Botanical Society of Otago Newsletter

Number 33
August – Sept. 2002

BSO Meetings and Field Trips

11 Sept, Wed 5.30 pm. ***Threatened plants of Otago.*** **John Barkla,** a botanist with the Otago Conservancy of DOC, will discuss the new system for classifying species according to the threat of extinction and how this applies to Otago's threatened plants. John will show slides of some of the most threatened plants and talk about the conservation programmes being implemented for them. **Meet Zoology Annexe Seminar Room**, Great King St, behind the car park between Dental School and Zoology. Be prompt or knock loudly. Drinks, chat & nibbles.

28 Sept, Sat. 1pm. ***Graham's Bush.*** **Ralf Ohlemueller** will take us to look at the native and exotic species richness of **Graham's Bush**. As one of a series of trips to significant remnants of indigenous forest in coastal Otago, this trip will focus on weed invasions in different parts of Graham's Bush, which is just above Sawyers Bay. We will be walking along a well- maintained track for 2-3 hours. **Meet at 1pm,** Botany Dept. car park, 464 Great King Street.

19 Oct, Sat.10 am. Breathtaking Botanising at ***Heyward Point*** with **Robyn Bridges**. We will visit the DoC Reserve, check out the seals at the point and amble round the cliffs to the glorious Kai Kai beach. Wind sculptured totara, Kowhai, lots of fili-ramulose species (once browsed by ratites?), caves, mussels if the tide is right, and a visit to a piece of priceless real estate. A good round trip of about 6 hours. **Meet 10.00am**, Botany Dept. car park, 464 Great King Street.

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Notes from Head Office

It seems as though only days ago we were shivering in the depths of Winter but now all of a sudden it seems as though Spring is here (or at least just around the corner). The first magnolia flowers over the hedge have opened (and some have already blown off in the wind), the blue bells are out along the path and the daffodils have started blooming and blossoms are everywhere. Maybe it's that spring is in the air and everyone is feeling more charitable even to the weather, but it struck a chord last week when someone remarked that we ought to praise the changeability of Dunedin's weather in Winter as much as we curse it in Summer.

The committee members have been planning and working hard on a spring program and have put together lots of exciting talks and trips, so organise your diaries and come along! Its an excellent way to get to know the local plants and scenery, (often with some of the best botanists in the region thrown in for free) and it's fun.

The Botany Department (University of Otago) student colloquium is again being organised and we decided at the last committee meeting to again offer prizes for the best student talks and posters to encourage and foster botany in Otago, and we hope they will again give us lots of abstracts and articles to fill our pages so the entire society membership benefits directly.

This issue is full of weeds (except for Prof Baylis' *Ixerba*) which is no coincidence we've decided to make an active program of getting to know the weeds in Otago, what they are, where they are and how long they've been there. It's an ambitious idea, as there are lots of them around. But 'know thy enemy' has always been a favourite saying so we are starting off with *Bomarea spp.* and a few other weeds that are either: common, particularly bad or easily recognised species. On the hand we want to see what's where so we've decided to take a look at some particularly nice native bush remnants close to Dunedin and start a bit of an inventory of weeds to get an idea of their distribution and spread. So come and give us a hand the more eyes the better.

Barbara Anderson, Acting Chairperson

Cover pictures

Bomarea caldasii, a garden escape, which has become a serious weed invading native vegetation on the Otago Peninsula. Photocopied by Moira Parker. See her article p5. Back page. Mature capsule of *Tayloria octoblepharis*. From book reviewed p 18.

Subscriptions Very Very Over-Due Now!

Subscriptions are now overdue for 2002. Please pay promptly. It's a good deal – fascinating talks, fabulous forays, far-flung trips and fat newsletters all for just $5 (unwaged) or $10 a year. Use the membership form at the back of the newsletter or get one off our web page or notice board. – *Ralf Ohlemueller,* Treasurer

Notes & articles

Ixerba brexiodes

The Tawari – *Ixerba brexioides* – was mentioned in Graeme Jane's interesting account of the Bay of Plenty. Cheeseman's Flora comments appreciatively "A very beautiful tree. Its handsome mode of growth, which has been compared with the northern *Arbutus*, its elegant foliage and its conspicuous large white flowers, often produced in great abundance, render it most attractive." The old Laing and Blackwell has a good picture of it.

Ixerba is one of our North Island plants that does not cross the Volcanic Plateau, but like the kauri it should grow easily in Dunedin so I asked the local native plant specialists, Ribbonwood Nurseries for it. Philip Dunn produced a tray of sad little seedlings, raised in unsterilised compost, and said "That's the best that we can do. We can't sell those, can we?" So I got one as a gift.

I thought at first that it might cheer up in my best garden soil but it did not. So I gave it company – a seedling of broadleaf (*Griselinia littoralis*) and it was soon away. If the scientist can overcome the gardener in me I shall see if it can go it alone. I suspect not.

It seems that the *Ixerba* only grows when it is linked with the network of AM (arbuscular mycorrhizal) fungi pervading the soil. I doubt if it is unique in this but I know of no published examples. Metcalf's "Cultivation of New Zealand Plants' makes no mention of *Ixerba*! But it is obviously something that anyone keen on natives would want to grow.

Geoff Baylis
Emeritus Professor,
Botany Dept
Otago University

[Watch this space for further results from Geoff's ongoing experiments with Ixerba seedlings -*ed*].

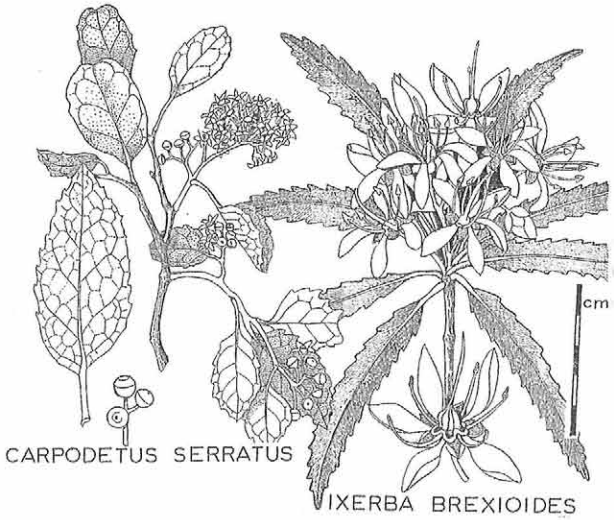


Fig. ***Carpodetus serratus*** (marble leaf) and ***Ixerba brexioides***, (tawari) two monotypic, endemic species of the Escallonia family. From: **Poole & Adams, *Trees and Shrubs of N.Z.***

Notes on *Bomarea* - a new threat to native vegetation

Introduction

My first encounter with the South American vine *Bomarea* was in a sheltered gully in Broad Bay, Otago Peninsula. The clusters of bright orange and yellow flowers were 10cm in diameter, and growing at a height of 3 – 4 m up a hawthorn tree. I cut some of the thin stems to prevent the flowers from setting seed, but did bot know how to kill this plant with 30 or more spindly stems each not more than 2 mm thick. My usual technique for dealing with problem climbers such as banana passion fruit or old man's beard is to trace the vine back to the main root, cut and then apply herbicide to the cut stump. But this technique will not work with this new weed.

My second encounter with this plant was on the top of Pudding Island (Titeremoana Scenic Reserve), in Otago Harbour off Portobello. Not just one vine this time but a carpet of *Bomarea* blanketing an area of approximately 50 square metres. Sometime later I learned of the thousands of starlings that roost for the night on Pudding Island and realised they might be an important means of dispersal.

Bomarea species

The Pest Management Strategy for Otago, (May 2001), includes both *Bomarea caldasii* and *Bomarea multiflora* as pest plant organisms. *Bomarea* growing at Colinswood Bush was identified by Janice Lord in May 2002 as the species *caldasii*, by the outer whorl of shorter petals and the inner whorl of longer petals. All the petals (technically tepals) are the same length in the species *multiflora*. I do not know if both species are present in the Dunedin area and will use the generic name in the following notes - a name originating from Jaques de Bomare, a French naturalist.

Description of *Bomarea* (Family Liliaceae)

Bomarea climbs by narrow twisting stems and has alternate pale green leaves. The thin leaves are approximately 60mm long, elongated and tapering towards the tip, with fine longitudinal leaf veins. Many of the leaves are twisted so they face downwards. The old stems die back to a pale tangle of stems, but green stems with green leaves are found all year round. *Bomarea* vines can climb through and over other vegetation to a height of 8 m. The flowers are tubular in shape, red at the base, shading to orange then yellow. The inside of each flower is yellow with dark speckles and there may be up to 40 tubular flowers hanging in a single cluster. Each flower matures into a 2 cm diameter capsule, green at first, then ripening to expose sticky pink seeds. Old capsules dry out and remain on the vine empty of seeds - presumably the seeds have all been eaten by birds and maybe by possums. Nigel McPherson, of Macandrew Bay, who has a keen interest in *Bomarea*, has counted 76 flowers in a particularly large cluster and 50 seeds in an average size capsule. He has observed the vine flowering all year round, with the main flowering period from November to May.

Bomarea seedlings grow in both light and shade and the first stems grow rapidly towards the light. Juvenile leaves are similar in shape to the adult leaves, but smaller. *Bomarea* is a perennial. The bases of the stems are fleshy, pink in colour and arise from horizontal rhizomes, lying just below the surface of the ground, and about the thickness

of a finger. Numerous roots also arise from the rhizome and the two form a dense mat in the soil. Some roots end in round tubers, which tend to be situated below the main mass of roots and rhizomes. These tubers can easily be mistaken for potatoes and are produced in abundance. A one metre tall *Bomarea* vine covering about 2 square metres of ground on the road edge near Hoopers Inlet produced half a sack of tubers.

How did it get here?

Bomarea is one of the many plant pests that has jumped the garden fence, and as far as I know is not a problem in any other part of New Zealand. Nigel McPherson recorded it growing in his Howard St, Macandrew Bay garden in 1952. Peter Johnson recorded *Bomarea caldasii* at only one Peninsula bush site in 1982 and that was Colinswood Bush, Macandrew Bay. So the plant has been around for quite awhile, but within the past 2 - 3 years it has started to appear in many different locations. In Aug 2000 Tom Myers, Dunedin Botanic Gardens, in an article titled *"Beautiful climber has potential to become weed"* reported that the species *Bomarea caldasii* was gradually establishing in Dunedin. The seeds are dispersed by birds and human dispersal may also play a part. Two of the Portobello *Bomarea* infestations are in the sort of places where people dump their garden rubbish.

The significance of Bomarea

Bomarea behaves in a similar way to old man's beard and banana passion fruit by cutting out the light from the supporting plants, which struggle and may eventually die. It poses a real threat to our remnants of native bush. To quote from the Otago Regional Council fact sheet on *Bomarea:*

> "*Bomarea* invades forest and shrub land interiors. Here the vines grow into the tree canopy and form large masses, which overtop and smother the supporting trees. Seedlings are able to establish in the shade of the forest interior, creeping along the ground, strangling saplings and smothering low growing species. Extensive infestations in the tree canopy alter light levels, which can kill mature trees and prevent the establishment of native species."

Colinswood Bush has been a timely warning to others involved in conservation of native vegetation. Colinswood Bush, fenced to exclude stock in the mid 1980's, and protected by a Department of Conservation covenant, has had a major problem with *Bomarea* for the past 12 years. A huge amount of work has, and still is being done to try to control this vine. Volunteers cut off the flower clusters and seed capsules and grub out the rhizomes. Earlier this year a group collected three sacks full of flowers and fruits.

In the past 2 years I have noticed a great increase in the number of *Bomarea* plants in Portobello. Examples of the places where it now grows are:- banks above the road, often in association with banana passion fruit; through apple trees; among the slash left after clearing under the power lines; among broom bushes; up into macrocarpa trees and through hedges. The netting fence surrounding the netball courts at the school provided a great support for this vine.

Bomarea seeds appear to be able to germinate and establish under the canopy of established trees, which is not surprising as the plant grows in forest in South America. *Bomarea* seedlings are popping up everywhere in dense shade in a planted area adjacent

to Portobello School. *Bomarea* can withstand frosts. Tom Myers notes that "This species grows from 1800-3500m altitude in the Andes region of Colombia and Equador in the forest and over hedges in grassland." So I suspect a Dunedin winter is not going to worry this pest plant. Tom Myers also refers to the plant's ability to survive dry periods by means of the underground tubers.

Control methods

Bomarea control is difficult because any pieces of rhizome left in the ground will grow. In some situations the rhizomes can be dug out of the soil and then killed by putting them in a black plastic bag and leaving the bag in the sun. But in a forest situation it is not possible to dig between the tree roots to get out all the rhizomes. I am pleased to learn from Peter Raal, Department of Conservation, that although the tubers look like potatoes, they do not sprout to form a new plant. So, the control is made slightly easier because the tubers do not have to be removed.

Nigel McPherson has had encouraging results by cutting all the stems and spraying the regrowth with the herbicides Touchdown and double strength Roundup. The Otago Regional Council recommend applying Escort herbicide directly to the cut ends of the vine. The new herbicide Vigilant (5% picloram in a gel) which has been developed for woody weed control is being tried on *Bomarea*. The technique is to cut the vine stems about 30cm above the ground, tie the bases of the stems together and paste with Vigilant gel. This summer will reveal if the method is successful. Vigilant comes in an easy to use pack and is sold by Wrightsons.- it is very handy to have for use on old man's beard , Darwin's barberry, gorse and banana passion fruit.

Control strategy

The Pest Management Strategy for Otago, (May 2001), includes *Bomarea caldasii* and *Bomarea multiflora* as pest plant organisms. The Regional Council believes it may be possible to eradicate this plant from Otago because *Bomarea* is currently only known to be present in the Dunedin area..

The strategy objectives (4.10.2) are:

i) Eradication of *Bomarea* from Otago Peninsula within 5 years.

ii) Eradication of *Bomarea* from Otago within 10 years.

The *Bomarea* rule (4.10.4) states that occupiers must destroy any *Bomarea* on their land. Any breach of this rule is an offence under the Biosecurity Act 1993

The Regional Council monitors retail outlets for plants that are banned from sale, propagation and distribution and is considering joining the National Pest Plant Accord which can assist in this area.

Action now, while the plant is not widespread, is sensible and could save a very expensive problem in the future

The listing of *Bomarea* as a pest plant and the obligation of occupiers to destroy the plant are two important first steps. However, this needs to be followed up by a lot of public education and community action. In general people I have talked to seem quite sympathetic to the view that *Bomarea* threatens native vegetation. But some keen gardeners are fond of their colourful climbers and are reluctant to get rid of them.

Peninsula Biodiversity Project

The Peninsula Biodiversity Project is a joint project between the local community and the Otago Regional Council aimed at preserving the valuable biodiversity features of the Otago Peninsula. Save the Otago Peninsula (STOP) and Otago Peninsula Trust members undertook a survey of 5 plants threatening biodiversity of bush remnants (*Bomarea*, Chilean flame creeper, banana passion fruit, old man's beard and Darwin's barberry) and were horrified by the numbers found.

The Regional Council agreed to fund a Task Force Green Team, supervised on a voluntary basis by the four people who did the initial survey work. The team worked for 14 weeks, concentrating mainly on the weed infestations on road reserves and other public land on the Peninsula. The team did a tremendous job of tackling the five weeds listed above. The Council also initiated newspaper articles, produced fact sheets on the five weeds, and a coloured poster of "PEST FLOWERS - DELIGHTFUL BUT DESTRUCTIVE" as part of a campaign to encourage the community to assist in eradicating *Bomarea*. This plant will only be eradicated if private landowners recognise the plant, understand the damage it can do and get rid of it.

How can Botanical Society members help eradicate *Bomarea*?

1) Look out for this vine - the only other vine I know of which has similar foliage is *Parsonsia* (native jasmine) However mature *Parsonsia* leaves are broader, not as tapered, darker green and have a glossy upper surface. (see fig. next page)
2) Ask neighbours and friends if they have this plant on their section, and explain what damage it can do to our native plants. Inform them of the *Bomarea* rule
3) Contact Lisa Maria at the Otago Regional Council for advice on identification and control.
4) Contact the Otago Regional Council for a copy of the *Bomarea* fact sheet
5) Inform Neville Miller, Dunedin City Council Parks of any *Bomarea* growing on road reserve or other DCC land. As the landowner, the DCC has responsibility to eradicate the plants. To ignore this responsibility is an offence under section 154(r) of the Biosecurity Act 1993.

Every *Bomarea* plant is a seed source and needs to be targeted.

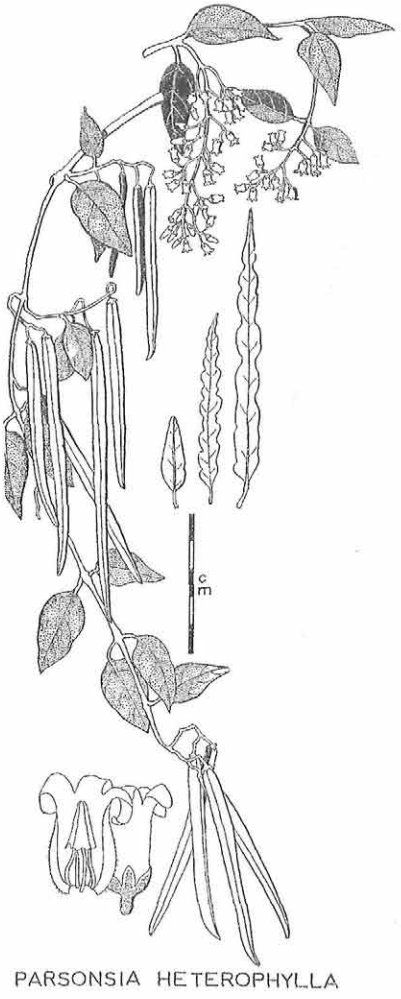
References

1) Angela Crompton 2/2/2001 Strangling beauty Otago Daily Times
2) Peter Johnson 1982. Forest and scrub vegetation on Otago Peninsula Botany Division DSIR
3) Tom Myers 11/8/2000. Beautiful climber has potential to become weed. Otago Daily Times
4) Pest Management Strategy for Otago. May 2001 Otago Regional Council
5) *Bomarea* factsheet 2002 Otago Regional Council
6) Peninsula Biodiversity Project fact sheet 2002 Otago Regional Council
7) Nigel McPherson (pers comm)

Moira Parker, conservationist

Botanical Definition: Tepal Used when the calyx (producing sepals) and the corolla (producing petals) of a flower are not readily distinguishable, as in the tubular flowers of *Bomarea caldasii* and *B multiflora*.

Fig. Leaves of *Bomarea caldasii* (photocopy) compared with *Parsonsia heterophylla* (From **Poole & Adams, *Trees and Shrubs of N.Z.***)



Reports and plant lists.

'Why weeds : Prioritising weeds for control and surveillance in Otago'

Presentation by Peter Raal (Department of Conservation) 19 June 2002

Peter began by outlining the various types of weeds, narrowing his talk to those invasive species that are a threat to species and ecosystems. About 250 fall into this

category and 121 of these are recorded in Otago, with 51 considered to present a serious threat. He went on to explain the reasons why DOC controls weeds before discussing the various strategies available to help achieve this. Most important was the 'Strategic Plan for Managing Invasive Weeds', a national document that introduces the important distinction between site-led and weed-led control programmes. Peter then outlined the process in determining an Otago strategy which involved a step-wise approach beginning with weed inventory and ending in operational plans. Along the way were important components of advocacy, liaison and co-operation with other organisations. The main control options (mechanical, chemical and biological) were also covered. Peter then explained the concept of weed surveillance which basically means finding new incursions soon after they arrive and eradicating them before they have time to get well established and potentially cost much more to control. This is not something DOC can do on its own and the important role that groups like the Botancial Society of Otago can play was emphasised. Finally we saw slides of a range of weeds of concern in Otago before Peter answered many probing questions from the audience. Thanks Peter for a very stimulating presentation on a subject that was clearly of considerable interest and relevance to this Society.

John Barkla, Department of Conservation, Otago Conservancy

Weed Sighting Forms

Have you.....
Been out in the field?
Seen exotic weeds that deserve to be reported - marram grass, passionfruit, elderberry, heiracium, old man's beard and others on the following lists?????
Peter Raal has given us weed reporting forms. They are in the herbarium at the Botany Department, University of Otago. They're in an appropriately labelled box situated on the bookshelf above the computer.
They are waterproof and notebook-sized !!
Feel free to grab some forms before/after a fieldtrip. A herbarium voucher is also worthwhile.
Post forms to D.o.C Otago Weed Control Officer, Box 5244, Dunedin when done.
Happy collecting !!

Adrienne Markey

Known invasive weeds occurring within the Otago Conservancy

Invasive weeds present in the Otago Conservancy were identified from discussions with DOC conservancy staff, internal reports, published literature and communications with botanists. The species are divided into weeds posing a serious or moderate threat to indigenous ecosystems or biodiversity conservation.

Many of the species on these two lists are included in weed-led and site-led control programmes and/or are recommended for monitoring. Where there are known infestations of these plants outside land administered by DOC, advocacy actions are recommended.

Weeds posing a moderate threat in the Otago Conservancy

Scientific name	**Common name**	*Scientific name*	**Common name**
Agapanthus praecox	Agapanthus	*Iris pseudacorus*	Yellow flag iris
Agrostis capillaris	Browntop	*Jasmine polyanthum*	Jasmine
Allium triqetum	Onion weed	*Juncus articulatus*	Jointed rush
Alnus glutinosa	Alder	*Juncus bulbosus*	Bulbous rush
Arctium minus	Burdock	*Juncus effusus*	Soft rush
Arundo donax	Giant reed	*Juncus squarrosus*	Heath rush
Bambusa spp	Bamboo	*Leycesteria formosa*	Himalayan honeysuckle
Berberis glaucocarpa	Barberry	*Ligustrum ovalifolium*	Privet
Betula pendula	Silver birch	*Ligustrum sinense*	Chinese privet
Bromus tectorum	Cheatgrass	*Lolium perenne*	Perennial ryegrass
Buddleja davidii	Buddleia	*Lotus pedunculatus*	Lotus
****Calicotome spinosa***	**Spiny broom**	*Melianthus major*	Cape honey flower
****Calotis lappulacea***	**Bur daisy**	*Mimulus guttatus*	Monkey musk
****Carduus spp.***	**Thistles**	*Nardus stricta*	Mat grass
Ceratophyllum demersum	Hornwort	*Nephrolepis cordifolia*	Tuber ladder fern
Cirsium arvense	Californian thistle	*Nymphaea alba*	Water lily
Cirsium palustre	Marsh thistle	*Paraserianthes lophantha*	Brush wattle
Conium maculatum	Hemlock	*Passiflora caerulea*	Blue passion flower
Convolvulus arvense	Convolvulus	*Pennisetum macrourum*	African feather grass
Cotoneaster spp.	Cotoneaster	*Phyllostachys aurea*	Bamboo
Crocosmia x crocosmiiflora	Montbretia	*Populus alba*	White poplar
Dactylis glomerata	Cocksfoot	*Potamegeton perfoliatus*	Clasped pondweed
Daphne laureola	Daphne	*Prunus spp.*	Cherries
Echium vulgare	Vipers bugloss	*Ribes sanguineum*	Flowering current
Equisetum arvense	Field horsetail	*Sambucus nigra*	Elderberry
****Eragrostis curvula***	**African lovegrass**	*Selaginella kraussiana*	African club moss
Erigeron karvinskianus	Mexican daisy	****Senecio angulatus***	**Cape ivy**
Eucalyptus spp.	Gums	****Senecio jacobaea***	**Ragwort**
Euonymus europaeus	European spindle	*Senecio mikanioides*	German ivy
Festuca arundinacea	Tall fescue	*Silibum spp.*	Thistles
Galeobdolon luteum	Aluminium plant	*Solanum diflorum*	Jerusalem cherry
Hedychium flavescens	Yellow ginger	*Solanum jasminoides*	Potato vine
Hieracium caespitosum	Field hawkweed	****Solanum marginatum***	**White-edged nightshade**
Humulus lupulus	Hop	*Solanum pseudocapsicum*	Jerusalem cherry
Hypericum androsaemum	Tutsan	*Sorbus aucuparia*	Rowan
Hypericum perforatum	St. John's wort	*Tropaeolum majus*	Nasturtium
Ilex aquifolium	Holly	****Urtica dioica***	**Perennial nettle**
Iris foetidissima	Stinking iris	*Zantedeschia aethiopica*	Arum lily

*Weeds included in the Otago Regional Council's Regional Pest Management Strategy (RPMS).

Weeds posing a serious threat in the Otago Conservancy.

Scientific Name	**Common Name**	*Scientific Name*	**Common Name**
Acer pseudoplanatus	Sycamore	*Lupinus arboreus*	Tree lupin
Ammophila arenaria	Marram grass	*Lupinus polyphyllus*	Russell lupin
Berberis darwinii	Darwin's barberry	*Lycium ferocissimum*	Boxthorn
****Bomarea caldasii***	**Bomarea**	*Lythrum salicaria*	Purple loosestrife
****Bomarea multiflora***	**Bomarea**	*Passiflora mollissima*	Banana passionfruit
Calluna vulgaris	Heather	****Pinus contorta***	**Lodgepole pine**
****Chrysanthemoides monilifera***	**Boneseed**	*Pinus mugo*	Mountain pine
Clematis tangutica	Oriental clematis	*Pinus nigra*	Corsican pine
****Clematis vitalba***	**Old Man's Beard**	*Pinus radiata*	Radiata pine
Cortaderia jubata	Pampas	*Pinus sylvestris*	Scotts pine
Cortaderia selloana	Pampas	*Plantago coronopus*	Buckshorn plantain
Crataegus monogyna	Hawthorn	*Pseudosuga menziesii*	Douglas fir
****Cytisus scoparius***	**Broom**	*Rosa rubiginosa*	Sweet brier
Elodea canadensis	Canadian pondweed	*Rubus fruiticosus*	Blackberry
Erica lusitanica	Spanish Heath	*Salix cinerea*	Grey willow
Glyceria fluitans	Floating sweetgrass	*Salix fragilis*	Crack willow
Glyceria declinata	Floating weedgrass	*Sedum acre*	Stonecrop
Glyceria maxima	Reed sweetgrass	****Spartina spp***	**Spartina**
Hedera helix	Ivy	****Stipa trichotoma***	**Nassella tussock**
Hieracium lepidulum	Tussock hawkweed	****Teline monspessulana***	**Montpellier broom**
Hieracium pilosella	Mouse-eared hawkweed	*Tradescantia fluminensis*	Wandering jew
Hieracium praeltum	King devil	*Tropaeolum speciosum*	Chilean flame creeper
Juncus gerardii	Black salt rush	**Ulex europaeus*	Gorse
****Lagarosiphon major***	**Lagarosiphon**	*Undaria pinnatifida*	Undaria
Larix decidua	Larch	*Vinca major*	Periwinkle
Lonicera japonica	Japanese honeysuckle		

*Weeds included in the Otago Regional Council's Regional Pest Management Strategy (RPMS).

Reference: Owen, S.J. 1997:*Ecological Weeds on Conservation Land in New Zealand: A Database.* Department of Conservation, Wellington, New Zealand.

Peter Raal, Technical Support Officer: Plant Pests and Biosecurity, DoC, Otago.

Botanical Society of Otago Fungal Foray 14th – 16th June 2002. Haast Pass to Makarora. This eagerly anticipated trip was not held because of snow ! **We'll try again in May next year – look out for it.**

July Meeting: **Botany of the Bay of Plenty**

Graeme Jane, botanist with zeal, came down from Tauranga to tempt us with all that is interesting in the Bay of Plenty, site of this summer's Wellington Botanical Society field trip. Defining the Bay of Plenty is not easy, depending whether the boundaries are political, geographical or ecological. In the broadest sense it stretches in a broad triangle from the base of Coramandel peninsula in the north to the base of East Cape in the south, and inland as far as Lake Taupo. Potential sites of interest for the summer include the fog forests of the Kaimai ranges, where red and silver beech reach their northern limit and kauri it's southern; the thermal communities of Rotorua, the fringes of the Urawera forests, the coastal wetlands, dunelands and mangroves.

Factors determining the current landscape and flora, such as geology, climate, volcanic, human, and animal disturbance, were vividly described and illustrated. Repeated volcanic eruptions in the surrounding area have overlain greywacke with layers of lava, ash, and pumice of varying fertility. The longshore tropical current has carried volcanic sands to form sandy shores, shallow bays and coastal wetlands and approaches it's southern limit here, as do the mangroves. The Bay also often marks the limits of both warm tropical cyclones and the cold southerly snowstorms, forming a rich transition area as northern plant communities replace southern.

Massive volcanic activity in the Taupo area around 2000 years ago largely wiped out beeches from the Uraweras. They were replaced by richly fruiting podocarps, attracting birds, which in turn attracted many Maori. Fortified pa sites remain a feature of the landscape and there are 4000 archaeological sites in Tauranga alone. Europeans cleared the forests and drained the swamps for farmland. They milled kauri for houses, building log dams to flood the logs down the streams. Tramways (now tramping tracks) were constructed to extract kahikatea for butter boxes and tawa for flooring. Much forest was cleared for goldmining, then for pasture and for exotic forest planting.

Wild goats, deer and possums have all impacted on the flora. Recently 50,000 ha in the northern Urawera (Waimana) has been set up as a 'mainland island' and Tauranga city is active in restoring coastal estuaries. Thank you, Graeme, for giving us such a comprehensive overview of your home patch, and for giving us the excuse to go out to a convivial banquet afterwards

Allison Knight

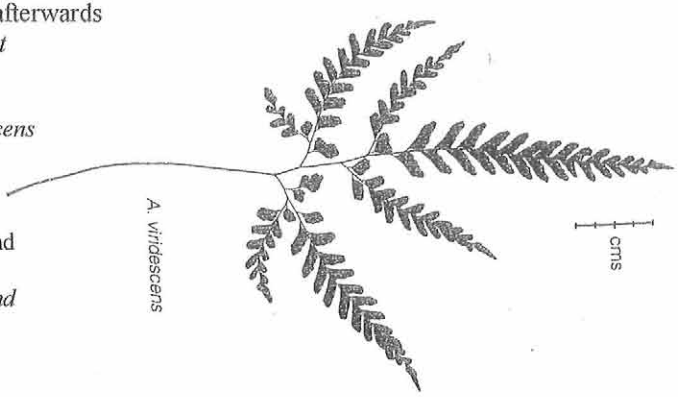


Fig. *Adiantum viridescens*

From: PJ Brownsey and JC Smith-Dodsworth, *New Zealand Ferns and Allied Plants* 2000.

Some plant species of interest in the Bay of Plenty - *Graeme Jane 2002*

(excerpted from Graeme's Kaimai and Rotorua district lists of over 500 taxa)

Scientific name **(synonyms); common names**

Dicotyledonous trees and shrubs

Beilschmiedia tarairi; Taraire
Brachyglottis kirkii (Senecio kirkii, Urostemon); Kirks daisy
Coprosma arborea; Mamangi, tree-coprosma
Coprosma dodonaeifolia
Coprosma spathulata
Corokia buddleioides; Korokio-taranga
Dracophyllum latifolium agg. (D. mathewsii); Needle-leaved neinei
Dracophyllum lessonianum
Dracophyllum sinclairii agg. (D. viride, D. adamsii)
Dracophyllum strictum; Totorwhiti; grass tree
Epacris pauciflora; Tamingi, bog epacris
Gaultheria oppositifolia; Niniwa
Hebe macrocarpa var. (H. corriganii)
***Ixerba brexioides*; Tawari**
Leionema nudum (Phebalium); Mairehau
Litsea calicaris; Mangeo
Mida salicifolia; Willow-leaved maire
Pimelea tomentose; Taranga;
Pittosporum kirkii; Thick-leaved kohuhu
Pittosporum umbellatum; Haekaro
Pseudopanax discolor;
Rhabdothamnus solandri; Taurepo;
Syzygium maire (Eugenia); Swamp maire, maire tawake
Toronia toru (Persoonia); Toru
Vitex lucens; Pururi, kauere

Gymnosperm trees and shrubs

Agathis australis; Kauri
Phyllocladus toatoa (P. glauca); Toatoa

Monocotyledonous trees and shrubs

Cordyline pumilio; Ti rauriki, dwarf cabbage tree

Dicotyledonous lianes and related trailing plants

Clematis cunninghamii (C. parviflora); Scented clematis, pokopoko
Metrosideros carminea; Crimson rata

Scientific name **(synonyms); common names**

Psilopsids, Lycopods & Quillworts

Psilotum nudum (P. heterocarpom)
Tmesipteris lanceolata (T. tannensis)

Ferns

Adiantum fulvum
Adiantum hispidulum (A. pubescens); Rosy maidenhair fern
***Adiantum viridescens* (A. fulvum)**
Arthropteris tenella; Jointed fern
Asplenium lamprophyllum
Blechnum nigrum; Black fern
Cyclosorus interruptus
Hymenophyllum pulcherrimum (Mecodium)
Hypolepis dicksonioides
Lindsaea viridis
Lygodium articulatum; Mangemange
Nephrolepis "thermal" (N. cordifolia, N. "Kermadec")
Microsorum novae-zelandiae (Phymatorus); Fragrant fern
Thelypteris confluens

Orchids

Pterostylis micromega
Pterostylis aff. *montana*

Sedges

Baumea arthrophylla (Cladium)
Carex spinirostris
Carex subdola
Morelotia affinis

Remaining herbs

Astelia "nervosa North" (A. kauri)
Elatostema rugosum; Parataniwha
Gentiana spenceri
Hydrocotyle pterocarpa
Jovellana sinclairii; Maori calceolaria
Nertera dichondrifolia (Coprosma); Hairy nertera
Rorippa divaricata (R. gigantea, G. stylosa)

***Illustrated** this issue

Rare and threatened plants in the Bay of Plenty – *Graeme Jane*

***Taxon* (Current CMS status) and (Most recent recorded sighting).**

Pterostylis micromega
Christella "dentata: thermal"
Dicranopteris linearis,
Pterostylis puberula (E) 1955 (Hynes and Knowleton)
Euphorbia glauca (V) 1992 (A. Wright pers. comm.)
Lepidium oleraceum (V) 1955 (Hynes and Knowleton)
Pimelea tomentosa (V)
Marattia salicina (R) 1926 (Allan and Dalrymple)
Nephrolepis "cf. cordifolia"
Ranunculus macropus (V) 1926 (Sladden)
Rorippa divaricata (V)
Hibiscus trionum "NZ" (V)
Pisonia brunonnina (R)
Sicyos australis (L) 1955 (AK herbarium voucher)
Corybas cryptanthus (I) 1930 (Lucy Moore record, B. Irwin)

Key: CMS, Conservation Management Strategy; E, endangered; V,vulnerable; R, rare; L, local; I, indeterminate.

Reference: D Given, *Rare and endangered plants of New Zealand.* Reed, 1981.

Fig. ***Christella dentata***

(From: PJ Brownsey and JC Smith-Dodsworth, *New Zealand Ferns and Allied Plants* 2000.)

Fungus Workshop, 20 July 2002

On a sunny Saturday afternoon sixteen keen would-be mycologists gathered in the downstairs Botany laboratory to learn from David Orlovich how to identify fungi to herbarium standard. First, David explained the importance of a line drawing or photograph of fresh specimens showing several fruiting bodies of representative ages, including the base of the stalk and with a transverse section and a size scale. He highlighted the need to collect at least 3 of each species and to process them fresh before dehydrating them to preserve them. David also warned us not to handle any specimens by the stalk, except at the very base, so as not to obliterate fragile features.

Next, using a video attached to a dissecting microscope he pointed out relevant macroscopic features to note:- colour (using a standard soil colour chart), texture and shape of the cap (**pileus**), stalk (**stipe**), gills and spores (from a spore-print). A generous handout with a comprehensive glossary of descriptive terms used internationally greatly increased our mycological vocabulary and the precision of our descriptions.

Then David went on to show us how to use the high power microscopes to look at relevant features of gills and gill squashes, revealing the sterile **cystidia**, the **basidia** to which spores are attached, and the spores themselves. Again, the video camera attached to the microscope gave us a good idea of what to look for.

Once all the details were assembled we could have a go at using the key to the genera of New Zealand *agarics*, *boletes* and related genera in the handout. It was all so fascinating that the keenest stayed on til after dark. Special thanks to those who brought fresh specimens and many thanks to David for setting such an enthusiastic and professional standard, and to the Botany Department for making available the laboratory, microscopes and other equipment. **Note:** A reference copy of the Fungal Workshop handout is available in the Herbarium, Botany Department, University of Otago. . *– Allison Knight*

Brief Fungal Glossary *– Allison Knight*

The following excerpts from fungal and lichen glossaries give some idea of the terminology used to properly describe a fungal collection for the herbarium. They are given in the order of terms used in Slaven Kljucanin's description on the next page.

habit: the natural form or appearance of an organism
omphaloid: gills (**lamellae**) descending down the stalk (**stipe**). (See fig below)
pileus: cap of mushroom or toadstool
hygrophanous: having a water-soaked appearance when wet
lamellae: gills (vertical radiating plates covered with **hymenium**, under the cap)
decurrent: gills descending down the stalk.
lamellulae: short gills that don't go all the way from the cap margin to the stalk.
stipe: stalk of fungal fruiting body (basidioma or ascoma)
(sub)globose: (sub)spherical, or nearly so.
apiculus: the projection which connects the spore to the **sterigma**
amyloid ridges: ornamentation on spores (see *Lactarius*, fig a)
basidia: spore-bearing structures in the **hymenium** (see *Lactarius*, fig b)
hyaline: colourless, transparent
clavate: club-shaped
sterigmata (singular **sterigma**):apical extensions on the **basidia** which bear the spores
cystidia: sterile, differentiated terminal elements in the spore-producing layer. (see *Lactarius*, fig c)
fusiform: spindle-like, wide in the middle and narrow at both ends
hymenium: the spore-producing layer in a fungal fruiting body

References:
1. *Flora Agaricina Neerlandica*, vol 1. Ed C Bas et al 1988. Ch 8, *Glossary*, E Vellinga.
2. W Malcolm & D Galloway, 1997. *New Zealand Lichens*: Checklist, Key and Glossary

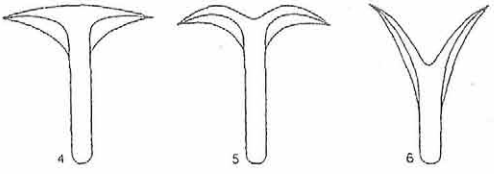
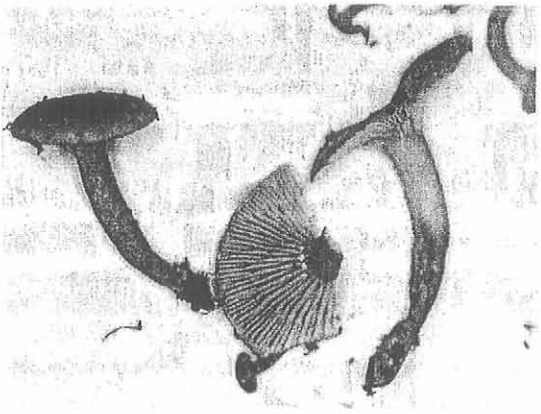


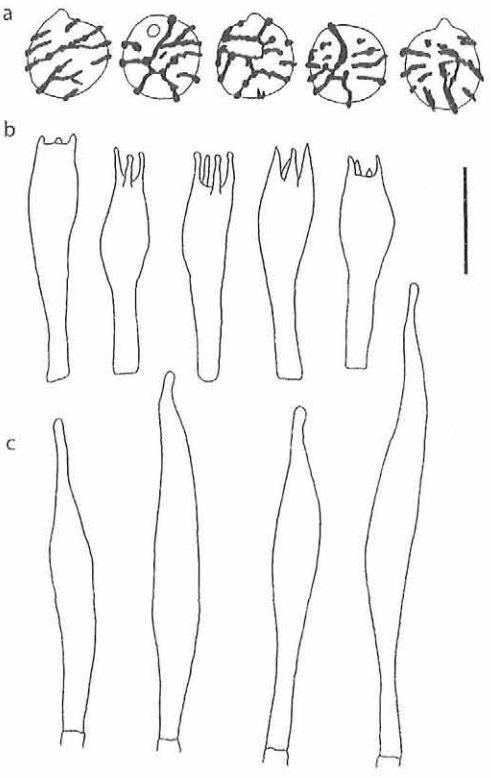
Fig. **Omphaloid** habit, with decurrent gills (from ref. 1.)

Lactarius sp. aff. *umerensis* (McNabb). **Russulaceae** (Lotsy 1907)

Habit omphalioid. **Pileus** circular, 10-30 mm diameter, salmon, dark red (Munsell 10R 4/6), convex in younger specimens, centrally depressed or applanate, surface dry, rough, not hygrophanous, margin regular. **Lamellae** creamy pink (Munsell 5YR 7/3), crowded, subdecurrent or decurrent, 3-4 sets of lamellulae, when damaged exude white latex that changes to creamy yellow on exposure to air. **Stipe** central, breaks like chalk, dark red, slightly lighter towards pileus, 1-4 cm long, 2-5 mm diameter, hollow in some mature specimens. Flesh continuous in cap and stem, texture brittle, exuding latex (same as above). Photograph x 1.25.



Spores (a) creamy white, subglobose, 6.5-8 x 6.5-8 µm, measured from dried lamellae mounted in KOH, obliquely apiculate, apiculus to 1 µm, ornamentation of amyloid ridges up to 1 µm high. **Basidia** (b) hyaline, narrowly clavate, 36-46 x 6-13 µm, 4 spored, sterigmata to 6 µm long, clamp connections not present. **Cystidia** (c) narrowly fusiform, filled with contents giving appearance of shattered glass, 56-90 x 5-10 µm, clamp connections not present. Scale bar: (a)= 10 µm, (b,c)= 20 µm.



Notes: *Lactarius umerensis* McNabb has much smaller cystidia than this collection (25-60 x 3.5-6 µm), the spores of *L. umerensis* as described by McNabb (1971) are broadly elliptical; 8-10.5 x 6.5- 9 µm. *L. umerensis* McNabb has latex that is unchanging on exposure to air, but dries pallid cream. This collection had latex that changed from white to creamy yellow within 30 minutes of exposure to air.

Collection: Collected 6. v. 2002. Cascade Forest, South Westland, New Zealand in *Nothofagus* forest. Collector: Slaven Kljucanin.

Reference: McNabb, R. F. R. (1971) The Russulaceae of New Zealand 1. *Lactarius* DC ex S. F. Gray. *New Zealand Journal of Botany* **9**, 46-66.

Description and figures by ***Slaven Kljucanin***, 4th year student, Botany Dept., Otago Uni.

Reviews

Book

by John Steel

Buck, W.R.; Vitt, D.H.; Malcolm, W.M. 2002. *Key to the genera of Australian mosses.* 120 pp. Spiral bound. Australian Biological Resources Study, Canberra. $NZ45.

New Zealand has 207 genera of mosses which makes it relatively rich when compared to Australia which has 291, 170 of which are shared. Knowing this, I decided to risk what appears a rather high price for a small book which may have had limited value. As soon as I saw the cover I knew I was onto a winner!

I am a huge fan of Bill Malcolm's work and the front cover has his mark stamped all over it. Essentially it is a companion volume to the Malcolms' glossary (Malcolm, W.M.; Malcolm, N. 2000) and the two work together rather well. This volume is packed with information but could prove troublesome to the novice with little knowledge of the terminology.

The key is typically dichotomous but each terminal branch comprises a full description of a genus. The description is concise, full and even covers habitat and distribution within Australia. Each page has either four or eight excellent colour photographs highlighting some feature of the genus described and these have an added advantage of breaking up the rather densely packed layout. The photographs are small but effective with the exception of a few of those displaying a plant habit. The captions generally contain only a species' name and here the beginner needs access to the glossary to backtrack using the name to find a picture to identify the feature – I still cannot work out the cellular feature for what appears to be a leaf cross-section from *Atrichum angustatum*. (For my nit-picky point - a leaf of *Atrichum angustifolium* is shewn but appears in the glossary as *A. angustatum*.) This could also prove difficult for the Australian species which do not feature in the glossary. No doubt caption additions would have added considerably to space and cost.

A valuable addition to the New Zealand library; not a millimetre of space goes unused nor an unnecessary word added and yet the book does not suffer from cramping. And if the photographs are not enough the book ends with four pages of superb coloured line-drawings.

Reference: Malcolm, W.M.; Malcolm, N. (2000) *Mosses and other bryophytes. An illustrated glossary.* Micro-Optics Press, Nelson.

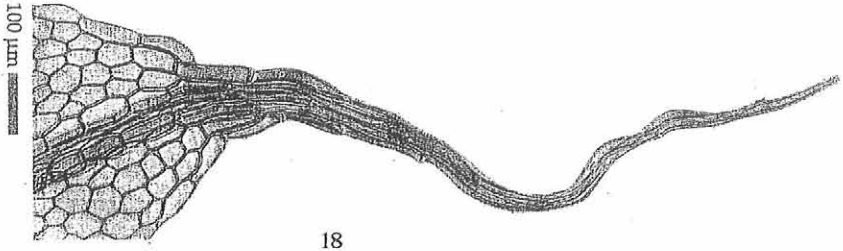


Fig. *Tayloria octoblepharis* leaf, cleared. From book reviewed above.

BSO Members Discount: Many botanical books, including those published by CSIRO, Australia, are available from Manaaki Whenua Press, at 20% off, to BSO Members. This includes post and packing. If you are a member of BSO, say so when you order.

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Web Sites

The New York Botanical Garden Vascular Plant Type Catalog (http://www.nybg.org/bsci/hcol/vasc/)

There's something really exciting about looking through old herbarium sheets. You might see the handwriting of famous collectors and botanists like Allan Cunningham, Donald Petrie and Etienne Fiacre Louis Raoul. You might come across specimens collected by Banks and Solander on Cook's first voyage. Well, at http://www.nybg.org/bsci/hcol/vasc/ you can do it all! The folks at the New York Botanical Garden have photographed and made available on the web all the vascular plant type specimens they have in their herbarium - 82,000 of them! Once those specimens on loan at present are returned and photographed, there will be almost 90,000 type specimens on-line.

"Who cares?" you might say - New York is a long way away from Otago! Well, I found that they have 38 collections from New Zealand listed as either types, syntypes, isotypes or 'possible types'. There is a specimen of *Ranunculus hirtus* Banks 499 and Solander labelled as "Type specimen" (although I couldn't verify this from Vol. 1 of Flora of New Zealand as the type specimen details are not recorded there). There is a collection of *Pratia arenaria* Hook. f. from the Auckland Islands, collected on the Wilkes Expedition (U.S. South Pacific Exploring Expedition, 1838-1842). Closer to home, there is a collection of *Carmichaelia compacta* Petrie from "Dunstan Gorge, Central Otago", a sheet originally from the herbarium of Leonard Cockayne. I got a bit confused about this one as the collecting details are "No. 1727 ... D. Petrie Nov 1890", and the specimen is listed on the web site as "Type". However that species was described five years earlier by Petrie in 1885 in the *Transactions and Proceeding of the New Zealand Institute 1884, vol. 17* (published 1885). There is no type locality in the original description, just a statement "Hab. Kawarau Gorge and Dunstan Gorge, Clutha River, Otago". In 1945, G. Simpson (*Transactions of the Royal Society of New Zealand 75: 321-287*) reported that one of Petrie's specimens "from the entrance to the Dunstan Gorge, near Clyde, No 224/490a" (now WELT 53661) was marked as "type" and thus that collection was designated as the lectotype. Peter Heenan from Landcare Research, Lincoln upheld this in his 1995 (*New Zealand Journal of Botany 33, 443*) paper and also upheld three of Simpson's isolectotypes (AK 4929, 211346 and WELT 26306).

Thus whilst the specimen at the New York Botanical Garden herbarium is interesting and valuable (at least as another specimen falling within Petrie's concept of that species and coming from the type locality), it isn't "type" material. I also got to

wondering about the sheets labeled "possible type" on the web site. I emailed Barbara Thiers, the director of the Herbarium in New York, to ask what "possible types" were and she replied (10 minutes later – email is incredible isn't it!) "... this is usually used in the case of putative syntypes, where the protolog is very vague, and there are a number of specimens that might potentially match it. We were not able to verify the status of every single type, but we thought by adding "possible type" we were at least alerting users to specimens that perhaps should be considered in lecto or neotypification."

So, it's an interesting website and one which will be valuable to people searching for early collections of selected species. Provided you're aware that the listing as "type", "syntype" etc should serve as a starting point for your investigation and not the end point, it is a worthwhile resource. Searching through the image database occupied a whole afternoon for me and I highly recommend the web site to people interested in taxonomy and botanical history. The New York Botanical Garden also maintains the online **Index Herbariorum** and a number of other databases such as **Lichens of Eastern North America** and the **Catalogue of Costa Rican Fungi**. The Costa Rican fungi catalogue even has macroscopic descriptions of some collections done by Roy Halling. You can access all these databases from the **Virtual Herbarium of the New York Botanical Garden** at http://www.nybg.org/bsci/hcol/.

Acknowledgments: I thank Peter Heenan, Landcare Research Lincoln and Dr Barbara Thiers, Director, The New York Botanical Garden Herbarium for help in preparing this review.

David Orlovich
Ecology, Conservation and Biodiversity Research Group,
Department of Botany, The University of Otago,

Botanical Society of Otago: http://www.botany.otago.ac.nz/bso Don't forget our very own web site, which David Orlovich is in the process of upgrading – in September, after he comes back from a Mycology conference in Oslo !

New Zealand Plant Name Database domain change!:

http://nzflora.landcareresearch.co.nz. Aaron Wilton advises that "Landcare Research have recently changed the domain name of their website (and email addresses) - 'landcare.cri.nz' has been replaced with **'landcareresearch.co.nz'**. Apparently people overseas didn't understand 'cri'. The website now includes lichens, mosses, liverworts, ferns, seed plants and fresh water algae. Common and Maori names have also recently been made available and can be searched." There are synonyms as well as current names for some of the plants, liverworts and lichens. Interestingly, *Bomarea multifida* is still the only *Bomarea* species listed as wild in New Zealand in this database.

All this marvelous extra information means that the interface now works best with Internet Explorer version 5 and later OR Netscape version 6 and later. Links to free upgrades are provided on the plant names home page. If only there were links to free computer upgrades!

- Allison Knight

News

New curator at CHR Herbarium.

Dr Aaron Wilton has recently replaced Dr Peter Heenan as the curator at the Landcare Research H H Allan Herbarium, Lincoln.

Newsletters from other Botanical Societies

Current newsletters from botanical societies in Auckland, Waikato, Rotorua, Wellington, Christchurch and Wakatipu are posted on the BSO notice board outside the Botany Department tea room. Back copies of newsletters, including the Botanical Society of New Zealand and BSO, are stored in the computer room. Check out the excellent recent bulletin from Auckland Botanical society.

Botanical Diary

National

18th John Child Bryophyte Workshop, 28 Nov – 3 Dec.
Based at Albert Town, near **Wanaka**, Central Otago.
For registration forms and more information see our noticeboard or contact:
David Glenny/Geoff Spearpoint, c/o 49 Hillview Rd, Birdlings Flat, Little River, 8162, New Zealand (Ph 03 329 0008)

Wellington Botanical Society summer trip, 2-12 Jan, 2003
Based on two camp sites near Katikati and Matata in the **Bay of Plenty**
Please register by 15 Sept. Forms are on our BSO noticeboard and website

Local events, Sept. (BSO events in boxes, details on front cover!)

4 Sept, Wed. 12 noon. Botany Dept Seminar. ***Invasive Plant Species: lessons from Australia.*** **Dr Ian Radford**, Hellaby Indigenous Grasslands Research Trust Post Doctoral Fellow, Botany Department, University of Otago, Dunedin

11 Sept, Wed. 12 noon. Botany Dept Seminar. ***Urban Ecology: a planning perspective*** **Dr Claire Freeman**, Geography Department, University of Otago

11 Sept, Wed. 5.30 pm. **BSO meeting**. Zoology Annexe. ***Threatened Plants of Otago*** **John Barkla**, Department of Conservation, Otago Conservancy.

12 Sept, Thurs.7 pm. Ocean Grove. ***Community-based Coastal Management***
Tomahawk-Smaills Beachcare is pleased to announce that **Greg Jenks** will be talking about his work as a Beachcare coordinator in the Bay of Plenty, as part of a visit to Dunedin organised by the Department of Geography. He will be talking at the Ocean Grove Community Hall at 7pm. There will be an opportunity for discussion and to meet others interested in coastal management issues.
Contact: Tracey Roe, 473 1553

18 Sept, Wed. **12 –2 pm**. Botany Dept Seminar. ***Honours/Post Graduate Diploma in Science student presentations.*** Note extended time.

19 Sept, Thurs. 1-2 pm. Botany Dept Seminar. ***Honours/Post Graduate Diploma in Science student presentations.*** Note changed time.

25 Sept, Wed. 12 noon. Botany Dept Seminar. ***Microsatellites and mushrooms: the population dynamics of Boletus edulis.*** **Alison Stringer,** MSc student, Botany Department, University of Otago

28 Sept, Sat. 1pm. **BSO field trip** with **Ralf Ohlemueller** to look at native species richness and exotic invasions in ***Graham's Bush.*** Meet botany Dept car park.

19 Oct, Sat. 10 am. **BSO field trip** with **Robyn Bridges** to botanise ***Heyward Point.*** **Good 6 h tramp.** Bring lunch, hand lens, boots etc. Meet botany Dept car park.

Local contacts and meeting places of groups with overlapping interests.

University of Otago Botany Dept Seminars are on Wednesdays during teaching semesters at 12 noon, upstairs in the Union St Lecture Theatre (formerly Botany School Annexe), **in the red-brown bldg, Cnr Union St West & Great King St. Contact: Trish Fleming, Secretary, phone 479 7577**

Dunedin Naturalists' Field Club (DNFC) Meetings are at 7.30 pm, first Monday of the month, in the Zoology Dept Seminar Room, (NOTE CHANGED VENUE) Great King St. Their field trips leave from the Citibus Depot, Princes St. Visitors are welcome. Contact: Beth Bain, President, 455 0189, email: bethbain@ihug.co.nz

Dunedin Forest and Bird (F&B) meetings are on Tuesday, at 7.45 pm in the Hutton Theatre, Otago Museum. Field trips leave from Otago Museum Gt King St entrance, 9am, Saturday. Secretary: Paul Star 478 0315

Friends of the Botanic Garden meet on the third Wednesday of the month at 7.30 pm in the Education Centre, Lovelock Ave. Secretary: Mrs Betty Wolf, 488 1550

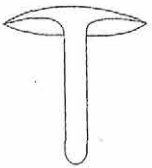
DOC Conservation Volunteers: ongoing opportunities for hands on conservation work in coastal Otago. Learn new skills in some neat places, help conservation efforts and have fun all the while! To sign up, and receive newsletters and event programmes, contact Caren Shrubshall, DOC: email: cshrubshall@doc.govt.nz, Ph 474 6932.

Otago Institute (OI) contact: Michelle McConnell, secretary, phone 479 5729, email: michelle.mcconnell@stonelaw.otago.ac.nz
Web: http://otagoinstitute.otago.ac.nz/

Southland Natural History Field Club. Meetings 7.30pm on the second Thursday of the month, currently at the Otatara Hall,just out of Invercargill. Fieldtrips the following Saturday or Sunday to places of botanical, ornithological, ecologcial or geological interest. Contact Lloyd Esler 032130404, email esler@southnet.co.nz

Times and other details may change. Check with the group involved first.

Botanical Society of Otago: whom to contact



Our mailing address is:
Botanical Society of Otago, c/o Botany Department,
University of Otago, P.O. Box 56, Dunedin, New Zealand

For membership enquiries, email the **treasurer**:
Ralf Ohlemueller, *ralf.ohlemueller@botany.otago.ac.nz*, ph.479 5981

For media, publicity or event enquiries, email the **secretary**:
Robyn Bridges, *robyn.bridges@stonebow.otago.ac.nz*, ph 479 8244

To suggest or offer to write newsletter items, email the newsletter editor:
Allison Knight, *botsocotago@botany.otago.ac.nz*

To suggest or offer trip ideas or speakers for our monthly activities, email the **chairman: David Orlovich**, *david.orlovich@botany.otago.ac.nz*, ph 4799060, or one of the other **committee members: Barbara Anderson, Kelvin Lloyd, John Barkla** or **Bastow Wilson.**

For information on activities contact the trip leader or see our notice board or web page: **http://www.botany.otago.ac.nz/bso/**

This Newsletter was published on 27 August 2002. ISSN 0113-0854
Please submit copy for next newsletter by the end of September.

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