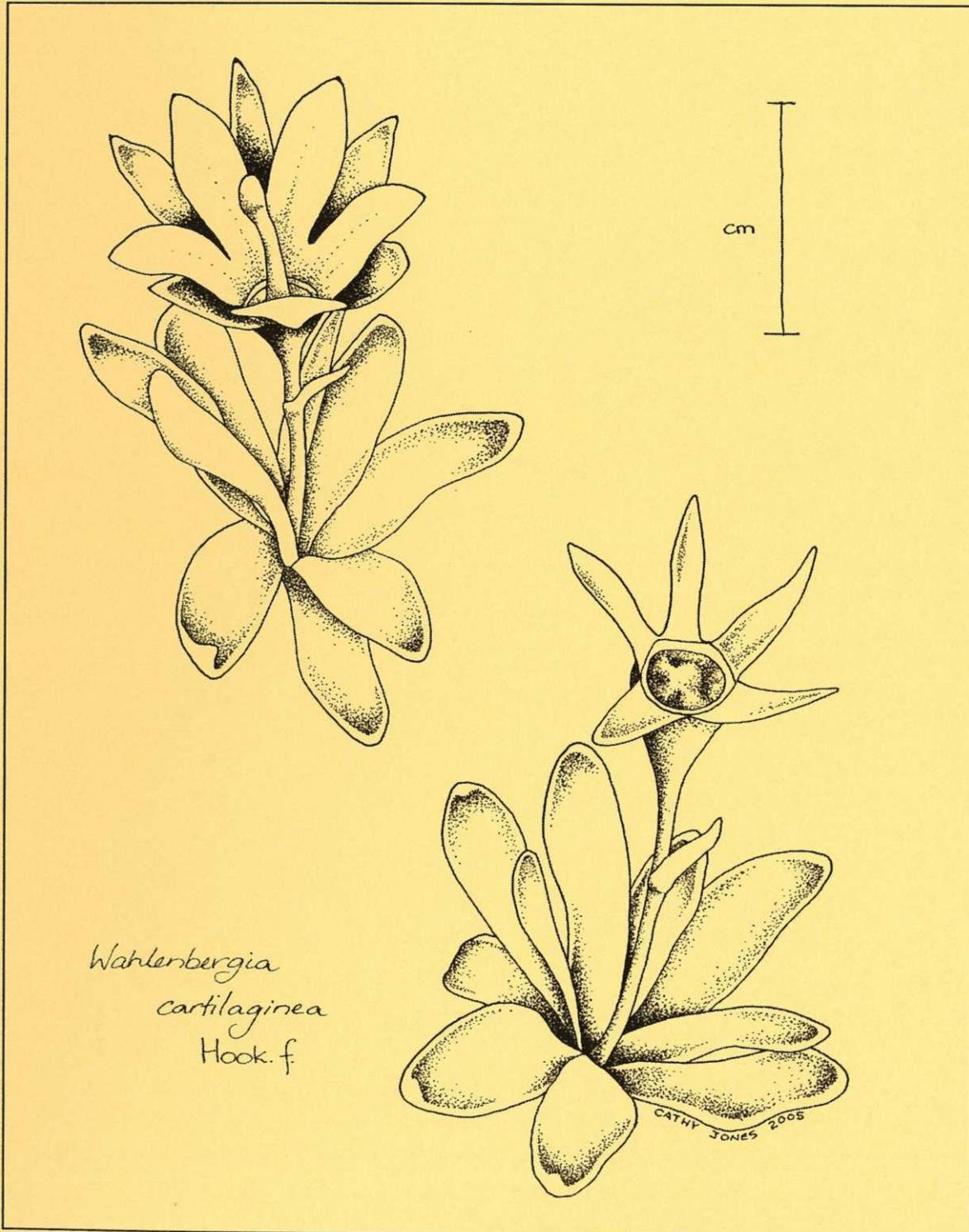


NEW ZEALAND BOTANICAL SOCIETY
NEWSLETTER

NUMBER 79

MARCH 2005



New Zealand Botanical Society

President: Anthony Wright
Secretary/Treasurer: Aaron Wilton
Committee: Bruce Clarkson, Colin Webb, Carol West

Address: c/- Canterbury Museum
Rolleston Avenue
CHRISTCHURCH 8001

Subscriptions

The 2005 ordinary and institutional subscriptions are \$25 (reduced to \$18 if paid by the due date on the subscription invoice). The 2005 student subscription, available to full-time students, is \$9 (reduced to \$7 if paid by the due date on the subscription invoice).

Back issues of the *Newsletter* are available at \$2.50 each from Number 1 (August 1985) to Number 46 (December 1996), \$3.00 each from Number 47 (March 1997) to Number 50 (December 1997), and \$3.75 each from Number 51 (March 1998) onwards. Since 1986 the *Newsletter* has appeared quarterly in March, June, September and December.

New subscriptions are always welcome and these, together with back issue orders, should be sent to the Secretary/Treasurer (address above).

Subscriptions are due by 28th February each year for that calendar year. Existing subscribers are sent an invoice with the December *Newsletter* for the next years subscription which offers a reduction if this is paid by the due date. If you are in arrears with your subscription a reminder notice comes attached to each issue of the *Newsletter*.

Deadline for next issue

The deadline for the June issue (80) is 25 May 2005.

Please post contributions to: Joy Talbot
17 Ford Road
Christchurch 8002

Send email contributions to joytalbot@free.net.nz or talbotj@cpit.ac.nz. Files are preferably in MS Word (Word XP or earlier) or saved as RTF or ASCII. Graphics can be sent as Corel 5, TIF JPG, or BMP files. Alternatively photos or line drawings can be posted and will be returned if required. Drawings and photos make an article more readable so please include them if possible. Macintosh files cannot be accepted so text should simply be embedded in the email message.

Cover Illustration

Wahlenbergia cartilaginea, a South Marlborough endemic, growing on scree and stable gravel slopes. These particular plants came from Island Saddle in the Upper Wairau area of Molesworth Station.

Drawing by **Cathy Jones**

NEW ZEALAND BOTANICAL SOCIETY
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NEWS

New Zealand Botanical Society News

▪ From the Secretary

Call for Nominations for the Allan Mere Award 2005

Nominations meeting the following conditions are invited for the award of the Allan Mere for the year 2005.

Conditions of Allan Mere Award

1. The Award shall be made annually to a person or persons who have made outstanding contributions to botany in New Zealand, either in a professional or amateur capacity.
2. The award shall be administered by the New Zealand Botanical Society.
3. Nominations for the Award may be made by regional Botanical Societies, or by individuals, to the Secretary of the New Zealand Botanical Society. Nominations shall close on 30th June each year. Nominations shall be signed by a nominator and seconder, and accompanied by two copies of supporting information that must not exceed one A4 page.
4. Selection of the successful nominee/nominees shall be made by the Committee of the New Zealand Botanical Society, normally within three months of the closing date for nominations.
5. If, in the opinion of the Committee, no suitable nomination is received in any particular year, the Committee may refrain from making an award.
6. The Mere shall be formally presented to the recipient on an appropriate occasion by the President of the New Zealand Botanical Society or his/her nominee, but otherwise shall remain in the custody of, and be displayed by, the Herbarium Keeper of the Allan Herbarium (CHR) at Landcare Research, Lincoln, together with the book recording awards.
7. The recipient shall receive an appropriately inscribed certificate.

Nominations should be forwarded by 30 June 2005 to:

Aaron Wilton, Secretary, New Zealand Botanical Society, c/- Canterbury Museum, Rolleston Avenue, Christchurch 8001

Financial Statement 2005

Balance sheet for financial year 1 January – 31 December 2004

Income	\$	Expenditure	\$
B/fwd from 2003	3,156.50	Printing Newsletter No. 74 (2003)	848.25
2003 Subscriptions	36.00	Posting Newsletter No. 73 & 74	256.74
2004 Subscriptions	5,209.00	Printing Newsletter No. 75	1,199.25
2005 Subscriptions	168.00	Printing Newsletter No. 76	1,275.75
Sponsor a Student Sub Donation	322.00	Posting Newsletter No. 76	267.65
Back Issue Sales	40.00	Printing Newsletter No. 77	990.00
Donations	32.00	Posting Newsletter No. 77	276.40
Interest	6.43	Bank Fees	42.00
Total Income	\$8,969.93	Total Expenses	\$5,156.04

Excess income over expenditure of \$3813.89 presented by current account balance of \$1651.18 and cash saver account balance of \$2,162.71 carried forward to 2004.

Note that the 2004 payment for printing the December *Newsletter* 78 (\$832.50) and postage (\$276.40) did not come to account until 2005 leaving an effective balance for 2005 of \$2704.99.

Aaron Wilton, Treasurer, New Zealand Botanical Society
wiltona@landcare.cri.nz

2 March 2005

Regional Botanical Society News

■ Auckland Botanical Society

September Meeting

Two past recipients of the Lucy Cranwell Fund awards spoke on the subject of their study. First, Jo Meys spoke on the role of introduced mammals in seed predation and dispersal of *Dactyloctenium aegyptium*. This was followed by Rose Thorogood's presentation on the vegetation composition of Tiritiri Matangi and its relationship with stitchbirds.

September Trip

Craig's Bush at Pollock on the Awhitu Peninsula is a small, unfenced bush remnant on steep slopes of consolidated sand. Despite the effects of cattle browsing, many interesting plants have survived, particularly asplenium ferns. These include *Asplenium hookerianum* (not common in the north), both entities that are presently included in *A. gracillimum*, and an amazing hybrid *A. flaccidum x bulbiferum* with fronds nearly a metre long. A surprising find was *Schizeilema trifoliolatum*, quite some distance north of its previous northern record.

October Meeting

The speaker for the Lucy Cranwell Memorial Lecture was Bill Sykes, who spoke on Himalayan alpine plants. Bill has had a long association with Nepal, covering over 50 years, so was well qualified to speak on the dramatically different floras that occur on either side of the main Himalayan Range.

October Trip

The usual day trip was replaced by a weekend at the Hauraki Plains. On Saturday the Kopuatai Peat Dome was visited, with the most spectacular plant seen being the giant bamboo rush, *Sporodanthus ferrugineus*. Later in the day the Howarth Memorial Wetland was explored, with guidance from members of the Te Aroha Fish & Game Assoc. On Sunday an early start saw a leisurely ascent of Mt Te Aroha, with the altitudinal vegetation zones being very noticeable.

November Meeting

Keith Thompson spoke on "A world of wetlands". This slide-illustrated overview of global wetland types used examples taken mainly from Canada, Europe, Africa, Indonesia, Australia and Antarctica. Wetland loss, and its implications, was discussed and management problems highlighted. The Waikato boasts two types of wetlands: the restiad peatlands, with their two species of Restionaceous rushes, and the 30 peat lakes.

November Trip

An area of privately owned bush bordering on Tawharanui Regional Park grades upwards from a raupo wetland to kauri covered ridges, with broadleaf forest in the gullies. On a calm, sunny day, a large group admired glorious views over Kawau Bay and out to Little Barrier, before entering the bush. Plants of note were *Leionema nudum*, *Schizaea dichotoma*, *Thelymitra aemula*, *Petalochilus (=Caladenia) chlorostylus*, *Syzygium maire*, and *Laurelia novae-zelandiae*.

Anniversary Weekend Camp

Te Kouma Harbour Farmstay, south of Coromandel township, was the base for the January camp. Day 1 saw a trip to the Manaia Kauri Sanctuary, with a lucky sighting of *Brachyglottis myrianthus*. On Day 2 two small islands were visited. Many Motuoruhi Island plants showed the off-shore island influence, most noticeably with the presence of *Pisonia brunoniana*. Only a short distance away, Motutapere Island lacked these features. Monday was spent exploring privately owned patches of bush on the Te Kouma peninsula, and those lucky enough to stay for Tuesday's outing were shown *Korthalsella salicornioides*, and *Austrofestuca littoralis*.

February Trip

At Mahurangi West Regional Park two bush-clad headlands were explored. The dappled light filtering through the (mainly) tawaroa canopy was a relief from the summer heat. The wondrous tawaroa trees (*Beilschmiedia tawaroa*) caused a deal of discussion – was this a separate species or not? The consensus seemed to be that some species don't have hard and fast boundaries. Other northern coastal species seen were pohutukawa, *Olearia albida*, and *Coprosma macrocarpa* subsp. *minor*.

FORTHCOMING ACTIVITIES

2 March AGM. Speakers, Jenny Lux – Ecological Studies in Waipoua
Tim Martin – SW North Island montane & Nothofagus forests, wind disturbance.

Maureen Young, 36 Alnwick Street, Warkworth. Email: youngmaureen@xtra.co.nz

■ Waikato Botanical Society

In June we had a guided tour of The University of Waikato gardens, a good place to practise botanising skills without driving too far! One interesting species found there is *Olearia angulata* - classified as 'data deficient' by the Department of Conservation. It is nearly impossible to distinguish from *Olearia albida*; in fact the only difference between the two may be chromosome number. This makes distinguishing it in the field extremely challenging! The gardens also contain a shaded hillslope fernery, with the majority of ferns named – an excellent spot in which to identify these ferns.

Our September fieldtrip started out from Kaiua on the Firth of Thames to explore the Mangatangi Track. A lot of the bush had been cut over in the past with tanekaha (*Phyllocladus trichomanoides*), kauri and the odd rimu emerging through the tall kanuka (*Kunzea ericoides*) secondary forest. In open, drier sections by the track the sundew *Drosera auriculata* was flowering, *Pterostylis trullifolia* was also here but not in flower. Further up the ridge we walked through stands of large hard beech (*Nothofagus truncata*) trees and found more orchids- *Bulbophyllum pygmaeum*, *Pterostylis agathicola* (in flower) and *Drymoanthus adversus* (in bud). The day ended with stop to see the shore birds at Miranda.

In August we first joined with Rotorua Botanical Society for a field trip to Mauao (Mt Maunganui). Later in the month we explored the Te Toto Gorge. This recently acquired reserve (DOC 1999) has started to show considerable understory recovery, principally with kawakawa (*Macropiper excelsus*), and karaka (*Corynocarpus laevigatus*), since the last of the cattle were removed a matter of a few years ago. Interesting finds of the day were the rare *Myosotis spathulata*, possible early Maori garden sites with stone lines and drains, and the largest puriri on the seaward side of Mt Karioi.

2005 has started out on the hunt for *Dactylanthus*. It is not known whether *Dactylanthus* is present on Mt Maungatautari, where predator proof fencing is being erected around the base to create a pest free sanctuary, and the Maungatautari Ecological Island Trust asked us to carry out a survey. We first had a trip to a known population on Mt Pirongia to familiarise ourselves with the species and learn search techniques, before conducting a search on Maungatautari. Unfortunately, no *Dactylanthus* was found, but no doubt the search will continue. As the flowering time of *Dactylanthus* varies from location to location it may flower at a different time on Maungatautari to that of our visit. We won't know when that is unless it is found!

UPCOMING EVENTS

Thursday 10th March - Festival of the Environment talk by botanist and conservationist David Given followed by a viewing of the Nancy Adams Botanical Drawings Exhibition.

Saturday 2nd April - Lonely Bay/Shakespeare Cliff - ***Olearia pachyphylla* survey**. On this trip we will retrace Peter de Lange's steps in an attempt to find the population of *Olearia pachyphylla* (classified as Nationally Endangered) which he found here and collected from in 1992.

Wednesday 27th April - AGM followed by a talk by Cilla McAllum. Cilla is finishing a PhD on the sustainable harvest and cultural aspects of harakeke (flax).

Sunday 25th September - Karangahake Gorge, Coromandel. This trip will follow the Dubbo track in the Karangahake Gorge and explore old mineshaft entrances, a long rock railway tunnel and other restored mining relics then take a loop track back along the Waitawheta River.

President: Joanna McQueen - jmcqueen@waikato.ac.nz

Secretary: Andrea Brandon - abrandon@doc.govt.nz.

Waikato Botanical Society, c/- Biological Sciences, University of Waikato, Private Bag 3105, Hamilton.

■ Manawatu Botanical Society

Kimbolton Scenic Reserve - Saturday 3 July 2004

Kimbolton Scenic Reserve, just 1km west of Kimbolton township is a small DOC reserve, of about 4 ha, and largely on terrace. Cold persistent rain suited two members, who happily started the long job of compiling a bryophyte flora listing for our local reserves. The reserve is now mainly (90%) dominated by a canopy of tawa, about 15m high, which mostly have multi-stemmed trunks, often about 60cm dbh, indicating they are open grown. It has clearly been logged in the past, with just a few big trees remaining. A rimu (female) estimated at 1.4 m diameter, and with an apparently intact top, several very sizeable fuchsias, a big hinau and several rewarewa were other canopy trees. There was very little in the way of subcanopy trees, though patches of tree ferns occurred. Divaricating and other small shrubs were also remarkably rare, although there were plenty of young pigeonwood and titoki. Only one big titoki was encountered. No pepper trees (*Macropiper excelsum*) were seen, unusual for the Manawatu. Mahoe was rare. 21 species of ferns were found but rarely in any great density. We recorded 22 woody species, 10 exotics, none particularly extensive, and 15 other misc. species, to give a modest species list for a most attractive little reserve.

Wairarapa Wanderings - Saturday 2 October 2004

On another damp day, the Botanical Society, packed ecologically into two cars, toured a few small areas of interest in the Puketoi Range area behind Pihiatua. We paused briefly overlooking the Makuri Gorge reserve, where the patches of kowhai on the opposite bank, in full flower, looked most spectacular. It is surprising how much kowhai is around this area, as it is noticeable only in flower, and finds refuges on the many steep, rocky slopes, especially along the river banks.

Our first planned stop was an hour on the roadside saddle of the Puketoi Range on the Makuri-Pongaroa road, at about 600m. Here we botanised the roadside bank, and compiled a preliminary species list. The banks were a mixture of scrub plants with some more open-area species, and down a bank, a number of more dark-tolerant plants, such as *Blechnum colensoi*.

Our main intended destination, the small reserve of Four Mile Bush just east of Pongaroa, had suffered quite badly in the February floods, with river deposits all through the bush unfortunately meaning little of interest was seen. Back to Pongaroa, we headed up the valley to Horoeka, to visit the Waihi Falls. Neat round-topped canopies, with blue-green foliage, which were scattered over the opposite face, were eventually identified (by reasoned argument, as again the stream height made the opposite banks inaccessible) as open-grown *Pseudopanax arboreus*. On the track to the falls, some *Pomaderris* shrubs about 50cm high, with tiny leaves, were later identified as *P. phyllocaefolia*, which we had not previously encountered in the region. We had thought we might find beech around the area, but none were seen.

Last stop for the day, since the weather was now quite pleasant, affording great views up to the Takapari Plateau, was the Ngapaeruru Reserve, near Dannevirke. This is a delightful little spot, with a grove of splendid podocarps, which we admired while completing the circular loop track.

THE PROGRAMME FOR THE COMING MONTHS IS:

Saturday 12 March	Field trip to Dannevirke beech remnants on private property
Thursday 21 April	Talk on Hawai'ian botanising by Jill Rapson
Saturday 23 April	Field trip to cull karaka from a local native planting

Jill Rapson Ecology Group, Institute of Natural Resources, Massey University, Palmerston North.
Ph (06) 350 5799 Ext 7963; Email: G.Rapson@massey.ac.nz

■ Nelson Botanical Society

December Evening Talk

After our end-of-year pot-luck dinner, Matt Loper, Professor of Biology at Shoreline Community College, Seattle, Washington State, gave an excellent talk about the local mountains and the plants to be found there focusing on the coastal Olympic mountains.

Cobb Valley Weekend Camp , 18th – 19th December

Saturday dawned dry, dull and cold. Most people stayed near to base and investigated the alpine garden established some years ago. Here *Gaultheria rupestris* and *Olearia aborescens*, were in stunning full flower. *Pseudopanax linearis*, was a first for a number of members. Orchid addicts had *Pterostylis oliveri*, *P.australis* and *Stegostyla lyallii* in flower. At 10.30am, with the thermometer reading 5.5°C, it started to snow and only a few hardy botanists continued to explore the Sylvester Lakes track and Cobb ridge.

On Sunday one group explored the Cobb Valley track, where *Gentiana patula* was in full flower. A group of 12 *Pittosporum patulum*, all over 2 m in height, was found. *Cyttaria gunnii* (strawberry fungus) having fallen from silver beech were lying on the track. A larger group explored the Mt Peel track. Above the bushline they found *Pterostylis humilis* beneath hebe bushes, masses of *Celmisia dallii* in bud, and small *Celmisia monroi* in full flower. *Aciphylla ferox* was not quite out in flower but a Speargrass weevil – *Lyperobius fallax* – was found busily munching its way through an *Aciphylla polita*. This fascinated the photography group so much that they set up tripods and stayed an extra hour in spite of the hail storm that hit about 4.30pm. Other finds included *Neopaxia calycina*, *Ranunculus insignis* and *Ranunculus verticillatus*.

St Arnaud Range, north of Rainbow skifield - January 16th.

Side ridges and tarns in slightly unexpected places, turned up bog plants such as *Oreobolus pectinatus*, *Carpha alpina* and *Drosera arcturi*. The screes we explored were home to *Haastia sinclairii* and the small penwiper (*Notothlaspi*). Rocky bluffs were covered in *Raoulia bryoides*, *R. eximia* and *Haastia pulvinaris*. At least nine *Celmisia* species were seen. In full flower were *Euphrasia revolute*, *Phyllachne colensoi*, *Raoulia grandiflora* and the scented *Pratia macrodon*.

Anniversary Weekend Camp - Titirangi, Marlborough Sounds

Although cool and misty, Saturday saw members climbing Mount Stokes, at 1203 metres the highest point of the Sounds. Broad-leaved cabbage trees (*Cordylina indivisa*), and masses of lanternberry (*Luzuriaga parviflora*) in full flower, drew lots of attention. Tree ferns were well represented, and of special interest was *Cyathea colensoi* with its prostrate, semi-buried trunks. Orchid included *Chiloglottis cornuta*, *Aporostylis bifolia*, *Prasophyllum sp*, *Pterostylis sp* and a tree full of epiphytics including *Winika cunninghamii* in full flower. A number of Powelliphanta shells all broken and empty were evidence of active predation. *Celmisia rutlandii* and *C. hieraciifolia* and the beautiful *Pimelea longifolia* were in flower and *Olearia colensoi* was flourishing.

On Sunday we headed for the kohekohe (*Dysoxylum spectabile*) forest behind the homestead. Other canopy trees included tawa (*Beilschmiedia tawa*), pukatea (*Laurelia novae-zelandiae*), *Pennantia corymbosa* and a few large hinau (*Elaeocarpus dentatus*). There was a proliferation of the climbing ferns *Blechnum filiforme* and *Microsorium scandens*, often both growing on the same tree. Outside the forested area on the open hillside, *Metrosideros perforata* formed large bushes in full flower. The next bay shelters the *Hebe speciosa* colony with the dozen or so bushes hanging precariously on the cliff above the high water mark, protected by an electric fence. There were several flower heads, best photographed from above – the electric fence side!

On Monday morning we drove to Punga Cove where we walked along the Queen Charlotte track towards Endeavour Inlet. There are a few outstanding old trees, such as a *Laurelia novae-zelandiae*, which towered above the surrounding tree ferns and regenerating broad-leaf species. Notable among these were *Pennantia corymbosa*, *Dysoxylum spectabile*, *Elaeocarpus dentatus* and *Olearia rani*. Along the way were lush masses of *Cordylina banksii* and many orchids. Most striking was *Orthoceras novae zelandiae* in full flower.

FUTURE TRIPS

March 20th, Gorge Creek. Leader Cathy Jones, Ph 546 9499

Easter Camp, Mt Lyford. Leader Cathy Jones, Ph 546 9499

April 17th, Maitai Caves. Leader Tim McArthur, Ph 548 6437

May 15th, Tennyson Inlet and BBQ. Leader Sally Warren, Ph 546 6637

President: Cathy Jones (03) 546 9499 Flat 2, 5 North Rd, Nelson. Email: cjones@doc.govt.nz

Treasurer: Gay Mitchell (03) 548 3351 13 Albert Rd, Nelson.

■ Canterbury Botanical Society

December Meeting

Grant Bawden, an ex deer culler who transferred his interest from deer shooting to "shooting" plants, showed a remarkable series of slides of alpine plants. He has photographed throughout the South Island including the stable and very steep granite screes of Fiordland (*Ranunculus buchananii*, *R. sericophyllus*), the Eyre Mountains (*Aciphylla spedenii*, *Celmisia philocremna* in crevices, *Cheesemania wallii*), Richmond Range (*Celmisia macmahonii*), *Geum divergens* on the Hanmer argillite and *Leucogenes tarahaoa* on Mt Peel. Grant explained the adaptations of these plants to the surroundings - drainage, snow, ice, isolation, animals. Bryony Macmillan

December Camp

Friday afternoon saw us walking along the roadside approaching Sharplin Falls to see the divaricating shrubs, with *Korthalsella clavata*, climbers and ferns of beech forest margin. Saturday the more energetic zig zagged up a fairly recent track on the west flank of Mt Somers, to a small saddle at 990 m. *Celmisia spectabilis* subsp. *magnifica* was abundant and not yet in flower. Tussocks and shrubs dominated the ridge with interesting rock outcrops and associated flora to investigate (rhyolite rock uplifted from an ancient eroded volcano). Totara hybrids in more sheltered gullies generated discussion. Those who dropped into the headwaters of Chapmans Creek found many moisture obligate plants. An alternative group followed the track along Woolshed Creek where they discussed the geology, biology, and history of the district. On Sunday morning we followed the Bowyers Stream gorge track to Sharplin Falls (a fine double fall), to examine the rich beech-mixed broadleaved forest flora with abundant ferns and bryophytes. After lunch we traveled to the north branch of the Ashburton River near Alford Forest to explore a Q.E.II covenant on "Glenarn". An area of 3 ha, it has black beech and kahikatea/black beech forest with more than 80 species, adjacent to dairying operations. Bryony Macmillan

February Camp Report

20 members spent six days based at Glentanner Park Centre with good clear days. We visited Pukaki Scientific Reserve on Pukaki Downs; Red Lake; Sealy Tarn; Blue Lakes and the Tasman moraine wall; and the Hooker Valley. Fuller details in the June Newsletter.

FUTURE EVENTS

- Friday April 1 Dr Brockerhof will talk on rare cultivated plant species. The field trip on Saturday will take us to see them.
- Friday May 6 "Photos of Canterbury College Students Field Trip to Cass, 1915". Sue Molloy from the Botanical Gardens will give an illustrated talk about a collection of photos of a field trip by staff and students from Canterbury College to their Mountain Biological Station at Cass in the year 1915. On Saturday the venue will be Lowry Peaks, North Canterbury.
- Saturday June 11 AGM at St Ninians Church Hall commencing at 11.00 a.m. No field trip.

■ Other Botanic Society Contacts

Botanical Society of Otago

Chairman: David Orlovich, david.orlovich@botany.otago.ac.nz

Secretary: Robyn Bridges, robyn.bridges@stonebow.otago.ac.nz, ph 479 8244, P O Box 6214, Dunedin North

Secretary: Margaret Geerkens (03) 352 7922 PO Box 8212, Riccarton, Christchurch.
Email: bert.marg@xtra.co.nz

Rotorua Botanical Society

c/- The Herbarium, Forest Research, Private Bag 3020, Rotorua

President: Chris Bycroft (07) 346-3647 chris@wildlands.co.nz

Secretary: Joan Fitzgerald (07) 347 7917

Wakatipu Botanical Group

Chairman: Neill Simpson (03) 442 2035

Secretary: Lyn Clendon (03) 442 3153

Wanganui Museum Botanical Group

Chairman: Ian Bell (06) 343 7686 115 Mt View Road, Wanganui

Secretary: Robyn Ogle (06) 347 8547 22 Forres Street, Wanganui

Wellington Botanical Society

President: Joyce Stretton (04) 934 2437

Secretary: Barbara Clark (04) 233 8202 (h); (04) 233 2222 (fax) PO Box 10 412, Wellington 6036

EVENTS

Hunza Wildflowers Tour 2005

Under the auspices of Silk Road Adventures, Cathy Jones is once again leading a Hunza Wildflowers Tour to the mountains of Northern Pakistan in 2005.

The trip in June 2004 was a great success and we saw wonderful alpine flowers. The itinerary will be similar to 2004, departing New Zealand on June 18th, returning July 7th. The cost of the Pakistan part of the tour will be \$NZ3650. This does not include airfares to Pakistan and back which are just over \$2000.

Brochures are available or you can look at the itinerary and other details on the Silk Road Adventures' website, www.silkroad.co.nz under Small Group Guided Journeys.

Contact Cathy on 03 546 9499 if you have any questions or would like a brochure.

21st John Child Bryophyte Workshop

8 – 13 December 2005

The workshop will be in the North Island and based in the Pohangina Valley, 38 km from Palmerston North. It is open to all who are interested in bryophytes, from novice amateurs to professional botanists.

If you are interested in receiving more information about the workshop please send your request:

either by email to Lynette Fischer at lynettofischer@paradise.net.nz or

by post to Susan Hansard at P O Box 176 Foxton 5551.

NOTES AND REPORTS

Research Report

- **Notes on Euphorbia and Crassula with a revised key to the latter wild in New Zealand**

W. R. Sykes, 115 Packe Street, St Albans, Christchurch 8001

Introduction

Four of the taxa treated below are very minor escapes from cultivation that have not previously been reported as such although two are common and well-known horticultural plants. Notes on several other *Crassula* species are included because of information in recent checklists of adventive plants as

well as realising that the taxonomy of several of them is more complicated than is indicated in Flora IV or even my recent note in the *Botanical Society Newsletter No. 75* (2004). In addition to these records relating to adventive status, there is a discussion of close relations in cultivation only in order to clear up nomenclatural and taxonomic confusions.

EUPHORBIACEAE

Euphorbia milii* var. *splendens (Hook.) Ursh & Leandri crown of thorns
Low, widespreading, much-branched, deciduous shrub; stems to at least 1 cm diameter, angled and grooved, succulent, with copious pale grey spines to c. 2 cm long. Leaves to c. 6 × 3 cm, ± broad elliptic, very bright green, entire; apex rounded and mucronulate. Inflorescence axillary; peduncles viscid; cymes with few cyathia; cyathial bracts paired, c. 1 × 1.3 cm, broadly subreniform, scarlet. Glands 1.5–2 mm wide, partly reddish. Stamens red. Capsule c. 4 mm across, dark red. Seeds c. 2.5 mm long, broad ellipsoid-oblong, echinate.

The above description is based on living plants, especially from Rangitoto Island, where it has been collected as a minor escape from cultivation, CHR 497945, *P. de Lange 2353* Auckland area, Rangitoto Island, Islington Bay, 1-11-1993.

“Crown of thorns” thrives in very dry conditions and often grows where soil is limited, e.g. the specimen from Rangitoto quoted above was from a plant in lava crevices around an old house site. Elsewhere in northern New Zealand it is often cultivated on walls and rocky banks. It grows readily from detached pieces of stem but apparently not from seed although these are produced on cultivated plants here. Thus it is probably largely represented by a single clone although yellow and cream-bracted plants are sometimes seen. However, these are more likely to have originated as “sports” (mutations) from the ordinary red-bracted plant instead of being clones raised from seed.

Euphorbia milii is from Madagascar but probably came to New Zealand via Europe where it has been grown for around 200 years. The common plant in cultivation here, including those growing on Rangitoto, is usually known now as var. *splendens* of this species, eg. Carter (1997 p.96). In this work, the brief comparative description between the ordinary form of *E. milii* and var. *splendens* shows that the latter has larger or longer spines, leaves and bracts and from the dimensions given the plant described above clearly falls under var. *splendens*. However, flora writers in the Pacific region such as Smith (1981, p.569) still record this plant as *E. splendens*.

Finally, despite the large number of spiny shrubby euphorbias in southern Africa, some widely cultivated in New Zealand, this is the first record of such a species growing outside cultivation here. Also “crown of thorns” is the only species with scarlet bracts that can be classed as having casual adventive status.

CRASSULACEAE

Crassula multicava* Lem. subsp. *multicava

The fully naturalised plant common in some coastal North Island localities, especially Rangitoto Island, is *Crassula multicava* subsp. *multicava*. This subspecies has 4-merous flowers whereas subsp. *floribunda* Friedr. ex Toelken has 5-merous flowers. I pointed out (Sykes 2004 p. 21) that my earlier description in Flora IV p. 575 of 5-merous flowers for our naturalised plant is wrong; in fact I have only seen 4-merous flowers on plants of *C. multicava*, whether wild or cultivated, in New Zealand. However, I now realise that the situation is a little more complicated than I thought even as recently as a year ago. Descriptions of subsp. *floribunda* state this has a pronounced fairly stout and ± erect stem in contrast to the rather slender decumbent to suberect ones of subsp. *multicava* and the leaves are usually narrower in proportion to length in subsp. *floribunda*. In addition, subsp. *floribunda* is said to lack the small plantlets in the inflorescence axils that are a feature of subsp. *multicava*. I have not seen or heard of this plant in New Zealand.

On the other hand, I do grow a stout erect plant with 5-merous flowers that I acquired as *C. multicava* and which I have seen cultivated as such in nurseries. This is, however, *C. cordata* Thunb., a close relative of *C. multicava*, originating from the same part of South Africa (southern Natal and Eastern Cape Provinces) as subsp. *multicava*, whereas subsp. *floribunda* is from Central Natal (Toelken 1985). In New Zealand, *C. cordata* has small plantlets in the inflorescence as has subsp. *multicava*

but they are so numerous that they comprise most of the visible inflorescence in the later stages of flowering. Other vegetative features of *C. cordata* are the cordate or subcordate leaves, whereas they are \pm truncate in subsp. *multicava*. But the two taxa are even more easily distinguished, at least in New Zealand, by *C. cordata* being much more glaucous and with smaller leaves that are not glandular-punctate beneath. In addition, the flowers are very pale yellowish with cream anthers whereas in both subspecies of *C. multicava* the petals are white or pinkish and the anthers are purple. Although I have seen a few plantlets growing around the parent plants of *C. cordata* the species does not grow rampantly and aggressively as subsp. *multicava* often does.

Crassula orbicularis L.
(= *Crassula rosularis* Haw.)

Prostrate succulent herb with short main stems hidden by dense leaf rosettes to c. 5 cm across, freely producing long filiform runners with secondary leaf rosettes. Leaves spirally arranged and strongly imbricate, to c. 2.5 x 1.6 cm, strongly ciliate, broad obovate to oblong-obovate but appearing almost orbicular when viewed from above because proximal part is hidden. Inflorescence a terminal elongated thyrse, the numerous small scented flowers fairly densely arranged; branches, bracts and calyx pinkish, the last two ciliate. Petals c. 2mm long, elliptic, greenish-white to pale greenish-yellow excepting the dark red apical area including the tiny dorsal appendage. Styles dark purple. Scales semi-lunate to broad obtuse. Capsules apparently not formed in New Zealand.

This description is mainly based on P. de Lange 6340, Rangitoto I. (Auckland), Islington Bay, entrance to quarry pit, 26-1-2005. The plants were growing in fine scoria and were "evidently spreading by detachment of rosettes. This readily happens because of the fragility of the thread-like runners. In cultivation in St Albans, Christchurch, this species also freely produces runners and rapidly forms a clump that covers a container. Like some other crassulas it tends to die out in the place where it was planted unless the rosette bearing runners can "escape" to suitable open surrounding sites. The description of floral parts above was compiled using flowers on my St Albans plants as well as those on the Rangitoto material.

Crassula rosularis has very similar inflorescences and flowers to those of *C. orbicularis* but vegetatively looks quite different with long narrow oblong green or brownish-pink leaves according to the degree of exposure. Also the plants lack runners so can only be propagated by offsets close to the stem base. Despite these differences Toelken (1985, pp 163-164) puts *C. rosularis* into the synonymy of *C. orbicularis*. This species aggregate is from the southern Cape Province of South Africa where it grows in partially shaded and sheltered coastal sites northwards into Natal. A feature hardly mentioned in the literature is the unpleasant scent of the flowers, this being especially strong in the morning in plants of *C. rosularis* grown in New Zealand.

C. orbicularis is the type species of the fairly large section Rosulares Haw., the species of which are nearly all from southern Africa. In New Zealand almost the only other species in this section seen is *C. socialis* Schonl. from Eastern Cape Province. This popular little succulent does not produce runners and also can be easily distinguished from *C. orbicularis* (including *C. rosularis*) because the leaf rosettes of *C. socialis* are square in outline owing to the prominently 4-ranked imbricate leaves as opposed to the larger spirally arranged ones of *C. orbicularis*. In addition, *C. socialis* is almost unique in the genus in having strongly reflexed styles.

Crassula ovata (Mill.) Druce jade plant
(= *Crassula argentea* Thunb.; *C. obliqua* Sol.; *C. portulacea* Lam.)

Succulent, much-branched, bushy shrub up to c. 1.5 m high, with a short stout trunk eventually to 7 or 8 cm diam. Leaves subsessile, to c. 4-(7) x 2.7-(3.5) cm and 2-4-(5) mm thick, broad obovate or elliptic-obovate, sometimes broad elliptic, glossy dark green, obscurely to prominently dotted with tiny white hydathode scales above; margins tending red, sometimes with a narrow yellow submarginal band, rounded distally. Inflor. a many-flowered rounded thyrse. Calyx with broadly triangular lobes c. 1 mm long. Corolla star-like; petals 7-10 mm long, oblong-lanceolate, acute, pale pink or whitish. Anthers purple. Glands transversely oblong. Seeds c. 0.7 mm long, oblong, echinate.

The above description is mainly based on specimens collected by P.J. de Lange, especially de Lange 6099, Wellington, Evans Bay, Little Karaka Bay, 8-7-2004 (plantlets) and 2-8-2004 (flowering shoots). The plants were of various sizes down to very small plantlets c. 1 cm high and grew at the

base of a small coastal cliff in a roadside gutter, the substrate being clay and greywacke gravel. These plants originated from a cultivated hedge along the cliff top c. 2 m above. A very similar situation is represented by de Lange 6345, Auckland, Mt Albert, Asquith Avenue, 8-2-2005. Plantlets were growing there at the junction of a footpath and a scoria wall with cultivated parents c. 10 metres above.

The nomenclature of the botanical name for jade plant needs explanation because of past confusion within and beyond New Zealand. Although correctly named as above it is often known as *Crassula argentea* and sometimes *C. portulacea*. *C. obliqua* is also sometimes used but this epithet should be used at an infraspecific level and applies to plants of *C. ovata* with slightly asymmetric and subacute leaves. There are several other forms, generally clones, grown in New Zealand distinguished mainly by leaf shape and colour. However, the plant described here is the commonly grown jade plant that is typical of the species as it occurs in other countries. Most of the named cultivars are clones and range from those with variegated leaves such as 'Sunset' with yellowish, red-margined leaves to those with unusual shapes such as the popular 'Gollum' with narrow curled semi-tubular leaves.

C. ovata typically flowers freely in winter and early spring, but some of these other forms flower much less readily. A feature that seems common to the species as a whole is sensitivity to frost with plants quickly damaged or killed by temperatures below 0°C. In this respect, *C. ovata* is very like the more weedy species *C. multicauda* subsp. *multicauda*. This common behaviour is unrelated to the fact that both species and their close relations mentioned in this paper are in the same section, namely Anacampseroideae Haw., along with the vegetatively very different *C. pellucida* subsp. *marginalis* L. that is keyed out below. All species in this section have star-shaped flowers with patent petals although in the last-named this feature is not so obvious as in the others.

Mention of the related *Crassula arborescens* (Mill.) Willd. is pertinent because it has been confused with *C. ovata*. Thus in the footnote to the genus *Crassula* on page 572 of Flora IV mention of the former in cultivation is in error for *C. ovata*. The main difference is that the former has completely pale blue-grey to whitish leaves. *C. ovata* originates from Natal and Eastern Cape Provinces of South Africa and *C. arborescens* is mainly from Western Cape Province (Toelken loc. cit.). Also this author states that in the wild *C. ovata* is winter flowering and *C. arborescens* is summer flowering. However, *C. arborescens* subsp. *undulatifolia* Toelken flowers prolifically in the winter in New Zealand and not in the summer whereas *C. arborescens* subsp. *arborescens* is very shy flowering but summer is probably the main period here. The clone name 'Blue Bird' is sometimes given to the almost acute-leaved plants of the first subspecies here and 'Orbit' to the rounded-leaved plants of the type subspecies.

Finally, in New Zealand there is often confusion over the common name "jade plant" or "jade tree" because this seems to have resulted in plants of the very dissimilar and unrelated *Portulacaria afra* (L.) Jacq. (Portulacaceae) being sold as *C. ovata* or one of its synonyms. Presumably this mistake arose because of switching the names "jade plant" or "jade tree" to *Portulacaria* as well as the *Crassula*. These common names should be restricted to *C. ovata* and the common name "elephant bush" applied to *P. afra*.

***Crassula pubescens* subsp. *radicans* (Haw.) Toelken**

Small mat-forming succulent herb with stems ± decumbent, short and < c. 3 cm high, green or reddish. Leaves to c. 2.5 × 1.2 cm, spatulate to narrow obovate, shining green to deep red, attenuate to base. Inflorescence stems erect, to c. 3–(7) cm high, puberulent, red or greenish-red; inflorescence to c. 1.5 cm across, subglobose and forming a dense head of many flowers; bracts small and inconspicuous. Flowers sessile, very small; petals c. 1.5 mm long, broadly rounded spatulate but ± curled when living, whitish or greenish-white; apex ± reflexed; appendage of petals erect, 0.6–0.7 mm long, cucullate or hooded, white. Anthers orange-pink. Glands c. 0.5 mm long, oblong-obcuneate.

The above description is based on collections: *P. de Lange 6098*, Auckland City, Mt Albert / Owairaka, Domain, 12–4–2004; *W.R. Sykes, 66/04*, Canterbury, Banks Peninsula, Charteris Bay, 20–8–2004.

In Auckland there were scattered plants "growing in cracks of jointed basalt lava, within old quarry pit". It has also been collected wild in Wellington, *P. de Lange 6100*, Hataitai, Waitoa Street, 8-7-2004. At Charteris Bay it grows very freely with fragments growing near the parent cultivated plants. Regeneration from such detached pieces is common because this subspecies readily forms small mats by this means. But it is only a minor escape from cultivation despite growing so prolifically. Also, it seems that viable seeds are not formed and it is quite likely that there is only a single or at least very few clones in New Zealand. Thus apart from minor leaf colour differences a careful examination of *de Lange 6098* and *Sykes 66/04* showed that they were identical in size and form of the leaves and size and colour of all flower parts. In cultivation I have noticed a strong correlation between stem and leaf colour and exposure to sunlight and moisture, a good example of this difference being illustrations in Cave (2002, p.69). There a green-leaved and red-leaved plant are illustrated together with a similar explanation of the differences. This may be the reason why this taxon has been confused with *C. atropurpurea* (Haw.) Dietr., and a similar colour phenomenon can be found in this related species. An indication that at least some of *C. pubescens* subsp. *radicans* in New Zealand represents a selected form is that on at least one occasion one of my plants reverted to a larger form by sending up taller shoots with leaves several times larger than is usual from stems of the standard small plant as described above.

Crassula pubescens Thunb. and its relations in section *Globulea* (Haw.) Harvey are characterised by the dense head of \pm sessile flowers with petal appendages as described here for *C. pubescens* subsp. *radicans*. These appendages vary greatly in shape but are usually $>$ tubular part of petal and are conspicuous when viewed from above because they overtop the corolla lobe apices. Flowers in *C. pubescens* subsp. *radicans* are produced over a long period from the middle of winter to summer and the taxon seems to flower more freely than any other *Crassula* in New Zealand. Like the other species in section *Globulea* this subspecies is from southern South Africa, in this case from Eastern Cape Province where it often forms large mats below the tree canopy (Toelken, loc. cit.).

Crassula biplanata Haw.

Very small, much-branched subshrub, forming a loose mat; stems very thin but wiry. Leaves forwards pointing, 4-6.5 x 1-2 mm thick, subterete (semi-cylindrical), glaucous-white bloomy; apex acute. Inflorescence terminal, many-flowered; peduncles prominent and reddish. Sepals 1.3-1.6 mm long, unequal. Petals 3.5-5 mm long, white. Stamen filaments white; anthers crimson. Glands prominent, rectangular to subcordate, yellow.

This is an amplified description of *Crassula biplanata* to complement the characters used in the key below and also supplements what is recorded in Heenan et al (1998, p.159).

***Crassula* section *Glomeratae* Haw.**

This section of the genus contains four of our indigenous *Crassula* species as well as the adventive Australian and South African *C. decumbens* Thunb., the Australian *C. colorata* (Nees) Ostenf., and the Mediterranean *C. alata* (Viv.) Berger. These are all very small, probably always annual, herbs that resemble indigenous species such as the Australasian *C. sieberiana* (Schult. & Schult f.) Druce and *C. colligata* Toelken. Thus they cannot be confused with the other South African species keyed below. These are in different sections. *C. colorata* and *C. decumbens* are described in Flora IV on pages 577 and 574-575. The other two indigenous species in this section, *C. manaia* A. Druce & Sykes and *C. mataikona* A. Druce, are endemic to New Zealand.

***Crassula alata* (Viv.) Berger**

Small very slender-stemmed herb (probably annual) forming small tufts, most plants being only a few cm high. The rather flattened stems appear winged when dry like some other species in this section keyed here and therefore the specific epithet "*alata*" can be misleading. The mucronate leaves and bracts are connate at the base. The inflorescences are sessile or pedunculate and consist of about two flowers in the leaf axils. The flowers provide the most important diagnostic character because most of them on any one plant have a three-parted calyx and corolla with only a minority having 4-merous flowers like most of our species in section *Glomeratae* (see key below). The sepals and petals are both finely acuminate, the former being slightly larger as in other of our species in this section. Finally, there are 2 seeds in each follicle and they are slightly longitudinally ribbed.

Crassula alata was only first found in New Zealand in 2003 growing in vehicle tracks in peaty sand at Santoft, near Bulls in the Wanganui area, the material being identified by H.R. Toelken as var. *alata*. This has just been recorded by Heenan et al. (2004 p.805). In addition I have examined fresh material sent even more recently from this locality by Colin Ogle of Wanganui and the short diagnostic description above is based on it.

***Crassula colorata* var. *acuminata* (Reader) Toelken**

Flora IV records and describes *Crassula colorata* (Nees) Ostenf., where it is stated that New Zealand plants belong to var. *acuminata* (Reader) Toelken. This taxon has remained very rare and may be extinct here; the only specimens were collected many years ago around the Awatere River and nearby Wither Hills in Marlborough. In Flora IV I stated that the taxon may be adventive there and almost contemporaneously with this paper Heenan et al. (2004 p.806) conclude that it should be treated as adventive because the plants were collected where a number of other Australian plants, especially grasses, were recorded. These authors say these plants were probably introduced accidentally during a period of sheep introduction. I concur with this theory and thus consider that there are now three adventive taxa in this section. Although this *Crassula* is very similar to others in the Glomeratae, *C. colorata* can be distinguished by its 5-merous flowers and the little tubercles towards the base of the outside of the follicles.

***Crassula colligata* Toelken subsp. *colligata*.**

This is the name now applied to what was called *C. tetramera* (Toelken) Druce & Sykes in Flora IV. The true *C. tetramera* is an Australian species with a quite different habit, see de Lange (2003 p.12).

***Crassula* section Helophytum (Eckl. & Zeyh.) Toelken**

(wrongly spelt Helophyton in Flora IV)

The seven (eight in Flora IV) species comprising the remainder of our indigenous *Crassula* species belong in this section. They are all small or tiny plants that mostly grow in wet places except sometimes the moss-like *C. multicaulis* (Petrie) A. Druce & Given and often the circum Antarctic *C. moschata* G. Forst. The latter usually has larger leaves and flowers than any other species in this section and at least in Australasia often grows on exposed rock faces with a southerly aspect.

Key to *Crassula* species wild in New Zealand

The revised key below treats all the indigenous and adventive species. Thus it includes the South African species comprising the first part of the key in Flora IV p. 573, as well as additional species in the present article and in Webb et al., (1995, p. 162), Heenan et al. (1998, p.159) and Heenan et al. (2004, p.805). Webb et al. (loc. cit.) record *Crassula sarmentosa* Harv. plus a description that compares it with the related *C. spathulata* Thunb. described in Flora IV, whilst as mentioned above Heenan et al.(loc. cit.1998) record *C. biplanata* Haw. (until recently known as *C. punctulata* Schon. & Bak.). This is described next to *C. tetragona* L. by Toelken (loc. cit.) but as indicated in the key below these two species have an extremely different form and habit, eg. *C. biplanata* has leaves as short and narrow as members of section Glomeratae see description of this species above. Almost contemporaneously with this paper Heenan et al. (loc. cit.) record *C. alata* (Viv.) Berger var. *alata* of this section, see diagnostic description above. Note that the key to the four indigenous species in section Glomeratae has been considerably changed from Flora IV because the key there does not cater properly for all the extra material now available.

The key to the species of section Helophytum has also been considerably changed from that in Flora IV. Again the main reason is because of the extra material now available, this also extending the known range of certain species; see footnote to the key below. It is relevant to note that all the material used was from New Zealand. The need to state this is illustrated by *Crassula helmsii* where the aggressive plants of this species in the British Isles have much larger vegetative parts than are seen in New Zealand. It is likely that such a form originated in Australia where the species is widespread and exhibits greater variability than here.

As with most succulent plants the key is easier to operate with fresh material because the information on many of the characters, especially organ measurements, can only be properly ascertained by using such material. Finally, the key is not always satisfactory for plants growing fully submerged.

1. Perennial herbs or subshrubs with very slender to stout stems or runners; leaves usually much >12 mm long; flowers 4–5–(6)-merous.....2.
 Annual or perennial herbs with filiform or very slender stems; true runners not apparent; leaves <12 mm long; flowers (3)- 4–(5)-merous 11.
2. Stems erect, stout, usually 15–50 cm high; plants lacking runners.....3.
 Stems prostrate to suberect or rarely erect, ± slender and lax, rarely ascending to 15 cm or slightly more high, if short and inconspicuous then plants with long runners5.
3. Plant forming a medium-sized bush with main stem becoming >3 cm diam.; leaves flattened and rounded distally; hydathode glands present although sometimes inconspicuous; corolla star-like.....
 **C. ovata**
 Plants forming small subshrubs with main stems <2 cm diam.; leaves subterete to flattened and ovate-oblong, with obtuse to acute apex; hydathode glands absent; corolla not starlike4.
4. Leaves subterete, up to c. 8 mm wide, semi-cylindrical; flowers ± diffuse; fragrant; corolla of free petals 2–3 mm long, white.....**C. tetragonal**
 Leaves flattened and >10 mm wide, elliptic to oblong-ovate; flowers densely packed, not fragrant; corolla tubular with lobes 4–7 mm long, scarlet **C. coccinea**
5. Plants with short inconspicuous main stems hidden by dense prostrate leaf rosettes, with conspicuous long thread-like runners bearing secondary rosettes; leaves prominently ciliate; inflorescence terminal.....**C. orbicularis**
6. Plants with conspicuous slender to stout stems; runners lacking; leaves not in dense prostrate rosettes, not ciliate; inflorescence lateral6.
7. Inflorescence a many-flowered, rather diffuse, thyrse (type of panicle); corolla of free or only basally fused petals that are widespreading to near base, i.e. corolla star-like7.
 Inflorescence either a few-flowered bracteate cyme or a dense head with more flowers; corolla appearing tubular in lower half because of petals cohering (actually only connate at base), either not at all star-like or at least not obviously so9.
8. Leaves entire; hydathode dots abundant, conspicuous and present all over surface on both sides
 **C. multicava** subsp. **multicava**
 Leaves finely toothed; hydathode dots inconspicuous and confined to marginal teeth sinuses.....8.
9. Stems creeping, trailing or decumbent, often rooting at nodes; lamina of leaves crenulate, up to 15 × 15 mm; petals 3.5–5 mm long..... **C. spathulata**
 Stems widespreading to suberect, not rooting at nodes; lamina of leaves serrulate, usually 15–30 × 12–25 mm (smaller near inflorescence); petals 7.5–8 mm long **C. sarmentosa**
10. Plant a small shrublet with slender but wiry, erect or suberect stems; leaves cylindrical or semi-cylindrical, white bloomy when mature, acute..... **C. biplanata**
 Plants herbaceous with slender but ± succulent, prostrate to decumbent stems; leaves flattened (spathulate, obovate or broadly rhombic-ovate), not bloomy 10.
11. Leaves up to c. 9 mm long, ± broad rhombic-ovate, both opposing leaves connate at base; peduncle very short and inconspicuous; inflorescence a few-flowered cyme; petals lacking an appendage **C. pellucida** subsp. **marginalis**

- Leaves up to *c.* 18 mm long, spatulate to broad obovate, not connate at base; peduncle long and conspicuous (much > inflorescence), inflorescence a dense head of many flowers; petals with prominent erect, subapical appendage **C. pubescens** subsp. **radicans**
12. Flowers often in small clusters in the leaf axils, sometimes solitary, inconspicuous; petals closely appressed to carpels or with spreading tips, usually < calyx lobes, sometimes = calyx lobes or nearly so..... (section **Glomeratae**) 12.
- Flowers always solitary in the leaf axils, conspicuous; petals spreading and corolla star-like, usually significantly > calyx lobes, rarely nearly equal (section **Helophyton**) 18.
12. Petals united at base; at least some pedicels 5-10-(15) mm long at fruiting; scales broadly T-shaped with length < to = width; seeds 4-10 per follicle **C. decumbens**
- Petals free, pedicels nearly always < 7mm long at fruiting; scales narrow linear, oblanceolate, rectangular, with length much > width; seeds 1-2 per follicle 13
13. Flowers usually 3 or 5-merous, rarely 4-merous; follicles either with a cluster of tuberculate appendages on outer surface and 5-merous or if smooth flowers 3-(4)-merous and seeds with inconspicuous longitudinal ribs 14.
- Flowers 4-merous; follicles smooth; seeds lacking longitudinal ribs..... 15.
14. Flowers 5-merous; follicles with a cluster of tuberculate appendages outside towards base; seeds lacking longitudinal ribs..... **C. colorata** var. **acuminata**
- Flowers 3-(4)-merous; follicles smooth; seeds with rather inconspicuous longitudinal ribs..... **C. alata**
15. Plants very small, dense and moss-like or forming larger rather loose mats, stems decumbent to ascending, to *c.* 3 cm high when mature and growing in open sites; flowers 1-2 in leaf axils, either not clustered or clusters very small with flowers not conspicuously aggregated in dichasia; calyx lobes usually acute 16.
- Plants loosely mat-like or not; stems ascending or erect from base and close or spaced, usually 3 – *c.* 12 cm high when mature and growing in open sites; flowers 2- *c.*10 in leaf axils, always clustered in dichasia except in very depauperate plants; calyx lobes acuminate and often long acuminate 17.
16. Plant forming dense moss-like cushions; stems decumbent or ascending, 3-10 mm high in open sites, ± inconspicuous between leaves; flowers 1 per leaf axil, not appearing clustered; seeds usually 0.3 - 0.35 mm long..... **C. manaia**
- Plant forming small rather loose mats; stems ascending in upper part or sometimes erect from near base, 10-30 mm high in open sites; ± conspicuous between leaves; flowers 1-2 in leaf axils, often appearing rather clustered because of subsidiary leaves with flowers at the nodes; seeds usually 0.35–0.43 mm long..... **C. mataikona**
17. Plants with stems ascending to erect, branched from near base, ± fleshy, pink by fruiting stage, forming loose mats; often rooting at lower nodes; pedicels variable in length but usually some to *c.* 3 mm long at fruiting, remaining inconspicuous because usually ± hidden by leaves; **C. sieberiana**
- Plants with stems ± erect, close or spaced, usually with lower part unbranched, scarcely fleshy, not forming mats, usually ± red by fruiting, at least towards base, not rooting at nodes; pedicels very variable in length but usually some 3-6 mm long at fruiting, these then conspicuous because held beyond leaves **C. colligata** subsp. **colligata**
18. Leaves often > 7x 2 mm; flowers 4-7 mm diam.; plants terrestrial **C. moschata**
- Leaves < 7x 1.6 mm; flowers 1.8-4 mm diam.; plants usually aquatic but if terrestrial then leaves always smaller 19.

19. Pedicels elongating to 13 mm long at fruiting; seeds > 10 per follicle**C. peduncularis**
 Pedicels to c. 5 (7) mm long, scarcely elongating at fruiting; seeds rarely > 5 per follicle.....20.
20. Leaves ± triangular-lanceolate, clustered and imbricate at stem nodes, acuminate; petals rounded **C. multicaulis**
 Leaves linear to elliptic or if _+ lanceolate then not triangular-lanceolate, usually opposite, occasionally clustered at stem nodes; petals obtuse to acute21.
21. Petals 0.9-1.5 x calyx lobes22.
 Petals 2-3 x calyx lobes23.
22. Leaves 0.7-2.8 × 0.3-0.6 mm, not noticeably succulent (< 0.5mm thick); calyx lobes 0.5-1 mm long; petals with length c 2-2.1 x width **C. hunua/C.ruamahanga***
 Leaves 2.3-7 × 0.7-1.6 mm, obviously succulent (> 0.5 mm thick); calyx lobes 1-1.5 mm long; petals with length c. 1.7-1.8 x width **C. helmsii**
23. Plants mat-forming but not obviously moss-like; leaves obtuse, subacute or sometimes ± apiculate, 1.5-5.5 x 0.8-1.7 mm; seeds 0.5-0.7mm long **C. kirkii**
 Plants forming fine moss-like mats; leaves ± acute, 0.5-2 x 0.2-0.5 mm; seeds 0.3-0.45 mm long **C. sinclairii**

* *Crassula ruamahanga* and *C. hunua* virtually intergrade and cannot be separated properly if the variation over the whole of their now known range is taken into consideration. Many more specimens are now available than when I compiled the description for Flora IV, with several from the Chatham Islands seeming to occupy an intermediate position. Thus the key there will not work now and it is therefore impossible to adhere to the present taxonomy. Hence they are here keyed out as a single entity. A separate paper formally uniting these two taxa is being prepared by P.J. de Lange & W.R. Sykes.

Acknowledgments

I am very grateful to Peter Heenan for casting an eye over this article and for encouraging me to publish these records. I acknowledge useful discussions with Peter de Lange on the indigenous species in particular and also for sending me material of the adventive crassulas from Wellington and Auckland that form the basis for this paper. A big thank you to Colin Ogle for making a special trip to Santoft near Bulls to collect fresh material of *Crassula alata* for me. Thanks to Tim and Hamish Prebble of Texture Plants, Prebbleton, near Christchurch, for giving me plants to study from their nursery specialising in succulent plants, as well as sharing information about cultivars in particular. Thanks also to the glasshouse staff at the Botanic Gardens, Christchurch, for freely letting me have material of several of the above crassulas for comparison with specimens from elsewhere. Finally, I acknowledge Wendy Weller and Ines Schönberger of Landcare Research, Lincoln, for all their help in formatting my manuscript into a state acceptable for publication.

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THESES

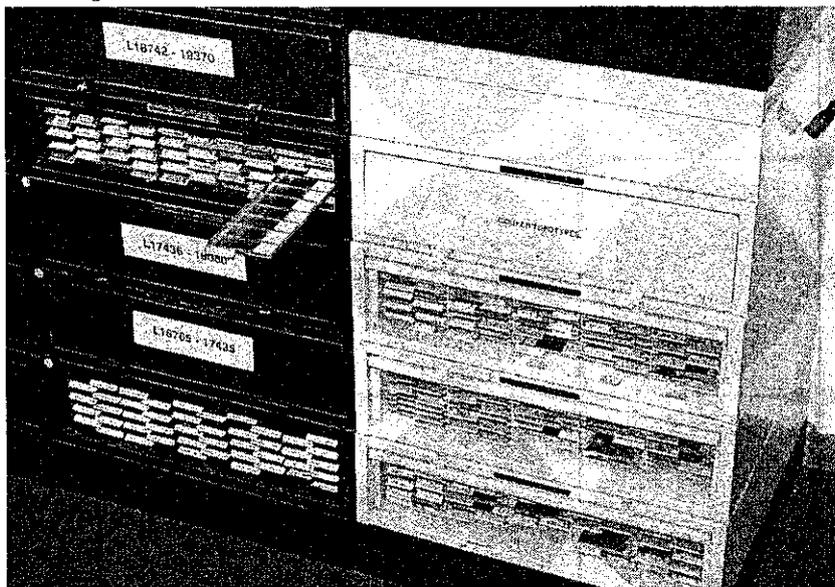
■ Recent theses from the University of Otago, Department of Botany

- McQueen, Amelia (2002) Species pools and colonisation dynamics in grassland communities of the lower South Island, New Zealand. Ph.D. thesis, University of Otago, Dunedin. 317 pp.
- Bagley, Scott (2003) Population ecology of *Amanita muscaria* as determined by random amplified microsatellites (RAMS). MSc Thesis, University of Otago, Dunedin. 47 pp.
- Hunter, Denise (2003) *In vitro* organogenesis from lettuce explants. A physiological study. Ph.D. Thesis, University of Otago, Dunedin. 337 pp.
- Keitel, Claudia (2003) Isotope signatures ($\delta^{13}C$, $\delta^{18}O$, $\delta^{15}N$) as a measure of environmental effects on the physiology of trees in the Northern and Southern Hemisphere. Ph.D. thesis, Albert Ludwigs Universität, Freiburg. 198 pp.
- Miller, Sheryl (2003) Ecophysiology of *Ecklonia radiata* (Alariaceae: Laminariales) in Doubtful Sound, Fiordland. Ph.D. Thesis, University of Otago, Dunedin. 260 pp.
- Ohlemuller, Ralf (2003) Indigenous forest fragments: modelling present-day species richness and potential natural vegetation. Ph.D. Thesis, University of Otago, Dunedin. 215 pp.
- Stowe, Chris (2003) The ecology and ethnobotany of karaka (*Corynocarpus laevigatus*). MSc Thesis, University of Otago, Dunedin. 119 pp.
- Stringer, Alison (2003) *Boletus edulis* in New Zealand: its genetic affinities and history. MSc Thesis, University of Otago, Dunedin. 169 pp.
- Kissling, W. Daniel (2004) Population structure and reproduction of *Nardus stricta* L. (Poaceae) - an alien invader into New Zealand. MSc Thesis, University of Otago, Dunedin. 72 pp.

REQUESTS

■ GNS looks for second-hand "Technicon" microscope slide storage cabinets

The palynology lab at Institute of Geological and Nuclear Sciences in Gracefield, Lower Hutt, has a growing archive of palynology slides built up over the last 55 years and prepared from over 20,000 rock and other samples. The slides are stored in a stack of "Technicon" metal cabinets (See photo) which allow the slides to lie flat, 16 places to a tray, 50 trays to a cabinet.



Unfortunately the British company which manufactured these cabinets no longer produces them, and we have almost used up all the "spare" cabinets which were available elsewhere in the Institute. Although there are alternatives, the cabinets are a neat and compact storage system, and it would be good to continue to use them if possible. So we are asking, if anyone has any such cabinets that they no longer need, we would be interested in purchasing them.

Contact: Ian Raine, Geological & Nuclear Sciences, P.O. Box 30368 Lower Hutt, i.raine@gns.cri.nz.

■ New whitefly

It's Biosecurity New Zealand's mission to reduce the risk to New Zealand from introduced unwanted pests and diseases. But it is not always obvious whether an organism is actually new to New Zealand, as many of our unique organisms are not known to many people, including scientists.

Potentially, one such insect is a recently-discovered, unnamed whitefly found infesting some species of *Melicytus* in Christchurch. Biosecurity New Zealand is now investigating other regions to see how widely distributed this whitefly may be.

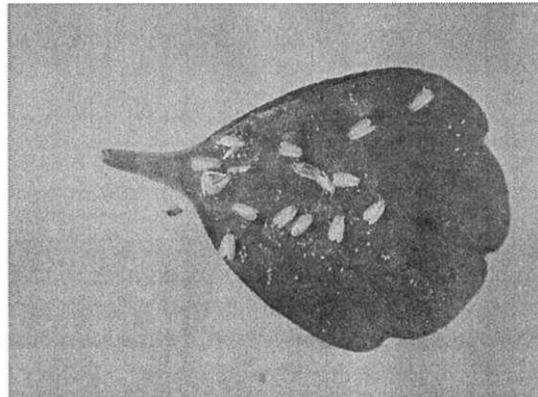
If you are out and about, or if you have *Melicytus* in your garden, have a close look to see if whitefly is present. Another clue may be the presence of black sooty mould which grows on sugary secretions excreted by immature whiteflies. It is the nymphs or pupae stuck to the underside of the leaf that are required for identification. If what you see looks similar to the pictures below, or at www.biosecurity.govt.nz/whitefly, please collect a leaf sample into a plastic bag, place in a non-breakable container and send to:

Freepost 120201, Whitefly Survey, MAF Laboratory, PO Box 24, Lincoln, Canterbury 8152

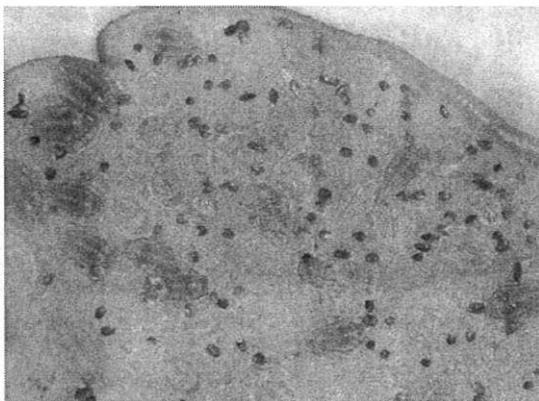
Please include your contact details, the date and location of collection, and the species of *Melicytus*.



Whitefly on *Melicytus lanceolatus*



Whitefly adults on *Melicytus obovatus*



Immature whitefly stages on *Melicytus lanceolatus*

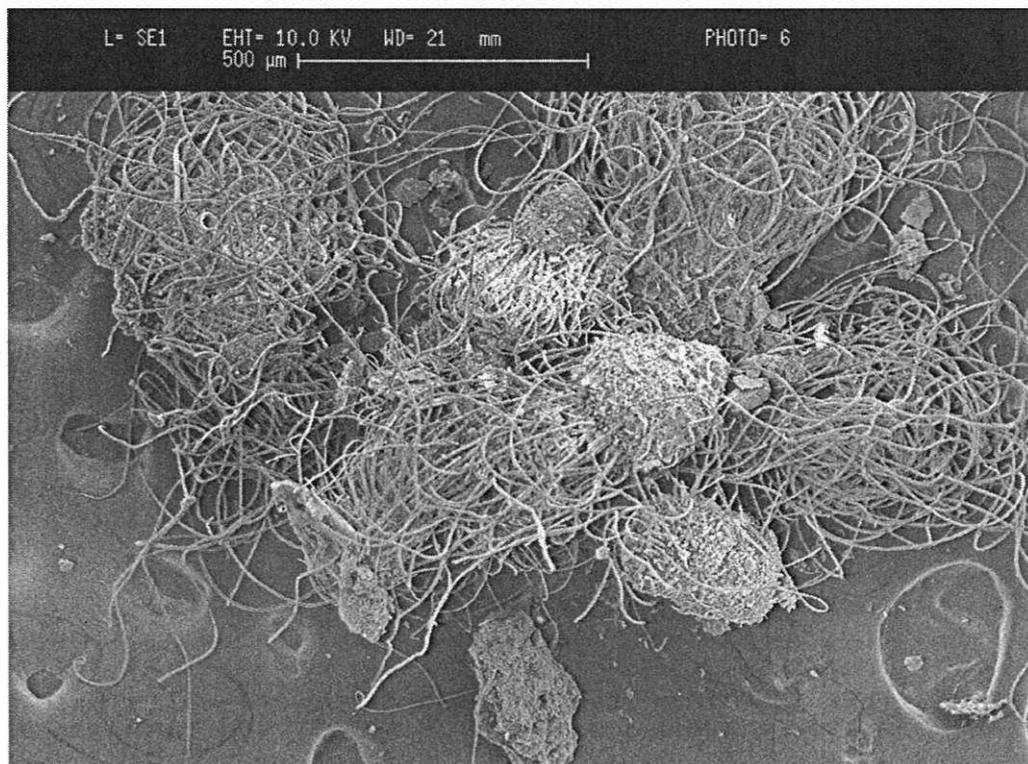
■ Identification Request

I am a PhD student at the Geology Department, University of Otago researching past ecosystems of Central Otago. I have recently been digging in sediments under rock shelters looking for plant and animal remains.

Below is a photograph of some objects which I have found. They are small (see scale) but very numerous. They are through the sediments, mostly attached to small bits of moa down, and are commonly found on and in moa droppings. I had thought that they might be seeds of some sort, being

transported on moa similar to bidibids; however several botanists I have shown them to do not think they are seeds.

The structure of the objects is a round ball or pod with numerous long woolly structures sprouting from one end. It is not apparent in this photograph but the balls seem to be hollow cup like shapes.



If any member can identify these objects, Jamie can be contacted by mail or email (wooja716@student.otago.ac.nz).

Jamie Wood, Geology Department, University of Otago, PO Box 56, Dunedin

■ Specimen Request

Schoenus plants needed for a new PhD project

I am assembling a collection of *Schoenus* (Cyperaceae) species from as wide a range of localities as possible for a PhD project. *Schoenus*, along with other Cyperaceae, is unusual in having holocentric chromosomes; instead of having only a single centromere that controls orientation and movement of chromosomes they have centromeric activity distributed along their whole length. This has important implications for chromosome evolution, as chromosome breakage, which occurs naturally all the time, will not result in loss of genetic material, as each fragment will have a centromere. Our preliminary studies have found chromosome numbers ranging from $2n=8$ to $2n=74$ amongst the native species and we have also found chromosome races in *S. pauciflorus*.

We need live plants to grow on for chromosome analysis so small plugs with roots and leaves of plants from known localities, wrapped in wet tissue and put in a plastic bag and posted to the address below would be gratefully received. Please remember to obtain the appropriate permit or permission before making collections.

Species of *Schoenus* native to New Zealand

Schoenus apogon

S. caespitans

S. brevifolius

S. carsei

S. concinuus

S. fluitans

S. maschalinus

S. nitens

S. pauciflorus

S. tendo

Brian Murray

School of Biological Sciences, Private Bag 92019, 3A Symonds Street, Auckland
b.murray@auckland.ac.nz

BIOGRAPHY/BIBLIOGRAPHY

▪ **Biographical Notes (57) : Phillip Parker King (1791–1856)**

E.J. Godley, Research Associate, Landcare Research, P.O. Box 69, Lincoln.

Phillip Parker King RN, noted for his explorations in Australia and South America, spent only 21 days in New Zealand, and made no botanical observations of note. However, in that brief visit he met William Colenso, and was later instrumental in bringing Colenso into contact with Sir William Jackson Hooker, Regius Professor of Botany at Glasgow, and later Director of the Royal Gardens at Kew. Before that he had played a major part in the career of our great pioneer botanist, Allan Cunningham.

King was born on Norfolk Island on 13 December 1791 (1, 2). In November 1793 his father, Phillip Gidley King (1758–1808), Lieutenant-Governor of the island, visited the North Cape region of New Zealand to return two Maori who had been taken to the island to advise on the processing of flax (3, 4). A map of New Zealand that one of them sketched is reproduced in (5) and (6). This visit by the father in 1793 should not be confused with the visit by the son in 1838–39. As there does not seem to be a published account of the latter I have given the itinerary below.

At the age of 5 Phillip was taken to England by his parents, and there he remained when his father was appointed Governor of New South Wales in 1799. In November 1807 he joined the Royal Navy, and in February 1814 was promoted lieutenant, after service in the North Sea, Bay of Biscay, and the Mediterranean(1).

After training as a surveyor under Captain Thomas Hurd, hydrographer to the Admiralty, King was posted to Australia, arriving at Port Jackson (Sydney) in September 1817. His mission was to continue the hydrographic surveys of Baudin and Flinders, which meant concentrating on the north-west and northern coasts of the Continent. But because this survey was commissioned by the Colonial Office and not the Admiralty, King was instructed to do far more than chart the coast. He was to find out whether any great river led far inland, and also to obtain information on natural products. To the latter end Sir Joseph Banks had made available Allan Cunningham, His Majesty's Botanical Collector, who had been at Port Jackson since December 1816. King made the following surveying expeditions and was accompanied by Cunningham on all five (1, 7).

1. 22 December 1817 – 29 July 1818: via Bass Strait and W. Australia to NW and N Australia with 10 days refitting at Timor.
2. 25 December 1818 – 14 February 1819: surveyed Macquarie Harbour, Tasmania, while waiting for the monsoon season.
3. 8 May 1819 – 12 January 1820: to NE and N coasts via Inner Passage (Queensland coast) and Torres Strait, returning via W coast and Bass Strait, with 7 days at Timor.
4. 13 July – 9 December 1820: via Queensland coast and Torres Strait to NW coast, returning via W coast and Bass Strait.
5. 26 May 1821 – 25 April 1822: via Queensland coast and Torres Strait to NW and W coast, returning via Bass Strait with a visit to Mauritius for repairs and provisions.

King arrived back in England in April 1823, in poor health. In Feb. 1824 he was elected as Fellow of the Royal Society in recognition of his eminence as an hydrographer and explorer; and he wrote his 2-volume *Narrative of a Survey of the Intertropical and Western Coasts of Australia*. It included some of his own sketches and, with appendices by specialists, appeared in 1827 (1).

On 27 May, 1826, King left Plymouth in command of *H.M.S. Adventure* to survey the coast of South America from Montevideo round to Chiloé. He was accompanied by *HMS Beagle*, commanded by Pringle Stokes. A shore base was established at Port Famine in the Straits of Magellan and four seasons spent surveying from near Cape Horn up to Chiloé. The winters were spent at either Montevideo or Rio de Janeiro in the east, or at Ancud, Chiloé in the west. In 1828 Comander Stokes

became depressed and shot himself. He was replaced by Lieut. Robert Fitzroy, who commanded the *Beagle* until the expedition returned to England in October 1830; and then (promoted Captain) commanded her during her second voyage from 1831 to 1836 with Darwin aboard (8).

The *Narrative of the surveying voyages of His Majesty's ships Adventure and Beagle between the years 1826 and 1836* appeared in 1839 in three volumes edited by Fitzroy. The first volume, *Proceedings of the first expedition 1826–30*, was written by King; the second volume *Proceedings of the second expedition 1831–36* was written by Fitzroy; and the third volume, *Journal and remarks 1832–36* was written by Darwin and became a classic when issued separately (8).

In 1832 King returned to his pastoral estates in New South Wales and in 1834 began a 10-year period in charge of the Australian Agricultural Co.(1). He continued to seek new areas for development and to write; and one of his journeys, to New Zealand and Norfolk Island, took him in the footsteps of his old friend Allan Cunningham.

Cunningham had made his first visit to New Zealand in 1826, arriving at the Bay of Islands on 9 September on the whaler *Indian*. He carried an introduction from Samuel Marsden to Henry Williams, of the Church Missionary Society, Paihia. After collecting in the far north and a brief visit to Tauranga on the mission schooner *Columbine*, he left on the *Columbine* for Sydney on 29 December (7). In mid-April, 1838, he returned to the Bay of Islands on the French corvette *L'Héroïne* and again stayed at the Paihia mission station. Here he made great friends with William Colenso, the catechist-printer, and gave Colenso invaluable instruction in botany.

After he returned to Sydney in September, Cunningham wrote regularly to Colenso, sending advice and encouragement. On 14 December, 1838, when informing Colenso of the completion of a promised vasculum, Cunningham announced: "At length our Lord Bishop [Broughton] is about to pay you a visit and I trust it will be a friendly one. He is, I understand, on the point of embarking in the *Pelorus*, and with his Lordship, Mr Hatfield [Octavius Hadfield] whom I have seen." (9) Another passenger, but not mentioned in the published extract from Cunningham's letter, was Phillip Parker King. He does not appear to have been on any official business and may have been shouted a sentimental journey to his place of birth. In fact the only published reference to his journey that I can find is a sentence in (1). However, he kept a journal.

King's 60-page journal (12 Dec. 1838 – 28 Jan. 1839) is held in the State Library of New South Wales, Sydney. (A copy is now held at the Landcare Research Library, Lincoln). It records what Bishop Broughton did, and gives impressions of Māori and Pakeha in the Bay of Islands and at Maraetai near Auckland, and comments on the progress of Christianity. The sequence is as follows.

HMS Pelorus (Capt. Hardy) left Sydney on 12 December, 1838 and sighted the Three Kings on the 18th. She anchored in the Bay of Islands on the 21st, off the village of Kororareka and was welcomed by James Busby, the British Resident.

22 Dec.: "the Bishop landed at the Residents [house?], received by the Revd. Mr Maunsell, Mr Colenso the Printer, Mr Henry Williams Sen. and Mr Ford."

23 Dec.: "Landed at Payeha [Paihia] and attended Divine Service. Prayers read by Mr Maunsell and the Sermon preached by the Bishop —." "After Service the Bishop, accompanied by Mr Maunsell and Mr Colenso, sailed over in the *Pelorus*' boat and after partaking of a lunch on board the *Pelorus* landed and preached in the church at Kororareka —."

These, and another below, are the only references that I can find to Colenso in King's journal. On 24 and 25 December King was either on board *Pelorus* or making local excursions, but on the 26th he went up the Kawakawa River and gave a long description of what he saw. On 27 December he left with the Bishop and Capt. Hardy to visit the Church Missionary Society settlement at Te Waimate. "Capt. Hardy slept at Mr Davis's, I at Mr Clarke's, and the Bishop was domiciled with Mr Williams." King has again left a long account of what he saw here next day. The party returned on 29 December "and reached the ship off Kororareka in time to get under weigh to run into the Kawakawa off Mr Mair's house, a much more convenient situation for our communication with the shore at Paihia and a better anchorage —." On 30 December "the Bishop preached a very excellent sermon on the 90th Psalm," whereas 31 December – 2 January 1839 seem to have been taken up with tidal observations.

On 3 January King accompanied Capt. Hardy and others up the Kawakawa again. "The day following, the Bishop consecrated the burial grounds of Paihia and Kororareka and the succeeding day (5th) confirmed 41 natives —." "The whole ceremony had been translated and printed off by Mr Colenso." On Epiphany Sunday, 6 January, Octavius Hadfield was ordained priest.

The *Pelorus* left the Bay of Islands on 7 January 1839, bound for the Maraetai Mission Station, which was under the care of W.T. Fairburn. She anchored at the eastern end of Waiheke Island on 8 January and Fairburn spent the night aboard. Next day she sailed across to the mainland and anchored off Maraetai, finding that the *Columbine* had preceded her. On 10 January "the Bishop landed under a salute of 13 guns;" and while he was "examining and catechising the natives in Mr Fairburn's room," King and Capt. Hardy "ascended a hill and saw the head of Port Manukau, a harbour on the West Coast —." Later that day the Bishop confirmed the Fairburns's elder children.

H.M.S. Pelorus sailed from Maraetai at daylight on 11 January 1839; and at daylight on the 18th they sighted Norfolk Island. At 10 a.m. the Bishop, Hardy, and King assayed the hazardous open-boat landing; and late on the 20th they embarked for home, arriving on 28 January 1839. King's return to the island "after 42 years" gave him much to reflect on in his journal, much of it personal; but at least we could note: "I found my expectation of the beauty of the island very much below what it really deserves."

On 27 June, 1839, Allan Cunningham died in Sydney, *aet.* 48, leaving a grieving Colenso, bereft of friend and mentor. He turned to King who advised him to write to Sir William Jackson Hooker at Glasgow. When Colenso replied he sent 2 guineas to King (who was Cunningham's residual legatee) for a memorial to Cunningham; and on 14 February 1840 he wrote his first letter to Sir William. Then on 18 August 1841, *H.M.S. Erebus* and *H.M.S. Terror* of James Clark Ross's Antarctic expedition arrived at the Bay of Islands, bringing Joseph Dalton Hooker, Sir William's son, as assistant-surgeon on the *Erebus* and botanist to the expedition. He carried a letter from King to Colenso, stayed for 3 months, and was soon filling the gap in Colenso's life left by Cunningham's death. For many years Colenso collected for the Hookers who remunerated him out of their own pockets (10); and in 1864 Joseph Hooker described him as "the foremost New Zealand botanical collector" who had discovered "more new and interesting plants than any botanist since Banks and Solander" (11).

King continued surveying in New South Wales until 1855, and in that year he was promoted rear-admiral on the retired list. He died c. 26 February 1856, *aet.* 64, and "was the first and for many years the only Australian-born to attain eminence in the world outside the Australian colonies." (1)

Eponymy

1827

Kingia [Xanthorrhoeaceae]: Robert Brown in the Natural History Appendix to P.P. King's *Narrative* (see above). Brown wrote: "To this new genus I have given the name of my friend Captain King who, during his important surveys of the coasts of New Holland, formed valuable collections in several departments of Natural History, and on all occasions gave every assistance in his power to Mr Cunningham, the indefatigable botanist who accompanied him. The name is also intended as a mark of respect to the memory of the late Captain Philip Gidley King who, as Governor of New South Wales, materially forwarded the objects of Captain Flinders' voyage; and to whose friendship Mr Ferdinand Bauer and myself were indebted for important assistance in our pursuits while we remained in that colony."

1844

Coriaria kingiana: W. Colenso in *The London Journal of Botany* 3: 20; collected inland from Poverty Bay, near Whakapunake, on 21 December, 1841 (this was the second day of Colenso's first Waikaremoana journey). He wrote: "In this neighbourhood I noticed a new and very distinct species of *Coriaria* (100) an elegant procumbent plant with undulated ovate-acuminate leaves. I have named this species *C. kingiana* (in honour of my much respected friend, Capt P.P. King, R.N.), and was fortunate in procuring fine specimens in flower and fruit."

Acknowledgments

I am particularly grateful to Ms Tania Webster, Research Librarian, Landcare Research, Lincoln, for finding King's journal, and to Dr Ilse Breitwieser, also of Landcare Research, for obtaining it for me. I also thank Wendy Weller for her typing.

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(1) Anon. (1967): King, Phillip Parker (1791–1856). *Australian Dict. Biogr.* 2: 61–64; (2) T. Britten & G.S. Boulger (1931): *A biographical index of deceased British and Irish botanists*. Edn. 2. (ed. A.B. Rendle). London, Taylor & Francis; (3) A.G.L. Shaw (1967): King, Phillip Gidley (1758–1808). *Australian Dict. Biogr.* 2: 55–61; (4) Robert McNabb (1914): King's Journal. *Historical records of New Zealand* 2: 535–553. Wellington, Govt. Printer; (5) P.B. Maling (1969): *Early charts of New Zealand 1542–1851*. Wellington, AH & AW Reed; (6) Malcolm McKinnon, ed (1997): *Bateman New Zealand Historical Atlas*. D. Bateman in association with Historical Branch, Dept. of Internal Affairs; (7) W.G. McMinn (1970): *Allan Cunningham, botanist & explorer*. Melbourne University Press; (8) E.J. Godley (1965): Botany of the Southern Zone. Exploration to 1843. *Tuatara* 13: 140–181; (9) A.G. Bagnall (1941): Allan Cunningham and William Colenso. *Turnbull Library Record* 3: 5–10; (10) A.G. Bagnall & G.C. Petersen (1948): *William Colenso*. Wellington, AH & AW Reed; (11) J.D. Hooker (1864): *Handbook of the New Zealand flora*. London. Lovell Reeve & Co.

PUBLICATIONS

Journal Received

New Zealand Native Orchid Group Journal No. 94, Feb 2005
Edited by Ian St George [ISSN 1170-4543]

Original papers in this issue are: Bruce Irwin - Rogers got it right – *Prasophylla* are difficult; Ian Hood (adapted article) – *Armillaria* and *Gastrodia* in pine forests

Book Review

▪ New Zealand wildflower portraits

Shelia H Cunningham (2004), published by Ashley Cunningham. 92 pages, soft cover, ~ \$34.95.

The late Shelia Cunningham published the first book some twenty years ago. "Hawkes Bay for the happy wanderer" should be familiar to many botanists and walkers - it is the best tramping guide for the region, and is full historical and botanic interest. It stresses the author's love of the region and the outdoors. Shelia died in 1988, but her legacy continues with plantings at Lake Tutira and Bay View, the book her loving husband Ashley wrote about her, and now, this lovely book of her own paintings of wildflowers. Into the book Ashley has compiled about 300 paintings of flowers by Shelia, each with a short description. There are three or four plants described and illustrated on each page. Sure, most specimens are weeds, including thistles, gorse, and the like, but there are a few natives, and nice illustrations of many plants that you will find in your own back yard. The book is designed to be educational as much as artistic, and its knowledge will add to any tramp or outdoor excursion. A very nice gift book.

Tony Gates

New Book

▪ Wetland types in New Zealand

P.N. Johnson; P.J. Gerbeaux 2004. >DOC Science Publishing, Wellington. 184 p.

Wetlands are diverse for many reasons, and New Zealand has many sorts. They include bogs and marshes, swamps and seepages, and the edges of lakes, rivers and estuaries. Wetlands are important for biodiversity, birds, fish, plants and people. This book, by New Zealand's top wetlands authors, describes a recently-devised system for classifying and naming New Zealand wetland types, and provides an understanding of how wetlands work. Designed as a field guide, its 184 pages are beautifully illustrated with full-colour photographs.

PETER JOHNSON is a botanist and plant ecologist with Landcare Research in Dunedin. He has a particular interest in wetland ecology, and is the author, with Pat Brooke, of *Wetland Plants in New Zealand*.

PHILIPPE GERBEAUX is Technical Support Officer with the Department of Conservation based in Hokitika (West Coast Conservancy), and is an expert in freshwater and wetland ecology.

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(Special discounts apply to DOC staff and members of the Limnological and the Botanical Societies of New Zealand, and for bulk orders. Email us for more details.)



Wetlands bordering Mahinapua Creek, Westland. The stream contains submerged aquatic plants and the floating foliage of water lily. Turf on the stream margin grades back to flax swamp then kahikatea forest swamp (Wetland Types in New Zealand, cover photo)

Financial support from the TFBIS fund (the Terrestrial and Freshwater Biodiversity Information System Programme, the Government's Biodiversity Funding Package) in 2004 meant many copies of this book were able to be made available free of charge to wetlands practitioners in NZ. However, within 2 months of first announcing publication, DOC office was flooded with hundreds and hundreds of orders. Due to this unprecedented demand, the quota of free copies is now exhausted.

However, the contents (with pictures rendered in B&W) are of course free on the DOC website: search at www.doc.govt.nz > Publications > Science and Research or link direct to: <http://www.doc.govt.nz/Publications/004~Science-and-Research/Miscellaneous/>

Jaap Jasperse, Science & Technical Publishing Manager, Department of Conservation, PO Box 10-420, Wellington, NZ

