraxacum officinale °
Trifolium pratense °
Trifolium repens °

Ulex europaeus °
Veronica salicifolia

MONOCOTYLEDONS:

Agrostis capillaris °
Anthoxanthum odoratum °
Arrhenatherum elatius °
Astelia nervosa

Cordyline australis
Cynosurus cristatus °
Dactylis glomerata °
Holcus lanatus °
Lolium perenne °

Microlaena avenacea
Phleum pratense °
Poa annua °
Ripogonum scandens



Historic Macrocarpa lining the driveway to the Rankin Tanner House. (Photo: Allison Knight)

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