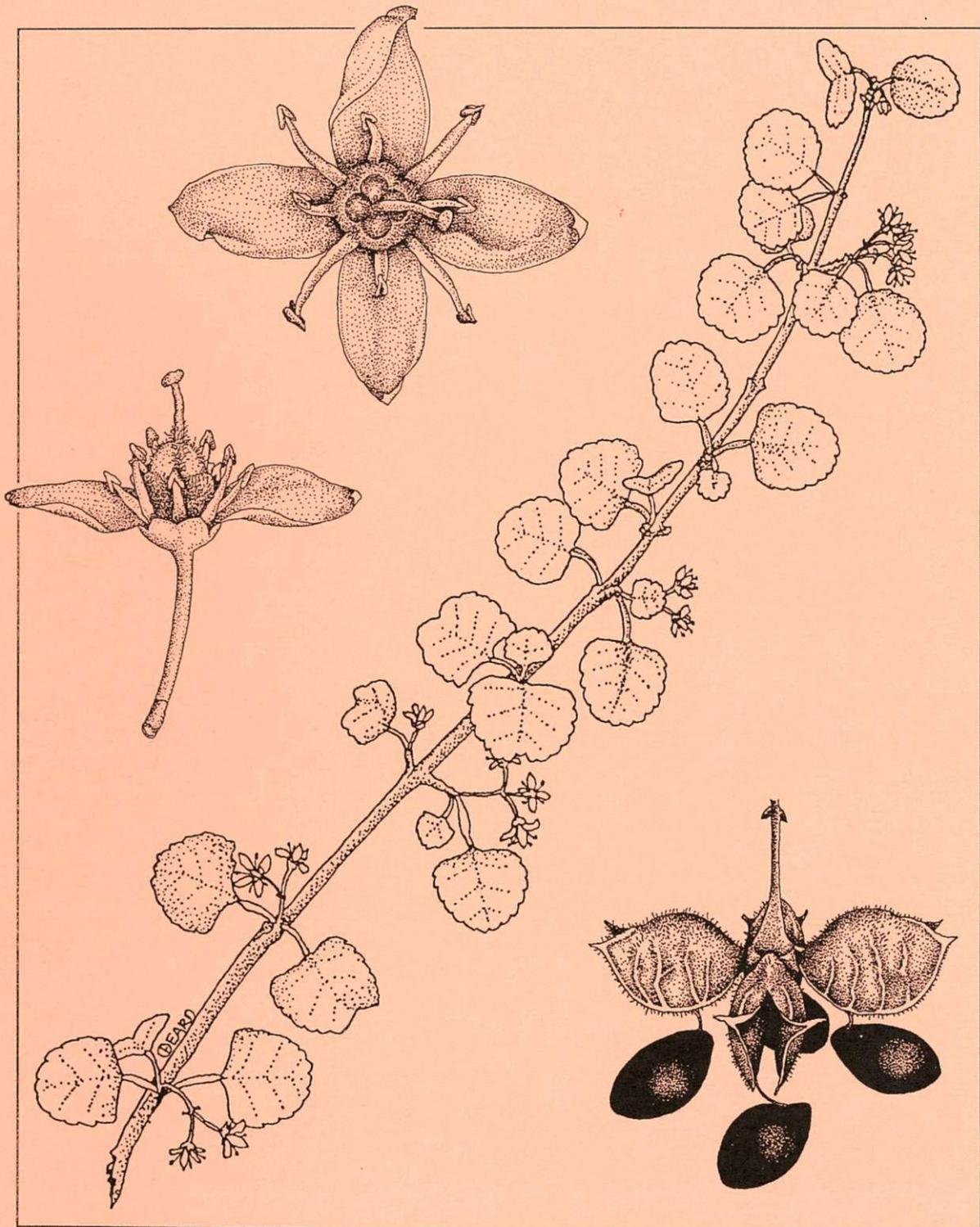


NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 52

JUNE 1998



NEW ZEALAND BOTANICAL SOCIETY
N E W S L E T T E R
NUMBER 52 JUNE 1998

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New Zealand Botanical Society

President:	Jessica Beever
Secretary/Treasurer:	Anthony Wright
Committee:	Bruce Clarkson, Colin Webb, Carol West
Address:	C/- Canterbury Museum Rolleston Avenue CHRISTCHURCH 8001

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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 28 February of each year for that calendar year. Existing subscribers are sent an invoice with the December *Newsletter* for the next year's 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 September 1998 issue (Number 53) is 28 August 1998.

Please forward contributions to: Dr Carol J. West,
c/- Department of Conservation
PO Box 743
Invercargill

Contributions may be provided on an IBM compatible floppy disc (Word) or by e-mail to cwest@doc.govt.nz

Cover Illustration

Melicope simplex (Rutaceae) drawn by Catherine Beard

NEWS

New Zealand Botanical Society News

■ A tribute to Antoinette Nielsen

The New Zealand Botanical Society owes a large debt of gratitude to a quiet and unassuming, hard-working young woman who has done much for the Society over the past seven years. Antoinette Nielsen joined the staff of Auckland Museum as my Secretary in 1992, and immediately took much of the load of my being Secretary/Treasurer of the Society. For six years, she undertook all the invoicing, receiving, receipting and banking of subs, and prepared the annual accounts (which always balanced - something that never easily happened for me previously!). In 1992, Antoinette took over the typing - and soon after the formatting and desktop publishing also - of the *Newsletter*, correcting more errors and typos than I or a succession of editors would care to contemplate. The clear, clean, consistent layouts are a testimony to her skills and logical thinking. Antoinette has also stuffed tens of thousands of envelopes in mailing out the *Newsletter* every quarter over these seven years.

This long and valuable contribution to our Society sadly ended with the mailing out of *Newsletter* no. 51. Antoinette has 'retired' from Auckland Museum and has headed for Hawkes Bay in search of better climes. Thank you, Antoinette, on behalf of the Society, and all good wishes for every success in the future.

Anthony Wright, Secretary/Treasurer, NZBS, Canterbury Museum, Rolleston Avenue, Christchurch 8001

Regional Botanical Society News

■ Auckland Botanical Society

March Meeting

The AGM was followed by a talk on invasive fungi by Dr Peter Johnston of Landcare Research, Mt Albert. The usual rule, that introduced fungal species are only associated with introduced hosts, and native species with native hosts, has been broken in the case of two conspicuous exotic fungi. The fly agaric, *Amanita muscaria*, and the orange pore fungus, *Favolaschia calocera*, have moved into native forests, and hence are considered to be fungal invaders. As well as discussing his research on these two species, Dr Johnston gave some insights into the presence or absence of an edaphytic fungus in natural and planted populations of manuka.

March Field Trip

The annual Hauraki Gulf trip was this year a repeat trip to the privately owned Noises Islands. Delays with the chartered vessel meant that there was time to explore only one of the islands - Otata. The sea was still warm enough for the children, and one or two others, to swim from the boat to the rocky shore. The track takes a circular route through vegetation dominated by coastal five finger, karo and pohutukawa. It was pleasing to see the local *Asplenium haurakiense* but, search as we might, there was no sign of the *Psilotum nudum* which had been found on the previous visit in March 1993.

April Meeting

John Braggins took the meeting on an armchair tour of interesting places, views and plants of Tasmania. The vegetation of Tasmania shares many similarities with that of New Zealand. *Dicksonia antarctica* grows along the roadsides; there are two species of *Coprosma* which have spines; *Pomaderris apetala* is common there, in contrast with its scarcity in New Zealand; and of the two species of *Nothofagus*, one is deciduous.

April Field Trip

The first of the two small reserves near Waimauku which were visited on this day was the Huapai Reserve which belongs to the University of Auckland. Several large kauri trees were most impressive, though some of us wondered if the the research being carried out on the trees was as beneficial to the trees as it was to the researchers. One small frond of the fan fern, *Schizaea dichotoma*, was found in the kauri litter. In the afternoon, Morgan's Bush, owned by the Queen Elizabeth II National Trust, was explored. The regenerating forest had an interesting understorey of tree ferns and small-leaved shrubs.

May Meeting

Professor Steve Stephenson of Fairmont State University gave a fascinating illustrated talk on the mid-Appalachian forests of his home state, West Virginia. Slides showing beautiful autumnal colours were a treat for "deciduously deprived" Aucklanders, but the Professor pointed out that such beauty can be deceptive. In fact, the Appalachian forests are in a very vulnerable condition. Past logging has wreaked havoc, as have browsing deer. The forest composition has altered greatly with the invasion of foreign fungi and diseases, and now acid rain is also taking a toll.

May Field Trip

Puhinui Stream forms the southern boundary of a Manukau City reserve which, despite an unprepossessing appearance, contains two wetland areas, a long strip of salt marsh and some beachline vegetation. The mudflats of the Manukau Harbour support growths of *Zostera* and mangroves, and some peg roots remain from an ancient kauri forest. The salt marsh grades into a small area of manuka, under which grows sphagnum moss, *Hydrocotyle novae-zeelandiae*, *Coprosma tenuicaulis*, and the only known Auckland population of *Nertera scapanioides*.

Forthcoming Activities

Evening meetings

- 3 June - Wetland Research (Kerry Bodmin and Gillian Rutherford)
- 1 July - Mokohinau Islands (Ewen Cameron and Peter de Lange)
- 5 August - Ethnobotany (Sue Scheele)

Field Trips

- 20 June - Filmy Fern Workshop (John Smith-Dodsworth)
- 18 July - Mistletoe hunt, Drury (Bec Stanley)
- 15 August - Whangaparaoa Defence Land (Steve Benham)

Maureen Young, 36 Alnwick Street, Warkworth.

■ **Canterbury Botanical Society**

December Camp: 5-7 December

About 25 members were based at the Raincliff Scout Camp between Geraldine and Fairlie. Max Visch guided us through the outstanding exotic trees at Raincliff Station. We visited Pioneer Park, a regenerating totara forest with a wide range of broadleaved trees and shrubs, where we observed the effects of a very dry spring and early summer. We spent a day at the Kakahu Bush Farm covenant with the owner Ian Morrison. Here all the valleys are reverting to podocarp-hardwood forest very satisfactorily. Common along some of the open boundaries is *Pomaderris apetala* (a rare Australian form with thick, long-rayed stellate indumentum, N.G. Walsh, in litt.). We found two trees of *Hoheria angustifolia* x *H. lyallii*. Thanks to local members Fraser Ross and John Talbot for their leadership.

January Camp: 3-10 January

With 36 members based at the School of Forestry Field Station, Hari Hari, South Westland, we realised our aim to see plant associations from the coast to the subalpine. From Okarito we walked the beach to Three Mile Lagoon and the dune forest. At Mystery Hills in Ianthe Forest we walked in heavy rimu forest on glacial outwash, and on moraine ridge. We climbed to the summit of Alex Knob (1303m) through the magnificent *Dracophyllum traversii*-*D. fiordense*-*Olearia lacunosa*-*Libocedrus* forest. We relaxed on the coastal walk to the

Wanganui and Poerua River mouths where there is a lone southerly outlier of nikau. Returning south to Lake Gault above Lake Matheson we saw the stand of the prickly-to-grasp yellow silver pine (*Lepidothamnus intermedius*) at the lake edge, in torrential rain. Finally a fine, hot day was spent up the Wanganui River valley in terrace forest and shrubland. The planning and leadership of David Norton and Peter Wardle was much appreciated. We were fortunate to have Graeme Jane from Nelson at both our camps. He compiled our species lists and will make copies available on request.

February Meeting Richard Duncan, Lincoln University, spoke on "Invasions and extinctions: using historical records to answer ecological questions".

February Field Trip Snowdon Station wetland covenant, upper Rakaia Valley, led by Tony Tripp and David Webster, Q. E. II Regional Representative.

March Meeting Rob Allen, Landcare Research, Lincoln, spoke on "Mountain beech forest regeneration after fire at Mt Thomas Forest".

March Field Trip The climb to the sites on Mt Thomas was cancelled. An alternative circuit of the Glentui Nature Walk showed the effects of severe drought on some shrubs and ferns, in the vicinity of a remnant stand of rimu.

April Meeting Bill Sykes gave an illustrated talk on the botany of Tonga.

April Field Trip Colin Burrows showed us some proposed sites for bush enhancement on the Port Hills as planned by the Port Hills 2000 Committee as part of Canterbury's Millennium project.

May Meeting Hazel Chapman spoke on "The potential for evolution within apomictic populations of *Hieracium* (hawkweeds) in New Zealand".

May Field Trip "Otehore" Q.E. II covenants, Upper French Farm Bay Valley, Akaroa Harbour, led by David Webster. The effects of heat stress were evident on the trachyte lava of Pulpit Rock where broadleaf, *Cyathodes juniperina* and *Hymenophyllum rarum* appear to have been cooked. The silvery moss *Grimmia laevigata* was plentiful and flourishing.

Forthcoming Events

June 6, Saturday 11am-2pm. A.G.M. and social at St Ninians Church Lounge, Riccarton. The speaker will be Kerry Ford, Landcare Research, Lincoln. "Investigations into *Carex* in the mountains of north-west Nelson". Contact: Roger Keey (03) 3588513.

July 3, Friday. Members' evening. Slides, photographs, specimens and other exhibits. Also an informal launch of the book published by the Society and Manuka Press to commemorate the publication of "Choix de Plantes" by E.F.L. Raoul in 1846. Contact: Bryony Macmillan (03) 3519241.

July 4, Saturday. A beginners' workshop covering the absolute basics of botany and use of keys. Leader Philippa Horn (03) 3296707.

August 7, Friday. "The Christchurch City Council's native plant nursery at Linwood". Speaker: Joe Cartman. Contact: Bryony Macmillan (03)3519241.

August 8, Saturday. 10-12 am. Visit to the Linwood Nursery. Leader: Joe Cartman.

September 4, Friday. "What is a weed" Speaker: Philippa Horn (03) 3296707.

September 5, Saturday. Riccarton Bush. Leader: Colin Burrows (03) 3483880.

Visitors are very welcome at all our meetings.

Bryony Macmillan and Miles Giller, P.O.Box 8212, Riccarton, Christchurch.

■ Nelson Botanical Society

March Field Trip Report: Rimu Walk, Marahau

Once more the Mt. Arthur plague struck. Just as we arrived at Flora Saddle heavy rain set in and a retreat to lower altitudes to the Rimu Walk on the Marahau Hill seemed appropriate.

The walk traverses a small gully surrounded by recently logged pine forest. Initially the track descends through broadleaved shrubland of wineberry, mahoe, putaputaweta, pate and tree ferns such as silver fern. Once across the creek the mixed lowland silver beech, hard beech rimu forest begins including kiekie, supplejack and hangehange. About halfway round, several clumps of mistletoe occur on silver beech (probably *Peraxilla tetrapetala*). The return passes through drier mid slope forest with much horopito (*Pseudowintera axillaris*), *Pittosporum rigidum*, *Pseudopanax anomalus*, *Gahnia rigida* and black beech.

Find of the day - mistletoe

April Field Trip Report: Pretty Bridge

The first area visited, on private land in Scaife Stream, was alluvial forest of young black-silver beech forest with some podocarps and an understorey of tree fuchsia, pokaka, kaikomako, *Neomyrtus pedunculatus*, *Lophomyrtus obcordata*, *Raukaua anomala* and eight *Coprosma* species. Across the boundary into conservation land the understorey was slightly denser with more ferns, including *Lastreopsis velutina*, *L. glabella*, and *Leptolepia novae-zelandiae*, and a couple of extra *Coprosma* species. Hard beech occurred on the upper slopes. A rather large common wasp nest hanging from a branch also attracted attention and robins followed us throughout the forest while the "dawn chorus" of bellbirds and tuis continued all day.

After lunch we climbed a south-facing slope to the third area. This area was very different being well-drained hard beech forest with fewer species in the understorey. Some new species were *Pittosporum rigidum*, *Helichrysum lanceolatum*, *Gahnia pauciflora*, *Asplenium hookerianum*, *Cyathodes juniperina*, *Olearia rani* and *O. avicenniifolia*. Most people then went home while four of us visited another nearby privately owned bush. Here *Alepis flavida* growing on hard and black beech was somewhat battered by possums. Several middle-aged rimu were scattered through the tall beech forest, and kahikatea was present along its lower margin. Titoki and *Streblus heterophyllus* made their first appearances of the day. Having made four species lists for the day and with darkness imminent we then decided that we had earned a break and headed for home. (Abridged from report by Cathy Jones.)

Easter Camp Report: Paparoas

The first morning we headed off for Mt Fleming. From the end of the logging road the track first headed through cut-over forest. Here, seedlings of many shrubs were present and plants such as yellow-silver pine and rimu could be readily compared. Into undisturbed forest, we soon found *Dracophyllum townsonii*, *Hymenophyllum lyallii*, the secretive *Trichomanes strictum* and the tiny *H. armstrongii*. Other plants of interest here were *Corybas acuminatus*, *Archeria traversii*, *Metrosideros parkinsonii* and flowering *Earina autumnalis*. At the tussock grassland edge were the huge *Gentiana* "Paparoa", some over 75 cm tall, huge bright green *Aciphylla horrida* and tiny but colourful *A. hookeri* with its orange-margined, grey-green leaves. Fog soon descended but botanising on the lee side of the ridge revealed a good selection of alpine, including *Polystichum cystostegia*, *Celmisia verbascifolia*, *Cyathodes dealbata* and two further gentians, one possibly *G. vernicosa*.

Finds of the day: *Hymenophyllum armstrongii*, *Aciphylla hookeri*

On Saturday, the first stop was at the Blowholes track at Punakaiki. The coastal forest contained a good selection of ferns but the real interest lay in the plants on the coastal rocks and platforms. Here, *Euphorbia glauca*, *Craspedia major* and *Blechnum blechnoides* attracted special attention. The second stop of the day was at the Truman Track. The ferns here were especially varied, with over 40 species recorded. Interesting finds included *Blechnum nigrum*, *B. colensoi* and *Hypolepis distans*. Amongst the woody plants *Metrosideros colensoi* was of particular note and a fallen turf of moss contained *Bulbophyllum pygmaeum*. The coastal platforms were covered with a dense mat of *Samolus repens*, *Selliera radicans* and *Leptinella dioica* and at the rear huge old rimu reached only a metre tall. The final foray of the afternoon was at Kaipakati Point. Here nikau and karaka were of particular interest.

Finds of the day: *Euphorbia glauca*, *Blechnum nigrum*

The next day the trip was along the Tiropahi Track. The track passed through tall red and silver beech, then through kanuka forest followed by silver beech. This was followed by forest on limestone through the gorge and finally on to low scrub and the tangle fern of pakihi. The area was very rich in ferns with 57 species of ferns and fern allies recorded. Special finds included an abundance of *Hymenophyllum armstrongii*, *H. flexuosum* and *Leptolepia novae-zelandiae*. The forest contained a good range of podocarps including cedar, silver pine, and needle-leaved totara. On the limestone bluffs *Hebe townsonii* was spotted and two species of *Myosotis* recorded. Within the pakihi and in other wet areas a good list of rushes and sedges was completed. Tangle fern (*Gleichenia dicarpa*) was particularly abundant along with *Baumea teretifolia* and the occasional sundew and sun orchid (*Thelymitra cyanea*).

Find of the day: *H. armstrongii* in abundance

May Field Trip Report: Dun Mt Ultramafics via Maitai

About 25 headed off from the car park near the Matai Dam and passed rapidly through lower forest, botanised on a previous trip to the Maitai Cave. After about an hour we crossed the river for the second time to begin the ascent of Dun Mt. Here the forest contained several patches of *Botrychium biforme* (with mature sporophytic branches) and *Pterostylis alobula* just coming into flower. At the edge of the ultramafic shrublands, dominated by manuka, orchids included *Genoplesium nudum*, *Cyrtostylis reniformis* and *Acianthus sinclairii*. But the main challenges of the day were the sedges and ultramafic specialists. At first it was *Astelia* "serpentine" and then *Olearia serpentina*. Under the manuka, *Baumea tenax* with its bumble-bee striped seed and later the blue-green *Baumea rubiginosa* were common. Reddish, curly-leaved patches of *Carex traversii* and patches of *Isolepis aucklandica* occurred on the track. In drier areas, *Carex devia* produced culms up to 2 m long.

A few people headed off towards the summit. About two thirds of the way, the track passed through a small rata, pigeonwood, matai forest remnant with a dense understorey including *Olearia serpentina*. At the saddle the odd gentian was still flowering but many species had died back for the winter (e.g., *Notothlaspi australe*) but the group did see *Myosotis monroi* cryptically grey against the bare serpentine areas. A hasty retreat soon brought everyone together as we headed for the gate which was locked at 5 p.m.

Forthcoming trips

June 21 - Richmond Hill

July 19 - Happy Valley

August 16 - Abel Tasman - Waiharakeke-Totaranui

September 20 - Motueka Valley QEII covenant Kramer & Smith

Graeme Jane, 136 Cleveland Terrace, Nelson

Obituary

■ Rajnikant (Rajni) Naranbhai Patel (1936-1998)

New Zealand botanists were saddened to learn of the death of Rajni Patel in Christchurch on 9 April 1998. During his 34 years in New Zealand Rajni became the doyen of plant anatomists with his long series of papers on the anatomy of our indigenous plants. Rajni's quiet, careful and considered anatomical research set a standard in New Zealand botanical research. He applied traditional techniques using standard staining methods and light microscopy and accumulated a large body of published work which provides the benchmark for anatomical work, and an important foundation for many aspects of botany in both applied and basic botanical research; his published work will remain a monument to a dedicated botanist. In total Rajni published 40 research papers, mostly in the *N.Z. Journal of Botany*, including the 25 articles in his series on the wood anatomy of the dicotyledons indigenous to New Zealand between 1973 and 1995.

Rajni left Landcare Research (which included the former DSIR's Botany Division) on sick leave in 1995 and retired in 1996.

Our condolences go out to Mrs Tui Patel on her grievous loss.

A.D. Thomson, Centre for Studies on New Zealand Science History, 5 Karitane Drive, Christchurch 2

A full obituary for Rajni will be published in the *New Zealand Journal of Botany*, September issue.

Editor

NOTES AND REPORTS

Plant Records

■ A new northern limit for *Senecio sterquillinus* (Asteraceae)

Senecio sterquillinus, was segregated from the *S. lautus* complex by Ornduff (1960), on the basis of its much greater size, very succulent foliage, larger capitula, with considerably more involucre bracts and ray florets (see also comments by Webb 1988a, 1988b). Ornduff (1960) recognised the species from two locations, Napier (the type locality, from where he considered it extinct) and from the Brothers Islands in Cook Strait. In the same paper, on the basis of other field workers' comments, it was also suggested that the species grew on Stephens Island. Since then, Webb (1988a, 1988b) has confirmed the presence of this species on Stephens Island, and redefined *S. sterquillinus* to include Punakaiki plants previously placed by Ornduff (1960) within *S. lautus* var. *carosulus* (now considered a distinct species, *S. carosulus* (see Webb 1988a, 1988b)). In 1992, I reported the species, from Matiu/Somes, Mokopuna and Makaro Islands within Wellington Harbour (de Lange 1992). In the same article I also reported that *S. sterquillinus* appears from time to time as a casual on Petone Beach, at the northern end of Wellington Harbour.

Following on from those discoveries, in 1993, I discovered that *S. sterquillinus* is sparingly present on the western Wellington Coast at Rocky Bay. Here it grows alongside the Wellington coastal form of *S. lautus* var. *lautus* (see Ornduff 1960, Sykes 1971, Webb 1988a). Later, during November of that same year, I also discovered *S. sterquillinus* on a small rock stack, informally known as Stack "H" within the remote Mokohinau Archipelago c. 600 km north west of Napier, previously the accepted northern limit for the species (Ornduff 1960).

Stack "H" is one of a cluster of ten rock stacks that surround the three main islands of the northern Mokohinau group (*sensu* de Lange et al. 1995); Pokohinu (Burgess), Hokoromea (Maori Bay) and Atihau (Trig). Before the successful rodent eradication of 1990 (McFadden & Greene 1990), Stack "H" was the only part of the archipelago to remain free of kiore (*Rattus exulans*), and as such had acted as an important (and sometimes only known) refuge for several of the archipelago's threatened species. These include the large, flightless, endemic Mokohinau stag beetle (*Geodorcus ithaginis*), and the so-called "Stack H skink" (*Cyclodina* aff. *oliveri* [C. "Mokohinau"]) known elsewhere in the archipelago only from Tatapihi (Groper) Island (de Lange et al. 1995). In profile, Stack "H" is cliff girt and largely devoid of vegetation. The summit (35 m a.s.l.) is capped by a low (1.5-3 m tall) pohutukawa (*Metrosideros excelsa*) shrubland, and the western and southern flanks are sparingly clothed in patches of "petrel scrub" dominated by taupata (*Coprosma repens*), coastal mahoe (*Melicactus novae-zelandiae*) and *Chionochloa bromoides*.

Amongst and beneath the "petrel scrub" are literally thousands of diving petrel (*Pelecanoides urinatrix*), white-faced stormy petrel (*Pelagodroma marina*) and little shearwater (*Puffinus assimilis*) burrows. One result of these birds' visitations has been the formation of a guano-

enriched soil on which a distinctive ornithocoprophilous flora (sensu Ornduff 1965), dominated by the herbs *Wahlenbergia littoricola*, *Senecio lautus*, *S. marotiri*, *S. "Pokohinu"* (*S. aff. lautus*, AK 226359), *Einadia trigonos* subsp. *trigonos*, *Lepidium oleraceum*, and the ferns *Asplenium haurakiense* and *A. obtusatum* subsp. *northlandicum*, has developed. Associated with these herbs, on a series of narrow ledges facing due south, is where I found *S. sterquilinus* (de Lange 2615, AK 227133).

Since 1993, the flora of the Mokohinau Archipelago has been the subject of a research programme initiated by the author and E.K. Cameron of the Auckland Museum herbarium. Part of our fieldwork has involved visiting all the rock stacks of the archipelago, either by boat or helicopter. Yet despite these surveys *S. sterquilinus* is still only known within the archipelago from Stack "H". Further afield, on the other islands of the Hauraki Gulf and Bay of Plenty, I have not seen any additional populations of *S. sterquilinus*, nor have I found any previously unrecognised specimens of this species from the region lodged in the main New Zealand herbaria (AK! CHR! WELT!).

This apparent restriction of *S. sterquilinus* to Stack "H" is unusual, and it could be taken to suggest that the species is a recent introduction. There is some merit to this hypothesis, for the species was not recorded from the Mokohinau Islands by Cameron (1990), Cameron & Wright (1990) or Wright (1980). Furthermore, it is absent from the comprehensive collections made by A.E. Wright and others from Stack "H" and the rest of the archipelago during 1980 and 1984 (AK!). As regards a means of introduction, of those options available, I think it least likely that it was deliberately or accidentally introduced there by human agent, and that some other natural means of dispersal should be considered. For two reasons, I suggest that the species of petrel that visit the stack are the most likely seed vectors. Firstly, the short, hispid hairs found on the achenes of the New Zealand members of the lautusoid complex (sensu Belcher 1993, 1994) readily adhere to petrel feathers (P.J. de Lange unpubl. data) and, secondly, it is now known that the adolescent birds of many petrel species disperse widely, visiting other petrel colonies before returning to breed at their natal ones (G.A. Taylor pers. comm.). Therefore, it is not inconceivable that the Stack "H" population of *S. sterquilinus* originated through the accidental dispersal of seed by adolescent petrels travelling between colonies.

Acknowledgements

I would like to thank Ian McFadden, Greg Sherley, Terry Greene, Chris Green, Graeme Taylor, David Norton, and Ewen Cameron for company in the field and useful discussion. For encouragement and guidance in my studies of the New Zealand lautusoid *Senecio* I thank Colin Webb and Bob Ornduff. I also acknowledge the support of Graeme Campbell and Stella Penny, past and present Conservators of Auckland Conservancy, for facilitating permits to land and collect within the Mokohinau Islands Nature Reserve. I remain indebted to Ngati Rehua (Ngati Wai Aotea) who exercise mana whenua over these wahi tapu islands for their spiritual guidance and support of my work. Lastly, I thank Tony Monk and Roger Stevenson, who have provided helicopter assistance to enable visits to the less accessible islands, islets and stacks within the archipelago.

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Peter J. de Lange, Science & Research Unit, Science, Technology and Information Services, Department of Conservation, Private Bag 68908, Newton, Auckland

■ *Rorippa divaricata* near Rotorua

Rorippa divaricata is an endemic, perennial, taprooted herb that belongs to the Brassicaceae family. It is described in Garnock-Jones (1978) and Garnock-Jones and Jonsell (1988), see also Webb *et al.* (1988), and is classed as Endangered (Cameron *et al.* 1995).

R. divaricata had been found previously near Lake Tikitapu in 1989 (C.E. Ecroyd, NZFRI 18763). The walking track around Tikitapu was traversed on 12 February 1997, and one small population of *R. divaricata* was located. This population covered a very small area, less than 1 m², with two of the plants overhanging the track. The site is on the margin of a small clearing and the plants are growing beneath a canopy (2 - 5 m high) of pate (*Schefflera digitata*), tutu (*Coriaria arborea*), buddleia (*Buddleja davidii*), and kanono (*Coprosma grandifolia*).

Nine plants of *R. divaricata* were found. Six of these were flowering and three of these six also had fruit on them. One small plant was collected and transferred to a pot, and was cared for by Department of Conservation (DoC) staff. This plant subsequently flowered and seeded profusely.

Seed was also collected by DoC staff from the original site in autumn 1997. It was sown in seed trays in June 1997 and seedlings were pricked out into PB2's in July 1997. In October 1997 118 plants were planted in groups of 3-6 plants in a variety of habitats, sunny and shady, around Lakes Tikitapu and Okareka. These plants have generally flowered and seeded well, and have had good survival rates at the Lake Tikitapu site, however some losses occurred from the Lake Okareka plantings during weed control spraying operations.

DoC still has plants grown from seed collected from the original population, however these are now dying back. Seed has also been collected from the Lake Tikitapu plantings which were sown into seedling trays in May 1998.

The original site has been shaded by overtopping vegetation, and in February 1998 only three plants were present, with only a few seed heads. This site is likely to require ongoing maintenance for long-term survival of *R. divaricata*. It will be interesting to see if the planted populations are still thriving in the 1998/1999 season.

R. divaricata was recorded from Mokoia Island in 1990 (Beadel 1990). The site and general locality where it was observed in 1990 was searched in 1993 (Beadel 1993) and again in 1996. Despite several hours' effort on both occasions, no plants were found (Beadel 1993 & 1996).

R. divaricata is very rare. It has been collected only three times on the New Zealand mainland between 1977 and 1988 (Garnock-Jones and Jonsell 1988), and it has been recorded only rarely on the New Zealand mainland since 1988 (P. de Lange pers. comm., see Beadel 1992). One other site, at Lake Okataina, another of the Rotorua Lakes, has been found recently and has a total of six plants (P. Cashmore pers. comm.). There is also one site in the South Island, at Totaranui (Norton in draft).

There are only three known extant natural populations on the New Zealand mainland; Lake Tikitapu, Lake Okataina, and Totaranui.

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Sarah Beadel, Wildland Consultants Ltd, 14 Foster Road, RD4, Rotorua; Email: wildland@wave.co.nz and **George Pardy**, Rotorua Lakes Area Office, Department of Conservation, P.O. Box 281, Rotorua

■ *Carmichaelia juncea* - a little known plant on the brink of extinction

The *Carmichaelia juncea* Complex

Heenan (1995) in the first part of a comprehensive review of the taxonomic status of the predominantly New Zealand genus *Carmichaelia* reduced the endemic prostrate species *C. fieldii*, *C. floribunda*, *C. nigrans*, *C. lacustris*, and *C. prona* to synonymy under the earliest available name for the complex, *C. juncea*. This action was taken because it was felt that there were insufficient characters distinguishing these taxa to warrant their continued separation at species level (Heenan 1995).

Before this taxonomic revision five of the six species now included in *Carmichaelia juncea* were regarded as threatened with extinction to some degree (Cameron et al. 1995). As then understood, *C. floribunda* and *C. juncea*, known only from their type collections, were treated as Presumed Extinct or Insufficiently Known. It would seem that *C. lacustris* was inadvertently overlooked by Cameron et al. (1993, 1995) for it has not been listed as threatened. In any case this taxon, too, has not been collected for over fifty years and would probably have warranted Presumed Extinct status. *C. prona*, an eastern South Island lake margin species, had been thought extinct for some years until "rediscovered" in the Edinburgh Botanical Gardens (Simpson & de Lange 1993) and was listed as Extinct in the Wild. *C. fieldii* and *C. nigrans*, listed as Critical and Rare respectively (Cameron et al. 1995), remain the only members of the complex to persist in the wild. Following on from his taxonomical assessment, Heenan (1995) in treating these taxa as *C. juncea* suggested that this species should be regarded as Endangered.

Carmichaelia juncea (sensu Heenan 1995) is a distinctive species that is easily distinguished from other New Zealand *Carmichaelia* species by its distinctive prostrate habit (Fig. 1) not unlike a flattened and dying clump of rushes. The branchlets of *C. juncea* are strictly ground hugging, narrow, finely grooved, often dimpled brown or black, while the leaves when present, are rather inconspicuous, either unifoliate or trifoliate, with the leaflets extremely narrow. The small, white and purple-streaked flowers are relatively inconspicuous, and it is the dark-black fruits with their cartilaginous, persistent case, and distinctly pointed apex, which are most frequently seen.

Carmichaelia juncea on the West Coast

Our current knowledge of the distribution of *Carmichaelia juncea* (sensu Heenan 1995) suggests that this is one of the most threatened plants in New Zealand and we believe it should be listed as Critically Endangered under the IUCN classification scheme used by Cameron et al. (1995). As of March 1998 we are aware of only two wild populations, one at Farewell Spit, Nelson, comprising eight plants (S.P. Courtney pers. comm.) and one in the Fox River, south Westland, comprising 13 plants. However, this species appears to be poorly

known and it may well be that further populations are still present, especially around the shores of Lakes Manapouri and Te Anau, in the bed of the Makarora River, and in riverbeds around the Franz Josef and Fox Glaciers. But even if further populations are present, their long-term survival is likely to be tenuous because of the threats this species is facing in the wild. These threats include browsing by introduced animals (domestic stock and feral animals such as hares and chamois), competition from weeds, and riverbed modification by human disturbances (e.g., riverbank protection and riverbed modification; Davies 1997). The following account of the fate of a population of *C. juncea* in the Waiho River downstream from Franz Josef Glacier provides a useful case-study of the problems this species is facing.

Carmichaelia juncea has been known to be present in the Waiho Valley for many years (as *C. nigrans*; Wardle 1975). During fieldwork in the valley by one of us (DN) a large population was found in 1996 on an 'island' of old riverbed c. 500 m upstream from the Callery River confluence. At this time, this was the largest known extant population of this species. The plants were growing primarily amongst mats of *Raoulia tenuicaulis* on stable river gravels often with young plants of *Carmichaelia arborea*, *Hebe salicifolia*, *Coprosma rugosa* and *Cortaderia richardii*. Older areas of riverbed with dense growth of taller shrubland (*Carmichaelia arborea*, *H. salicifolia*, *Coriaria arborea*) lacked *C. juncea*. In agreement with



Fig. 1. *Carmichaelia juncea* plant showing distinctive prostrate habit, Fox River, Westland National Park.

browse, presumably by hares, was apparent on many of the *C. juncea* plants, the population was still considered to be of sufficient size to suggest that it was not immediately threatened with extinction. How wrong can you be!

During 1997, rip-rap was constructed along a section of the glacier access road opposite and slightly upstream of the *C. juncea* site. The rip-rap was established to protect the road from river erosion. This was a high priority for the Department of Conservation as the Franz Josef Glacier is one of the most popular visitor destinations on the West Coast. It was quickly apparent that the rip-rap had the potential to push the river away from the road (as was intended) towards the old riverbed 'island' containing the *C. juncea* population. Because of this threat, cuttings were taken from wild plants of *C. juncea* (by CM) and brought into

the observations of Wardle (1975), our impressions from the Waiho site suggest that *C. juncea* is a plant of recently stabilised riverbed gravels and is lost as taller vegetation establishes and forms a closed canopy on a site.

Up to several hundred *Carmichaelia juncea* plants were thought to be present at the Waiho site (Norton unpubl. data), although a complete census was not made during the 1996 visit as the intention was to come back and look at the site in more detail at a later date. However, it may be that the abundance of plants is less than this as buried stems were observed running for some metres from the central stem and root system and may have given rise to what appeared to be different plants (C.J. Miller unpubl. data). While

cultivation at a Hokitika nursery. Inevitably the river did change course and over the next 8-10 months it proceeded to destroy the 'island' and the *C. juncea* population on it. This was aided by the large amount of debris coming down the river from the advancing Franz Josef Glacier and the series of major floods that occurred over the 1997/98 summer. In October 1997, the lower part of the island was covered by gravel, although some *C. juncea* plants were still present, but by February 1998 only the upper parts of a few *Coriaria arborea* plants were still above the gravel. By March the island had totally gone, either being covered by several metres of gravel or having been washed away.

From the perspective of a plant on the brink of extinction this was a dramatic loss. Fortunately, we had taken cuttings and root stock of this population prior to the loss of the population, and have since discovered a population of *Carmichaelia juncea* in the Fox River, just above the State Highway bridge. This is close to the site of an earlier population described by Buxton (1993), that subsequently disappeared, presumably as a result of flooding (Rowan Buxton pers. comm.). During a visit in March 1998, two of us (DN, PdeL), located a new population of 13 plants in an area of c. 20 x 30 m on freshly disturbed (bulldozed!) river gravels, just upriver of the former site of the "Buxton" population. Subsequent searching of suitable habitat further upstream towards the Fox Glacier did not reveal any additional plants.

Conclusions

So what are the lessons from this for the conservation of *Carmichaelia juncea*? Firstly, the new population is confined to recently bulldozed river gravel, in several cases plants actually grow from within the old bulldozer tracks, so we suspect that these plants originated from freshly exhumed seed that had been dispersed from a former population(s) upstream. Secondly, this species is potentially threatened by flood control schemes and it is important that any future such schemes within the historic range of *C. juncea* consider this species through the Resource Management Act 1991 process. Finally, we have some indication of just how little we know about this peculiar plant and its dynamic habitat. Although it may well be that further populations are present in the wild and that diligent searching of historic sites and other suitable habitat may locate these, it is abundantly clear that we are still ignorant of the ecology of this species, especially with regard to growth rates, seed dispersal and viability, and exact habitat requirements. All of this information is vital if we are to intelligently manage the species. The Waiho case-study also serves to highlight the importance of the recreation and tourism components of conservation being co-ordinated with biodiversity conservation, co-ordination that is likely to be important for the conservation of other threatened plants as well as *C. juncea*.

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David A. Norton, Conservation Research Group, School of Forestry, University of Canterbury, Christchurch, **Peter J. de Lange**, Science, Technology and Information Services, Department of Conservation, Auckland and **Craig J. Miller**, West Coast Conservancy, Department of Conservation, Hokitika

Comment

■ How did the New Zealand flora originate?

Introduction

It has seemed to some biogeographers (e.g., Raven & Axelrod 1972, Stevens 1982) that the Late Cretaceous-early Tertiary separation of segments of Gondwanaland may account for some present floristic similarities between, e.g., Australia, New Zealand and South America. Cases in point would be members of the genera *Nothofagus*, *Discaria*, *Muehlenbeckia* and *Donatia*, or of the families Cunoniaceae and Podocarpaceae. According to this hypothesis lineages of the relevant plants have continued, uninterrupted since the late Cretaceous, in each of these regions. Also, as a corollary, the relevant sectors of Gondwanaland (including Antarctica) may have had a rather uniform general floristic array prior to the break-up of the vast southern land-mass, as Australia, New Zealand and South America were detached from different places around the Antarctic continent and have never been very close to one another. Of course local evolution in the time since Gondwana's fragmentation, and many vagaries of loss, or gain, of flora in the interim will have contributed to the substantial differences which also exist between the floras of these southern lands.

All long-distance dispersal?

Mike Pole (Pole 1994) postulated a novel model for development of New Zealand's forest flora which, in effect, proposes that it is not "Gondwanic" in any meaningful way. Furthermore, he suggests, the flora probably originated by immigration of plants to these islands, by long distance dispersal, since the Oligocene. The grounds for these views, according to Pole, are that:

- (a) The post-Oligocene floral composition in New Zealand differs substantially from that of the earlier Tertiary, which was more homogeneous in the southern lands than it is now.
- (b) During the Oligocene New Zealand's land area was much (possibly totally) reduced by marine encroachment. This would have eliminated most (possibly all) of the pre-existing flora.
- (c) Although submarine ridges extend from New Zealand towards New Caledonia, they are bereft of geological indications that land could have been present to provide any sort of close connection for late Tertiary plant migration between New Zealand and the lands to the north and west. No possible former connections with Australia exist either, and Lord Howe and Norfolk Islands are too young to have been "stepping stones" for transfer of plants.

Alternative views

Some biogeographers other than Pole (e.g., Fleming 1979, Mildenhall 1980) have also favoured long distance dispersal as the means for plant transfers to New Zealand, (which has occupied its remote oceanic position since the Eocene). However, other writers, considering the means of spread of plants between continents or from continents, or islands, to distant islands in the Pacific Ocean (e.g., Skottsberg 1949, Van Steenis 1962, Florin 1963, Good 1964) have held that long distance dispersal could not be the only means by which the plant groups involved have reached their destinations. One strong argument is that the disseminules of some taxa have no properties which fit them for long distance dispersal (Prest 1963).

It seems highly likely that New Zealand's flora has originated in a variety of ways, among which are several kinds of long distance dispersal (Table 1). It is also likely that plants have spread from New Zealand to other places in these ways.

Table 1. Plant taxa with ancestors (spores or seeds) which could have arrived in New Zealand by long distance dispersal¹

Dispersal mode

In air streams

Ferns in many genera, e.g., some species of *Asplenium*, *Blechnum*, *Cyathea*, *Gleichenia*, *Hymenophyllum* etc. Orchids in many genera, e.g., species of *Acianthus*, *Corybas*, *Gastrodia*, *Pterostylis*, *Thelymitra* etc. Some species of *Juncus*.

By flotation in ocean currents

Littoral species in the genera *Calystegia*, *Ipomoea*, *Juncus*, *Puccinellia*, *Samolus*, *Sarcocornia*, *Selliera*, *Spinifex*, *Suaeda*, *Triglochin*.

Attached to migratory birds

Aquatic species in the genera *Callitriche*, *Isolepis*, *Juncus*, *Lemna*, *Lepilaena*, *Potamogeton*, *Wolffia*, *Zannichellia*. Grasses in certain genera, e.g., some species of *Dichelachne*, *Lachnagrostis*, *Rytidosperma*, *Stipa*. Species in the genera *Acaena*, *Korthalsella*, *Uncinia*²

¹ Some species in most of the genera cited occur also in Australia, a few in New Caledonia and a few elsewhere. Arrivals could have been in the Quaternary (or late Tertiary).

² Arrivals of ancestral species of these three genera may have been during the late Tertiary, or earlier.

However, after identifying the New Zealand indigenous plants whose ancestors may have reached the country by long-distance dispersal, a substantial residue of species is unaccounted for. Among them are the plants, in forest and elsewhere, which have fleshy fruit or fruit with fleshy accessory tissues, with seeds that are dispersed by frugivorous birds. It is very unlikely that the ancestors of relatively large-seeded species in the genera *Alectryon*, *Beilschmiedia*, *Corynocarpus*, *Dysoxylum*, *Hedycarya* and *Pouteria*, or smaller-seeded species in genera such as *Fuchsia*, *Coprosma*, *Coriaria*, *Meliccytus*, *Myrsine*, or any of the members of Podocarpaceae, arrived in New Zealand by long-distance dispersal.

Tests of residence times of seeds in bird guts generally show that they are short - not more than an hour or two (Howe 1986, Levey 1986). However Ridley (1930) described experiments in which seeds of some plant species, eaten by certain bird species, were voided after 7.5 to 11 hours. Even so his general view is that land areas between which seeds could be transferred by frugivorous birds would not be much further apart than 100-200 km. This is also the conclusion of Van Steenis (1962) and Preest (1963). Long-distance dispersal of the relatively heavy seeds of dry-fruited *Nothofagus* spp. is also difficult to imagine (Preest 1963). Like those of the fleshy-fruited species noted above they do not float, or survive immersion in sea-water.

This leaves us in a dilemma. Long-distance dispersal of seeds by migrating birds, wind, or flotation in the sea appears to be biologically impossible for many species. Transport of seeds by exceptional means, such as uplift into the upper atmosphere during storms and carriage in the jet stream, also seems improbable. Extreme low temperatures are inimical to many seeds (though spores of ferns might survive).

Therefore we must seek other means by which the progenitors of plants in the modern flora could have reached New Zealand. One possibility is that plants derived from the original "Gondwana ark" did survive the Oligocene marine transgression in the region. Oligocene coal measures indicate that land floras persisted here, however reduced the land area was (Pocknall 1989). Another possibility is that earlier geological analyses concerning continual remoteness of New Zealand from other land areas through the Tertiary, as outlined by Pole (1994), were wrong.

Relevant earth history studies

Proto-New Zealand separated from west Antarctica about 80 million years ago (Late Cretaceous) and reached its present position, relative to the Antarctic continent, Tasmania

and Australia, during the Eocene (Veevers et al. 1991). New Zealand has never been closer to Australia than about 2000 km, even though more extensive land lay south of these islands until the Eocene (Sanford 1980). However new evidence shows that extensive land was present in the north Tasman Sea between New Zealand and New Caledonia through the times which interest us (Herzer et al. 1997). In that article large land areas are mapped along the Norfolk Ridge in the Late Cretaceous and Late Eocene. Then, in the Oligocene and early Miocene, uplift occurred, respectively, on the Norfolk and Reinga Ridges. The apparent post-Oligocene additions to New Zealand's forest flora most likely came from this source by island to island transfers over relatively short distances. Most of the land had subsided by the Pliocene. As the New Zealand, New Caledonian and Australian forest floras share many plant genera a northern route linking the three regions probably allowed seed and spore transfers throughout most of the Tertiary. Lowered sea levels during the Quaternary might also have influenced plant migration. So it is uncertain how many and which taxa are definitely the result of long-distance transfer even if their disseminules are well-suited to this.

For taxa shared between Australia-New Caledonia-New Zealand, Tertiary migrations of seeds from fleshy fruit need not necessarily all have been one-way. Plants could have reached New Caledonia, and then Australia, from New Zealand.

Conclusion

The development of a "best-fit" model for the origins of the New Zealand flora requires careful consideration of many contributing factors. Among them, for the time from the Late Cretaceous-Quaternary, are: relevant global tectonic events and relative distributions of land and sea; regional sedimentological data and the related plant micro- and macro-fossil record; the present distributions of the taxa concerned, at family, generic, and sometimes specific, levels; modern empirical evidence on the dispersibility of disseminules of the relevant taxa; and knowledge of trajectories of the relevant dispersal vectors through time. Some other kinds of data, from detailed plant anatomical and cytologic studies, or examination of relationships based on biochemical, or DNA, analyses may also be of use. A full-scale survey of all the evidence for each taxon in the indigenous flora remains to be done. However, it is a fair bet that the ancestors of the many species in our land plant flora arrived here in a variety of ways, at times spread throughout the period from the Late Cretaceous to the present.

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Colin J. Burrows, Research Associate, Department of Plant and Microbial Sciences, University of Canterbury, Christchurch

BIOGRAPHY/BIBLIOGRAPHY

■ Tribute to Otago botanist Dr Brenda Shore

Dr Brenda Faulkner Shore (née Slade, 1922-1993) retired from the University of Otago's Department of Botany in 1983 as an Associate Professor, one of the few women to have attained this rank in a New Zealand University Science Department.

Brenda was born in Auckland, the daughter of the Rev. Dr William Gardner Slade and Mrs Slade (née Faulkner). The Rev. Dr Slade became a President of the Methodist Conference. Brenda attended Primary School in Napier and recalled to Professor Peter Bannister of the University of Otago's Department of Botany (2) that during the 1931 Napier earthquake she was at school and witnessed the buildings collapse behind her,

"She was on a see-saw in the playground at the time and thought that the person on the other end was fooling around!" Her secondary education was at Wellington East Girls' College (1936-37) and Epsom Girls' Grammar School (1938-40) in Auckland where as a 17-year-old she was awarded the Cheeseman Memorial Prize (1940), nationally granted for a botanical project by a secondary school pupil. The project was entitled "Spring Diary" and contains daily entries which describe bush and gardens in the vicinity of Pukekohe and Auckland and includes water colour illustrations (4, p.17). Thus at Secondary School Brenda exhibited the enthusiasm for botanical science which was to become her life's work. Brenda was a student at Auckland University College (1941-42) and the University of Otago (1943-44) and she graduated B.Sc. (1945) and M.Sc. (1949) in botany with a thesis entitled "Comparative anatomy of the cladode in New Zealand brooms".

Mrs Margaret Kathleen Cookson (née Finlayson) has commented on the staffing situation in the University of Otago's Department of Botany in 1945 (3), "At the beginning of 1945 Dr J.E. Holloway [1881-1945], who was Head of the Department at Otago University was obliged to retire for health reasons. The Assistant Lecturer had already resigned to take another position. This left the Department with no staff as Dr G.T.S. Baylis [b.1913], who had been appointed as Head, was not released by the navy until the end of the war in August. [Brenda] in association with two other recent women graduates in botany (Elizabeth Batham [1917-1974] and Margaret Cookson), who were at the time engaged in research at the Medical School, [formed] a team of three to keep classes going at all levels of botany".

Brenda was appointed Assistant Lecturer in botany at the University of Otago in 1945. She was awarded a Fellowship of the N.Z. Federation of University Women (1952) for postgraduate study at Cambridge University (Newnham College) and she completed her Ph.D. in 1954 with a thesis entitled "Development of dicotyledonous leaves with special reference to their venation", and worked under E.J.H. Corner a systematic botanist at the Cambridge Botany School. Brenda was the first member of the N.Z. Federation of University Women to gain a Federation Fellowship. In later years she was always active in the Federation and was National Vice-President (1974-76) and was on the Otago Branch Committee for 9 years. She served terms as Branch Vice-President and President (1962-64) and in 1983 became an "Honoured Member".

Brenda was promoted to Lecturer (1955), Senior Lecturer (1960) and Associate Professor (1971) in the University of Otago's Department of Botany and retired in 1983. At the time of her retirement there were just 20 women in the 7 New Zealand Universities who were Associate Professors or readers out of a total of 370 University staff members at this level.

Brenda had a year in 1961 on study leave at Duke University, Durham, North Carolina on a Postdoctoral Fellowship of the American Association of University Women and a Fulbright Fellowship for travel expenses. At Duke University, Brenda extended her leaf developmental studies in collaboration with Dr Jane Philpott. While in the Department of Botany at Duke, Brenda gave a course of lectures in her specialist field of plant anatomy and morphogenesis. She also spoke to the local branch of the American Association of University Women about Maori people and their culture. Over the years Brenda became a regular participant in lecture programmes of many amateur societies in Dunedin.

Brenda's research centred around leaf development, extending from her M.Sc. research (5). She published in total 4 papers in the international botanical journals on this and related aspects of her research (6,7,10,11) and also published on the gametophytes of *Equisetum fluviatile* in agar culture (8). She also contributed to knowledge of the breeding systems of plants including dioecism in the New Zealand Escalloniaceae (9), and a study of the breeding systems of *Carpodetus serratus* (12). In total, Brenda seems to have published just 9 papers. I use a scientist's publication number at age 30 as a measure of when the scientist became active in research. At this age Brenda had published one research paper (5).

In University administration Brenda was a member of the Staff Common Room Committee in the 1940s, a member of the Science Faculty Executive, and a Member of the Library Committee.

Outside science Brenda was active in music and art in Dunedin. She was a foundation member of the "A Capella Choir" established by Professor P. Platt who was Professor of Music at Otago (1957-75). Brenda was an occasional soloist in this choir. She was a chorister at the First Church and later at the Maori Hill Presbyterian Church. Brenda was a member of the Dunedin Choral Society for many years. She was a foundation member and, for a time, Secretary of the Dunedin Grand Opera Group (later known as the Dunedin Opera Company) and occasionally took minor solo roles.

Brenda early on showed an artistic ability. In later years she achieved artist-membership of the Otago Art Society and in 1982 she successfully staged her first one-woman exhibition at Abemethy's Gallery in Dunedin. Brenda specialised in painting plants. Professor Peter Bannister retains her undergraduate laboratory book given to him by Brenda and it illustrates her early artistic leanings (2). After her retirement in 1983, Brenda practised a wide range of graphic arts and became known for high-quality fabric paintings and water-colour studies of flowers, "She created embroidered silk panels incorporating painting which used innovative mixes of dyes. Perhaps her best-known works are the striking silk murals which she presented to the Maori Hill Presbyterian Church" (1).

Brenda had wide interests and one of her more unusual achievements was that she qualified as a fully-licensed grade 1 Amateur Radio Operator (1970) and was a member of the local branch of N.Z. Amateur Radio Operators, and a member of W.A.R.O. (Women Amateurs). As an amateur radio operator her call sign was ZL4OQ.

Acknowledgements

Professor P. Bannister, with the assistance of Jan Littleton, kindly sent biographical information relating to Dr Shore. Dr H.E. Connor arranged for Mrs Margaret Cookson to provide data relating to the University of Otago's Department of Botany in 1945. I also thank Dr T.R. Partridge for his comments, and Mr N.D. Hood for checking Dr Shore's amateur radio operator's call sign.

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A.D. Thomson, Centre for Studies on New Zealand Science History, 5 Karitane Drive, Christchurch 2

■ Biographical Notes (30) : Joseph Crosby Smith (1853–1930)

J. Crosby Smith was born on 18 July 1853, at Keighley, Yorkshire (1). His birthplace is sometimes given as Keithley (2,3), which is the correct pronunciation but the wrong spelling (4).

Smith's father was Matthew Smith, and his mother's maiden name was Crosby (2). Their son always gave his name as J. Crosby Smith; and Smith is the surname on his death certificate. From time to time, however, Leonard Cockayne called him Crosby-Smith, particularly in the 1931 obituary; and this error has been repeated by several authors since then, including myself. On the other hand the hyphenated specific epithets listed below were deliberately chosen to distinguish Joseph Crosby Smith from all the other Smiths. In like manner John Scott Thomson is distinguished from his brother, William Alexander Thomson, and the unrelated George Malcolm Thomson (all of Dunedin) by the epithet *scott-thomsonii*.

Cockayne (1) records that at the age of nine—but only during part of the day—Smith “was employed at the Dean Clough carpet mill. One of the partners, Mr Edward Crowley, had a private observatory which the boy was encouraged to visit, and there, under the stimulus of the astronomical observer, his latent taste for natural science seems to have been awakened.”

The “Cyclopedia of New Zealand” (3) states that Smith arrived at Port Chalmers in 1876 on the “Calypso”, and that he was married in 1877; his death certificate adds that he was married in Dunedin, but gives his age as 26 (i.e., about 1879). On the other hand Cockayne (1) followed by Patrick (5) states that “at the age of 23, accompanied by his wife, he emigrated to New Zealand”. I can only state that I could not identify Smith's marriage in the New Zealand marriage records; and that the announcement of the Calypso's arrival does not mention their names. Thirteen first-class passengers are named and there were “36 second-class and steerage passengers”(6).

Until the turn of the century Smith worked as bookkeeper at the foundry of H.E. Shacklock, and also taught shorthand at the evening classes of the Caledonian Society (1). In Stone's Directory for 1890 he is listed as “clerk, Waller St., Momington”, and in 1900 as “clerk, High St., Caversham Extension, Caversham”. For about three years he was a member of the Caversham Borough Council (3); and he was the first secretary and one of the founders of the St. John Ambulance Association in Dunedin (7). He joined the Dunedin Naturalists Field Club, studied seaweeds and corresponded with R.M. Laing of Christchurch (1), and on 9 June 1896, he was elected a member of the Otago Institute (*TNZI* 29).

In 1901, Smith moved to Invercargill where he entered into business as an ironmonger in Esk Street, in partnership with Mr J. M. Laing; and in 1901 he became a member of the Invercargill Borough Council. By 1910, he was living at 196 Tay Street, and Smith & Laing had a branch at Winton (3,8). For many years he was a member of the Southland Education Board and for some time its chairman(1).

Smith is not mentioned in the Preface or the historical essay of Cheeseman's “Manual” of 1906. His recorded botanical work begins a little before this and for the next decade is as follows:

- 1905: In November, Smith visited the Longwood Range with L. Cockayne and H.P. Young (*TNZI* 39).
- 1907.1: At some time in January - February, Smith accompanied L. Cockayne, F.G. Gibbs, and R.M. Laing in an ascent of Mt Anglem, Stewart Island (9).
- 1907.2: From 14 to 30 November, Smith was a member of the Subantarctic Islands expedition, organised by the Philosophical Institute of Canterbury. In particular he was a member of the Campbell Island party, briefly visiting the Snares and Auckland Islands on the way south, and the Auckland Islands on the return journey. R.M. Laing was the other botanist on Campbell Island, and Smith collected seaweeds for him (10). Smith wrote a valuable account of the expedition (11).

1907.3: On 5 December Smith was elected a Fellow of the Linnean Society of London. Only the statement supporting Smith's application has been preserved and is as follows with the preamble in the hand of Charles Chilton (12).

"We the undersigned Fellows of the Linnean Society beg to support Mr J. Crosby Smith's nomination to the Society on the grounds stated in his letter above.

Chas. Chilton, Biological Laboratory, Canterbury College, N.Z.
J.T. Murphy, Agricultural Assn Office, Christchurch
Jas Drummond, "Lyttelton Times", Christchurch
Geo. M. Thomson, Newington, Dunedin, President N.Z. Institute
P. Goyen, Chief Inspector of Schools, Dunedin
T.M. Hocken, Vice-Pres., Otago Institute, Dunedin
Arthur Dendy."

Unfortunately we do not know the grounds on which Smith's application was based, but can note that his supporters were more zoologists or biologists than botanists.

1909: G.M. Thomson's "A New Zealand Naturalist's Calendar" contained photographs contributed by Smith.

1910.1: In February, accompanied by Mr Robert Gibb and Mr Vernon G. Smith [a son ?], Smith made an excursion to the botanically unexplored Lake Hauoko district. In their hired dinghy they spent 3 days in reaching the head of the lake, landing whenever the steep sides allowed. They then climbed End Peak, the last or end peak of the Princess Range. Next day as their provisions were low they rowed the twenty-five miles to the foot of the lake in nine hours; and from here they returned over the summit of the Hump to the coast and home (TNZI 43).

1910.2: The first edition of Cockayne's "New Zealand Plants and their Story" contained five photographs contributed by Smith. These were close-up studio photos of flowers or fruits with leaves of *Luzuriaga marginata*, *Olearia macrodonta*, *Styphelia robusta*, *Viola cunninghamii*, and a purple-flowered daisy tree.

1911: Smith's "Notes on the Botany of Lake Hauoko District" appeared. He wrote: "Botanically the trip may be considered very satisfactory, as the plants noted cover 225 species and 45 orders. Mr D. Petrie has kindly looked through my material, from which, in another place, he is describing no less than five new species, named as follows: *Euphrasia australis*, *Aciphylla pinnatifida*, *Gentiana flaccida*, *Olearia crosby-smithiana*, *Danthonia (?) barbata*" (TNZI 43).

1912: In March, Smith visited the Clinton Valley and the summit of McKinnon's Pass with Cockayne (TNZI 45).

1912–1913: On 30 December and at the end of January, Petrie visited the Takitimu Mountains (13). Cockayne (1) stated that Smith visited these mountains with Petrie, but gives no date.

1914: Smith's "List of Phanerogamic Plants indigenous in the Southland District" appeared (TNZI 46). He acknowledges the personal assistance of Petrie and Cockayne. The latter later described the list as "useful but rather premature"(1).

Smith lived in Invercargill until 1925, and then returned to Dunedin (1). In 1926 he was President of the Otago Institute, and in 1927 published "The vegetation of the Awarua Plain" based on notes made 12 years earlier (TNZI 58).

Joseph Crosby Smith died on 18 April, 1930, and next day the Otago Daily Times wrote: "The death occurred yesterday morning of Mr J. Crosby Smith at the age of 70 years. Mr Smith, who lived at 18 Council Street, St Kilda, fell from the roof of his house, and as he was subject to heart trouble it is surmised that his fall was due to a sudden attack" (14). He was buried in the Andersons Bay Cemetery(2).

Smith's son Arnold told Cockayne (15): "You will be pleased to know that he has left his Lantern Slides of New Zealand Flora to the N.Z. Institute for the use of anyone lecturing on this subject. We have also handed to Messrs Thomson and Simpson a number of papers dealing with botanical matters and a vast amount of correspondence he had received from time to time from Mr Petrie and yourself, mostly in reference to nomenclature and identification of various specimens. His enthusiasm in scientific matters was well known to yourself, but we alone in the family circle know the hours spent, both in early morning and again after his daily toil, far on into the night ever fossicking out information on the subject in which he was then interested."

And Cockayne wrote (1) "He was a delightful companion – his Yorkshire humour always to the fore – a true lover of Nature. Nor in speaking of the man must I neglect his devoted wife, his true comrade to whom he owed so much."

Eponymy

1911 *Olearia crosby-smithiana*. "Hab. – The Hump (3500 ft) south of Lake Hauroko. I am indebted to Mr J. Crosby Smith, FLS, of Invercargill, for a number of fruiting specimens of this most distinct species" (Petrie *TNZI* 43: 254).

1912 *Pimelea crosby-smithiana*. "Hab. – The Hump, a high hill between Lake Hauroko and the sea. This plant was collected by Mr J. Crosby Smith FLS of Invercargill. The south-west corner of the South Island is difficult to explore, but Mr Crosby Smith is reaping a fine reward for his zeal in examining this virgin country" (Petrie *TNZI* 44: 186).

1915 *Aciphylla crosby-smithii*. "– collected by Mr J. Crosby Smith in January last [1914] at an altitude of about 5000 ft on Mount Cleugheam, Fiord Country" (Petrie *TNZI* 47: 48).

1915 *Ourisia crosbyi*. "South Island : Southland – on floor of subalpine scrub, Longwood Range. Stewart Island – in forest, Mount Anglem. Named in honour of Mr J. Crosby Smith, FLS" (Cockayne *TNZI* 47: 113)

1916 *Euphrasia crosby-smithii*. "Wet alpine meadow on Mt Cleugheam, Fiord Country, about 5000 ft; J. Crosby Smith!" (Petrie *TNZI* 48: 190).

Acknowledgements

I am very grateful to Ms Gina Douglas, Librarian and Archivist, The Linnean Society of London, for information on Smith's election to a Fellowship. I also thank: the Otago Settlers Association for information on the "Calypso"; Ms Fiona Pitt (Museum of New Zealand, Wellington) for letters from Smith's sons to Dr Leonard Cockayne; Dr A.D. Thomson (Centre for Studies on New Zealand Science History, Christchurch) for the entry for Smith in "Southern People"; and Mr Alan Bryce (Section Head, Information Services, Invercargill City Libraries) for Smith's articles on the 1907 expedition.

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

PUBLICATIONS

■ Journals received

New Zealand Native Orchid Group Journal 67

(June 1998; ISSN 1170-4543) Edited by Ian St George. 35 p.

Original papers in this issue are: George Fuller - Hunting native orchids in New Plymouth city and finding an gigantic *Bulbophyllum pygmaeum*; E.D. Hatch - The New Zealand genera 4 – Australian genera with a single species in New Zealand; Peter de Lange and Brian Molloy - Some additional locations for *Danhatchia australis* (Hatch) Garay et Christenson (Orchidaceae); Rhys Gardner - Thoughts on some new names in *Caladenia* and *Pterostylis*.

Also included is notice of the NZNOG Conference and Field Days: 4-6 December 1998 at Taylor Memorial Lodge, Ruapehu. Space is limited to 50 places. Those wishing to offer a presentation or register their interest in attending should contact Ian St George, 22 Orchard Street, Wadestown, Wellington, immediately.

Editor

DESIDERATA

■ Mangrove dieback at Waitakaruru

One of the largest mangrove (*Avicennia marina* subsp. *australasica*) ecosystems in New Zealand occurs as an almost continuous strip defining the coastline of the Firth of Thames. In total this strip covers approximately 900 ha. In the latter half of 1997, several kilometres of mangrove trees either side of the Waitakaruru River mouth suffered defoliation and dieback. I was fortunate to inspect these mangroves in December 1997 at the invitation of Grant Barnes from Department of Conservation.

We noted two regular features of partially defoliated trees: (1) leaves below the high tide mark were largely unaffected, and (2) many leaves still attached had been "rolled" to encase insect larvae. A particular species of small moth was also abundant. John Dugdale from Nelson kindly identified specimens of these larvae and moths as the mangrove leafroller (*Planotortrix avicenniae*), a moth endemic to New Zealand mangroves. John remembers occasional episodes of heavy mangrove defoliation near Matakana Island in the 1960's as a result of epidemics of this moth. It therefore seems likely that the Waitakaruru defoliation episode was also a result of an epidemic of the mangrove leafroller.

Severe defoliation of *Avicennia marina* (Anderson & Lee 1995; Murphy 1990; West & Thorogood 1985) and *Avicennia alba* (Piyakarnchana 1981) by lepidopteran larvae population outbreaks have been reported from Australia, Singapore, and Hong Kong. The Hong Kong example now occurs on an annual basis (Anderson & Lee 1995). However, none of these references suggest what factors contribute to such an outbreak.

A follow-up inspection by Grant Barnes in February 1998 found that many of the mangroves that had been defoliated have now resprouted and appear to be recovering, and there is no sign of excessive numbers of insects including the mangrove leafroller. Nevertheless, I would like to collect more information on this phenomenon including its causes, consequences, and chance of recurrence. I would therefore welcome recollections of similar dieback events of mangroves in New Zealand or comments on the processes involved in this dieback.

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Bruce Burns, Landcare Research, Private Bag 3127, Hamilton. email: burnsb@landcare.cri.nz

■ **Can you help provide information for our Chatham Islands biological databases?**

The recent restructuring of the Department of Conservation has resulted in the administrative responsibility for the Chatham Islands shifting to Wellington Conservancy. The Department now seeks to bring together all existing biological information about the Chatham Islands into one central database in Wellington.

Can you help us by providing us with copies of, or references to, any of the following:

- Plant checklists for areas on the Chathams (e.g. Nelson Botanical Society Chatham Island Plant List 1996)
- Books, papers or reports about Chatham Islands sites or species (e.g., Walls, G. 1988: *Vegetation of Pitt Island Reserves: Chatham Islands*. Botany Division, DSIR)
- Photographs of Chatham Islands sites or species
- Detailed observations of occurrences of plants or animals on the Chathams (e.g., herbarium specimen information that you hold).

We need to compile this information so that we can:

- determine areas of biological importance on the Chatham Islands
- provide a baseline database of information about Chatham Islands sites and species
- determine priorities for conservation management of Chatham Islands sites and species.

Your help would be greatly appreciated. If you are interested in hearing about our progress with the Chatham Island biological databases please send us your name and address.

Please send information to:

Rebecca Ansell, Department of Conservation, PO Box 5086, Wellington. Email: ransell@doc.govt.nz. If you have any queries phone Rebecca Ansell on 04 801 6747 (Mon-Thurs) or 04 472-5821 ex 8410 (Fridays)

FORTHCOMING CONFERENCES/MEETINGS

LICHEN WORKSHOP NOVEMBER 1998

This will take place in the Botany Department of Otago University in Dunedin from Sunday November 15th to Thursday November 19th.

The programme will include:

- A session for beginners on Sunday, this will include laboratory work as well as an introductory talk by David Galloway on identifying lichens.
- A series of short talks and displays on a variety of lichen related subjects.
- Two field trips. It is hoped that these may add to our species lists.
- An illustrated public lecture at the Otago Museum to be given by Peter Johnson.

The cost of the workshop *without* accommodation is \$45 which will include transport for the field trips. Accommodation in a University Hall of Residence can be arranged and will cost \$36.50 for bed and a cooked breakfast. An evening meal would cost \$9.50 and would have to be ordered in advance. A list of other accommodation close to the University can be sent if required. A dinner is being arranged at a local restaurant on Wednesday 18th, cost \$28.

Numbers for the Workshop will be limited so it is advisable to post or fax your registration form as soon as possible. Full details and a request for payment will be sent closer to the time.

LICHEN WORKSHOP REGISTRATION FORM

NAME (include title)
ADDRESS
PHONE
E-mail

	Delete as appropriate	
I would like to stay in a Hall of Residence	YES	NO
I would prefer to receive an accommodation list	YES	NO
I would like to attend the dinner on Wednesday 18th November	YES	NO

Send this form to **Jennifer Bannister** c/o Department of Botany, P.O. Box 56, Dunedin. Fax: (03) 479-7583 Ph: (03) 467-2142 (home) E-mail: JMB@CLEAR.NET.NZ

CORRIGENDUM

Corrigendum for Newsletter 51

■ **Biographical Notes (29) : Harry Carse (1857-1930)**

Page 15, In the penultimate paragraph "Northem Wairoa" should be "Wairoa".

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

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