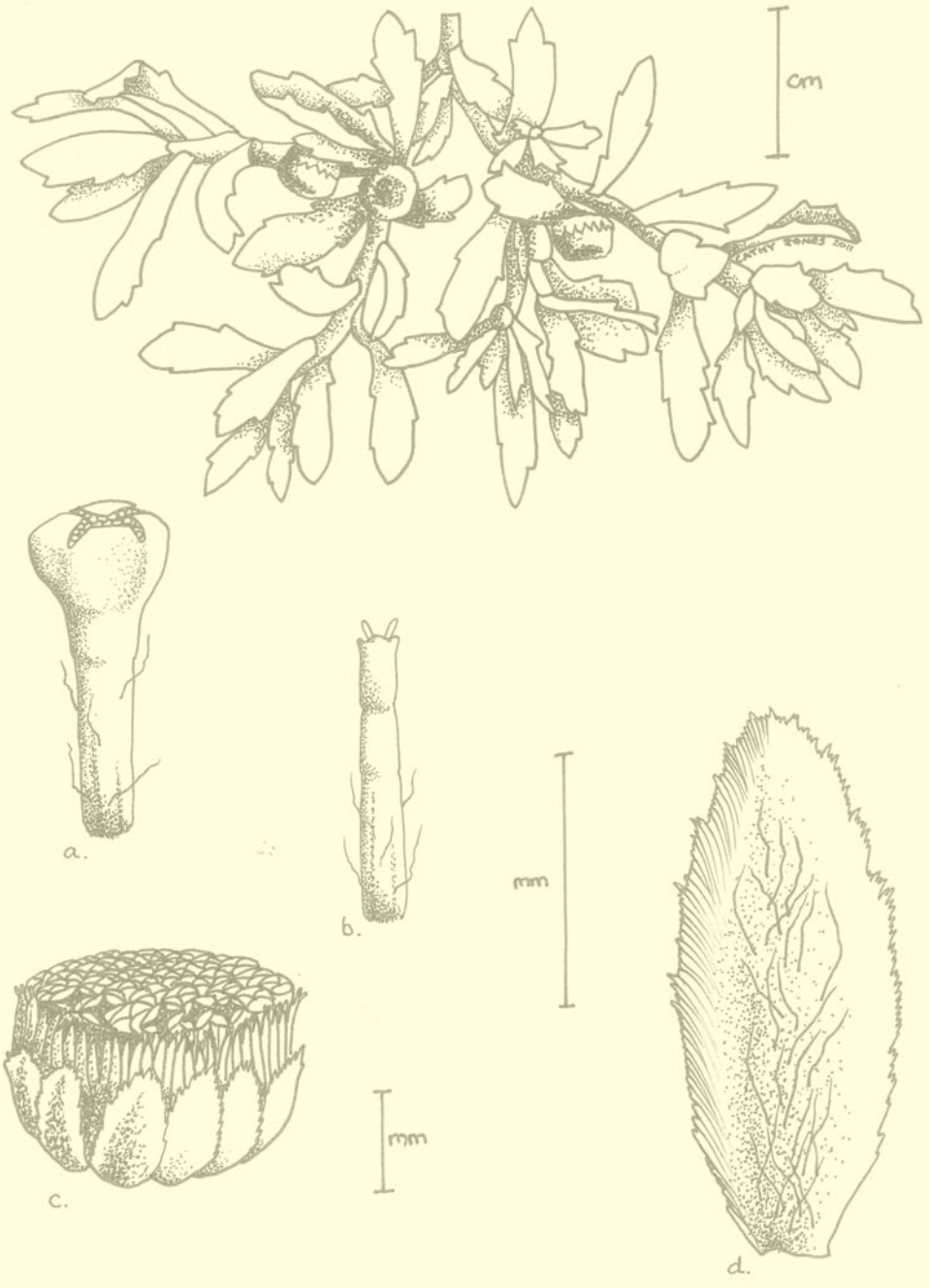
NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 104 June 2011



Centipeda aotearoana N. G. Walsh

New Zealand Botanical Society

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Deadline for next issue

The deadline for the September 2011 issue is 25 August 2011.

Please post contributions to:
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Send email contributions to editor@nzbotanicalsociety.org.nz. Files are preferably in MS Word, with suffix ".doc" or ".docx", or saved as RTF or ASCII. Macintosh files can also be accepted. Graphics can be sent as TIF, JPG, or BMP files; please do not embed images into documents. 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.

Cover Illustration

Centipeda aotearoana N.G.Walsh drawn by Cathy Jones from a specimen collected at Lake Chalice, Richmond Forest Park on 22 April 2011. a. perfect floret, b. female floret, c. capitulum, d. phyllary.

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N E W S L E T T E R

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- **Auckland Botanical Society**

March Meeting and AGM

Once the AGM was completed, Alison Wesley confided that she had changed the name of her talk from "Flora of Chile & Patagonia" to "Monkey Puzzles & Volcanoes". She then proceeded to show photos of the monkey puzzle trees (*Araucaria araucana*) growing as nature intended them, even in the snow in one case. Also illustrated were other Gondwanan families that we share, the Podocarpaceae, Nothofagaceae, and Plantaginaceae, with those beautiful red-flowered species of *Ourisia* that grow in Chile. It was a surprise that of the 49 species of orchids present not one is epiphytic.

March Field Trip

Tricia Aspin, so at home on the Awhitu Peninsula, led us around three small dune lakes west of Waiuku. These were Lakes Puketi, Rotoiti and an unnamed lake, all on private property. This was a good opportunity to brush up on wetland plants, especially the tricky monocots. The little turf plants, *Glossostigma elatinoides, Gratiola sexdentata, Lilaeopsis novae-zelandiae* and *Myriophyllum votschii* were present on the lake edges, and among the taller vegetation grew *Hydrocotyle pterocarpa* and the swamp buttercup, *Ranunculus macropus*. The ornithologists found interest in the wetland birds.

April Meeting

Tim Martin of Wildland Consultants spoke on an expedition in 2010 to survey and document the conservation status of Rarotonga's endemic flora. The combination of Rarotonga's geographical isolation from other landmasses, and the scarcity of higher altitude cloud forest in this part of the Pacific, means that the mountainous interior of the island supports a suite of species found nowhere else on earth. The rampant growth of exotic weeds, and the disappearance of previously known populations of some species, is causing growing concern about the future of Raotonga's endemic flora.

April Field Trip

A walk to the Upper Nihotipu Reservoir in the Waitakere Ranges took place on a rainy autumn day. The track and access road led past cascades and falls, skirting the lake to the spectacular high dam. *Raukaua anomalus* was seen, along with *Ixerba brexioides* in bud, and large, emergent rata trees (*Metrosideros robusta*).

Easter Camp

The Ngamuwahine Outdoor Education Lodge in the Kaimai Mamaku Forest Park was the venue for the Easter camp. We were fortunate to be led by knowledgeable guides, Graeme Jane and Gael Donaghy. Despite a poor forecast we enjoyed the tawa dominant forest in mostly fine weather, and on the last day rain did not dampen our enjoyment of the Wairere Falls. There were many river crossings, and these presented the challenge of finding those two rheophytic ferns, *Lindsaea viridis* and *Hymenophyllum atrovirens*. To our joy we saw them on more than one occasion.

May Meeting

Sandra Jones chose *Dodonaea viscosa* as her "Plant of the month". Mike Wilcox then took a whole monocot order, the Asparagales, for the subject of his main talk. For those members who have become exasperated over the years with the way that genera such as *Phormium, Dianella* and *Cordyline* bounce around from family to family, it was good to hear the latest thoughts on where they stand. Mike then covered topics such as economic uses, environmental weeds, and the importance of the order in ornamental horticulture.

May Field Trip

Twenty-two members, suitably shod in gumboots, explored the edges of a swamp forest in Rahuikiri Rd, Pakiri, avoiding the wettest areas and the fiercest *Gahnia xanthocarpa*. This forest is of a type rarely found nowadays, and although cattle roam and graze in it, it is a small miracle that it hasn't been drained and turned into pasture. The block is in multiple Maori ownership and has a canopy of cabbage tree, kahikatea and pukatea. We were pleased to be able to compare white maire (*Nestegis lanceolata*), black maire (*N. cunninghamii*) and swamp maire (*Syzygium maire*). A wet area under a manuka canopy supported *Gratiola sexdentata*, a herb that is on the regionally critically threatened list for the Auckland region. From there we stopped at the estuary to check out *Coprosma propinqua*, then walked down the beach to the Pakiri Regional Park and compared the divaricators, *Myrsine divaricata* and *Coprosma crassifolia*.

FUTURE EVENTS

June 1st:	Rhys Gardner – "Geniostoma" and John Early – "Figs and wasps: a marvellous mutualism"
June 18th:	Goodwood Heights
July 6th:	Anne Gaskett – "Plant-animal interactions"
July 16th:	Gill's Reserve, Albany
August 3rd:	Bruce Burns – "Ecology of forest fragments in NZ's rural landscapes"
August 20th:	Titirangi bush reserves

Auckland Botanical Society, PO Box 26391, Epsom, Auckland 1344
President: Mike Wilcox **Secretary:** Kristy Hall aucklandbotanicalsociety@gmail.com

- **Manawatu Botanical Society**

March field trip – Mangaweka *Dactylanthus*

Massey University's Todd McLay led us to Mangaweka Scenic Reserve to see the root parasite *Dactylanthus taylorii*. It was easy to spot the individuals within protective wire cages (!), but difficult otherwise. None were in flower, with flowering evidently behind last year's schedule.

April talk

Robin Atherton talked about plants seen during her travels to Oman and Easter Island.

April field trip – Paengaroa *Pittosporum obcordatum*

We lent a hand to Viv McGlynn who was seeking seed of *Pittosporum obcordatum* from Paengaroa Scenic Reserve. The intention is to provide company for the one lonely adult known within nearby Taihape Scenic Reserve. The crop was not extensive and mostly unripe. We were, however, able to add two medium-sized individuals to Viv's map.

May field trip – Rangiwahia area

After our visit earlier in the year to Rangiwahia Scenic Reserve, we checked out the nearby Kaikawaka and CL Pemberton Scenic Reserves. Many species are shared across the three reserves, but there are marked differences in abundance, with podocarps (mostly rimu and kahikatea), beech (black, red), or broadleaved trees (particularly black maire, hinau, rewarewa, kamahi) variously dominating. The driveway into CL Pemberton SR afforded us the opportunity to reach 39 with the species list before we even got out of the car.

FUTURE EVENTS

June 11th:	Branch Road walkway, Pohangina.
July 7th:	Talk by Viv McGlynn "Plants of the Chatham Islands".
August 13th:	Divaricate identification at Paengaroa, Taihape.
September 1st:	Talk by Cindy Skema "Plant collecting in Madagascar".

Contact: Jill Rapson Ecology Group, Institute of Natural Resources, Massey University, Palmerston North

- **Wellington Botanical Society**

Christmas fieldtrip: Northern Fiordland

In the best of weather 45 participants from WBS and BSO enjoyed the pick of sites with the local knowledge and leadership of Graeme Jane and Brian Rance.

Day 1 - Cascade Creek/Lake Gunn/Deer Flat: Plants seen immediately at Cascade Creek included *Aristotelia fruticosa* and *Coprosma dumosa*. On the flood plain 1 m high *Hebe odora*, in flower, and *Halocarpus bidwillii*, with cones, dotted the grassy swamp area. We saw *Geranium microphyllum* with striking red and brown leaves, *Dracophyllum prostratum*, *Androstoma* (ex *Cyathodes*) *empetrifolia*, *Lycopodium fastigiatum* and *Coprosma elatirioides*, with *Carex coriacea* and *C. sinclairii* in flower. Underneath all the other plants grows *Blechnum penna-marina*. A highlight for some was *Ranunculus multiscapus*, and we did find *Schizeilema haastii* and *Leucopogon fraseri*. After crossing back over the swift stream, swollen by heavy rain, many photographed the two large purple berries on *Coprosma atropurpurea*, and the single plant of *Scleranthus brockiei*.

The Lake Gunn Nature Walk featured *Nothofagus fusca* and was littered with wind-throws. Amongst the mosses on the forest floor were many clumps of flowering orchids e.g. *Gastrodia*, *Pterostylis australis* and *P. banksii*. Trees other than red beech included *Raukaua simplex*, Hall's totara (*P. cunninghamii*), *Halocarpus biformis*, *Olearia avicenniifolia* and *Pseudopanax colensoi*. Young pōkaka, with its diverse foliage, grows near the water's edge. Next was the campground at Deer Flat, another flat area on the same wide valley floor, where several hard rock outcrops, known as kames, occur. On one kame outcrop in the swamp there were several uncommon species, including *Melicytus flexuosus* and *Carmichaelia petriei*. Those who abandoned the idea of retaining dry feet were rewarded with discovery of the rare grass, *Deschampsia cespitosa*, thriving in the flooded area nearby.

Magnificent clumps of flowering mistletoes (*Peraxilla tetrapetala* and *P. colensoi*) hung at camera height in the silver beeches (*Nothofagus menziesii*). Growing nearby in swampy ground, *Coprosma propinqua* hosted many tiny mature *Korthalsella clavata* in berry. *Olearia ilicifolia* and *Hoheria glabrata* were found flowering on the riverbank on our return to the cars, and one of the Otago group was finally satisfied to find a plant of *Ranunculus ternatifolius*.

Day 2 - Gertrude Saddle**:** Leaving the valley floor we found a host of new species, including pineapple shrub (*Dracophyllum menziesii*), *Coprosma serrulata*, *Astelia nivicola* and *A. petriei*, *Chionochloa ovata*—with lovely purple heads, *C. crassiuscula*, with curled leaves, *Coprosma foweraker*i, *Olearia moschata* and *Brachyglottis revoluta*. Flower stalks of Haast's carrot (*Anisotome haastii*) stood up above the surrounding vegetation, and along with the white *Celmisia verbascifolia* and yellow *Dolichoglottis lyallii* and *Bulbinella gibbsii* flowers, created a delightful picture against the backdrop of the almost sheer rock face at the head of the valley.

On the screes we saw *Montia sessiliflora*, harebell (*Wahlenbergia albomarginata*), *Celmisia bonplandii*, *Myosotis lyallii*, and a patch of *Haastia sinclairii* with two magnificent flowers. In crevices in the scratched rock above and below Black Lake, we found *Ranunculus sericophyllus* in flower and *Aciphylla congesta* with tightly-packed flower heads yet to come out. On the saddle itself were flowering *Aciphylla congesta* and *A. multisecta*, vegetable sheep (*Raoulia buchananii* and *Kelleria croizatii*) and *Chionochloa oreophila* was in the snowbanks. Those that reached the saddle had great views to Milford Sound, and vertically down to Esperance Valley. A lucky few saw a rock wren on the scree and had a close encounter with a kea.

Day 3 - Key Summit: In reasonable weather we set off from The Divide, the lowest pass across the main divide, at c. 400m. The wet beech forest (*Nothofagus menziesii* and *N. solandri* var. *cliffortioides*) on the lower slopes had several understorey species of interest, including the large, tufted, filmy fern (*Hymenophyllum pulcherrimum*) and both crepe ferns (*Leptopteris hymenophylloides* and *L. superba*). There was an overhanging bank with very large, very dark maroon and very late flowering *Nematoceras macranthum* which attracted much attention from photographers. We saw two lovely *Cordyline indivisa*, and *Brachyglottis buchananii* in spectacular flower on the bank of a little stream.

The steep zigzag track rose above the bushline to reveal patches of *Blechnum montanum*, with beautiful bright red new fronds. The tarns at the top of the zigzag had cushion plants in flower, including *Donatia novae-zelandiae*, *Kelleria croizatii*, *Phyllachne colensoi*, and the little moss-like rushes *Gaimardia setacea* and *Centrolepis ciliata*. It took a while to identify a small plant in the bog that looked like an *Abrotanella* - the little umbelliferous *Actinotus novae-zelandiae*. The gentians were not quite in flower, and the *Oreostylidium* were mostly finished flowering. *Drosera arcturi* and *D. spathulata* were in flower, some of which were quite tiny. Higher up, the subalpine scrub was interspersed with open tussock. Here *Hebe macrantha* showcased its outsized flowers, against serrate leaves, and patches of *Dracophyllum menziesii* provided patches of dark red. *Celmisia petriei*, with its sword-shaped leaves, was common at higher altitudes. A few plants of the orchid, *Wairea stenopetala*, were also in flower.

Day 5 - Borland Saddle/Mt Burns**:** Despite the ominous steady rain overnight, it was a fantastic day at Borland Saddle where we met Professor Alan Mark and Dr Kath Dickinson. Alan talked about the botany, ecology and geology of the area and the extensive research history of the site. A GLORIA monitoring site is located on the Mt Burns ridge as part of an international research project looking at climate change.

The lower beech forest was dripping with the lichen, *Usnea articulata*, and the trunks were covered with other lichens including the perforated *Menegazzia pertransida* and *Pseudocyphellaria* species. Above the treeline we looked down to Pyramid Lake. The lake and surrounding lumpy landscape were formed by the huge Borland landslide, thought to be the largest in the world. The lake lies in a depression surrounded by red tussockland below the beech forest, i.e. an inverted treeline.

Mt Burns has a very rich flora. Of special note is the diversity of snow tussocks (seven species of *Chionochloa*) and alpine daisies (18 species of *Celmisia*). *Chionochloa teretifolia* with its very hairy leaf margins was striking in the lower tussocklands and, higher up, two forms of *C. crassiuscula* differing in leaf length formed swards. All three species are distinctive because of their many curled leaves. Most of the group made it up to the upper, rocky, summit ridge (around 1600 m). Plants putting on a great show included *Celmisia*, *Chionochloa* and *Aciphylla*. Most impressive were the *Aciphylla* (*A. lyallii*, *A. pinnatifida*, *A. congesta* and *A. crosby-smithii*) on the way to the summit ridge. Also impressive was the flowering of *Ranunculus buchananii*, *Dolichoglottis scorzoneroides* and the tiny *Euphrasia integrifolia* in the rocky valley below the summit. *Astelia linearis* was putting on a good show with many jelly-bean fruits visible in the sward among the *Chionochloa*. It was interesting to see *Grammitis poepiggiana* growing in mats on rocks high up in the tussocklands.

The diversity of habitats provided for a diverse flora. Major habitats included wetlands, shrub tussock, tussocklands, rockfields, herbfields, fellfields and rocky ridge/slope. The fellfields on the solifluction terraces along the upper ridge of Mt Burns are an interesting feature. The GLORIA site is located on these terraces, and was chosen because it is the lower altitude limit for several alpine plants. Some of the alpine plants flowering on these terraces, and the banks between them, were *Leptinella goyenii*, *Raoulia hectorii*, *Chionohebe ciliolota*, *Celmisia hectorii*, *C. sessiloflora*, *Geum uniflora*, *Kelleria croizatii*, *Phyllachne colensoi* and *Hectorella caespitosa*. Lichens included the black, hairy *Gowardia nigricans* and mats of brown *Cladia aggregata*. Alan and Kath were visiting the site to download a year of data from the four soil temperature and one air temperature dataloggers, which record the temperature each hour. The project now has eight years of records, with two more to go before the data is analysed. Brown creepers were active in the beech forest on the way down.

Eglinton River delta/Boyd Creek**:** Those who decided to forgo the Mt Burns exodus investigated the mouth of the Eglinton River. The high river flows prevented exploring the shingly delta. A churning, discoloured torrent discharged into the blue waters of Lake Te Anau, carrying with it small trees, branches and associated debris. Nevertheless, we explored the river-side margins within reach, at first recording mostly adventives from this highly disturbed site, but also noting reddish clumps of *Carex buchananii* and *Phormium tenax* in flower.

Further into the fringe of mānuka, we discovered considerably more indigenous diversity than was first apparent. Seedlings and saplings of woody species included *Coprosma tayloriae*, *C. rigida*, *Carpodetus serratus*, *Griselinia littoralis*, *Pittosporum tenuifolium*, *P. eugenioides*, *Gaultheria antipoda*, *Hebe salicifolia*, *Dracophyllum longifolium*, *Myrsine australis*, *Lophomyrtus obcordata, Olearia ilicifolia* and an unexpected find of fine-leaved parsley fern, *Botrychium biforme*. The afternoon was spent investigating the beech forest margin near the access road to the Boyd Creek camp. The creek drops over a series of small cascades, with flowering *Hoheria glabrata* extending out over the water. There was more *Botrychium* along with *Gastrodia* orchids. A few plants of speargrass (*Aciphylla subflabellata*) defended some grassy riparian clearings. The final highlight of the day occurred back at camp at 10 p.m. when a bat swooped low and circled over the multitude of tents nestled amongst the beech and bog pine.

Day 6 - Boyd Tops Track: From the edge of Boyd Camp we entered mountain beech forest encountering red and yellow mistletoe until we reached a large, open, bog area; all the while accompanied by the twitter and screech of many a bird including bountiful, twittering, rifleman, curious robin, shy tomtit, chattering kākā and screeching long-tailed cuckoo. Further on above the bush line lay a large basin backed by greywacke screes leading up to the southern summit of the Countess Range. The floor of the basin has extensive wetlands to the north side, and hummocky country in the south. The basin also contains a diversity of scattered wetlands and tarns. Wetland species included: *Donatia novae-zelandiae*, *Oreobolus pectinatus*, *Dracophyllum prostratum*, *Cyathodes empetrifolia*, *Pentachondra pumila*, *Abrotanella caespitosa* and cushion bog. The largest lake in the upper portion of the basin contained many interesting plants around its margin including *Deschampsia cespitosa*, *Stenostachys laevis*, *Isolepis basilaris*, *Acaena fissistipula*, *Rorippa palustris*.

Red tussock grew on the lower slopes with narrow-leaved tussock on the drier upper slopes. Below the screes we saw snow tōtara, *Coprosma cheesemanii*, *Drachophyllum rosmarinafolium*, *Gaultheria crassa*, *Olearia cymbifolia*, *Myrsine nummularifolia*, *Hebe odora* and *H. rakaiensis*. On the screes we found *Epilobium* sp., *Stellaria roughii*, *Cardamine* sp., *Haastia sinclairi*, and on the rocky summit *Hebe epacridea*, *H. petriei*, *Epilobium crassum*, *Leptinella pectinata* subsp. *willcoxii* and *Chionohebe thomsonii*.

Day 8 - Milford Sound**:** It was forecast to be a wet day. Most of the group took the 1.5-hour cruise to the Discovery Centre and Deep Water Observatory. After experiencing the famed Fiordland scenery in the rain: shrouded tops, thundering waterfalls and tantalising vegetation on sheer cliff faces, we observed some of its marine life from the observatory discretely located in a hidden bay. As a result of the high annual rainfall, and narrowness of the fiord, a layer of dark, fresh water accumulates over the sea, creating a deep ocean environment at a much shallower depth than usual ('deep-water emergence'). A spiral staircase descends over 10 m to the viewing chamber from which we saw anemones, sponges and corals, including the delicate-looking black coral which appears white owing to its coating of other organisms, and fish. The short Lookout Walk yielded the shrub *Archeria traversii* with an accessible raceme of waxy pink flowers, which the photographers under their umbrellas tried desperately to record. The genus, which has about five species in Tasmania, and two endemic to New Zealand, is named after William Archer (1820–1874), a Tasmanian architect, politician, botanical artist and plant collector, who for two years assisted Sir Joseph Hooker at Kew. William Travers (1819-1903) collected in Nelson and Marlborough and helped establish the Wellington Botanic Garden.

On the drive back to camp we joined the tourists at the Chasm Walkway on the Milford side of the Homer Tunnel. The dramatic views and thunder of the swirling Cleddau River, and the dripping forest draped in ferns, mosses and lichens were overwhelming. In contrast, the East Homer Nature Walk at the eastern portal of the tunnel is an open alpine landscape of rock and scree carved from the surrounding mountains by glacial action—and we had it to ourselves! The names of many of the shrubs and herbs, such as *Archeria traversii* earlier in the day, commemorate people, some of them well known to NZ botanists, and others less familiar. The large, glossy foliage of the giant buttercup, *Ranunculus lyallii*, and the distinctive bronze, tapered leaves of pineapple scrub (*Dracophyllum menziesii*) were easily recognised. Other species we saw included South Island leatherwood, *Brachyglottis buchananii* (syn. *Senecio bennettii*), low-

growing, spreading *Coprosma fowerakeri* (previously included in *C. pseudocuneata*), the now rather rare *Astelia petriei*, and the daisies *Celmisia walkeri*, *C. du-rietzii* and *C. bonplandii*. It was an enchanting place in spite of (or perhaps because of) the rain.

March fieldtrip: Baring Head/Ōrua-pouanui, Wainuiomata.
Led by Chris Hopkins, ten of us set off to do a first look at this 284-hectare reserve purchased in 2010, and added to East Harbour Regional Park. A 2002 plant list, last updated by Pat Enright, lists 192 indigenous and 135 adventive plant species. The reserve contains a diverse range of habitats from coastal turf, dunes, coastal bluffs, wetlands, river estuary, raised beaches, scree slopes, and an extensive 'grey scrub' community on the scarp above the true right river flats that intergrades with regenerating broadleaf forest above the "White Bridge" from where we started botanising.

The 'grey scrub' community includes: *Cordyline australis*, *Carmichaelia australis*, *Coprosma propinqua* subsp. *propinqua*, *Ozothamnus leptophyllus*, *Clematis forsteri*, *Muehlenbeckia complexa*, *Parsonsia capsularis*, *Rubus squarrosus*, *Scandia geniculata*, *Tetragonia implexicoma* and *Phormium cookianum* subsp. *hookeri*. Other notable plants are *Brachyglottiis greyi*, *Clematis afoliata*, *Discaria toumatou*, *Muehlenbeckia astonii* and two mistletoes, *Ileostylus micranthus* and *Korthalsella lindsayi*. 'Grey scrub' plant communities are becoming rare, so it has a Conservation Status of "Serious Decline". In this case grazing by cattle and sheep, domestic pigs, rabbits, hares and possums have all helped to deplete the 'grey scrub' regeneration. In 2004, six plants of *Ileostylus micranthus* were known in the lower Wainuiomata Valley, three on the property. By February 2011 none of these plants had survived. However, two more adult plants have been found on the property, near the original site. Unless one of these plants is a female, extinction is inevitable. The sole plant of *Clematis afoliata* suffers continuing browse. Though not uncommon here, plants of *Discaria toumatou*, matagouri have become clogged with exotic grasses. The only two plants known of *Muehlenbeckia astonii* were in fruit in March 2011 but no seedlings were found among the exotic grasses growing under or near these plants. For other plants, providing habitat that is free of browsing animals, and predators of native birds and lizards, will allow the natural regeneration processes to work.

April fieldtrip: Breaker Bay.
Frances Forsyth gave each of the eleven participants a site guide that included a base species list (developed from other Wellington south coast sites), and an aerial photograph of Breaker Bay and south Seatoun. This gave us our bearings and also showed public land ownership and blue water rights around Point Dorset. We did a thorough search of the blend of native and adventive species that made up the plant community below Breaker Bay Rd. Long-leaved poa (*Poa anceps*) and leafless sedge (*Ficinia nodosa*) are common here. Weed species from elsewhere in NZ, e.g. pōhutukawa and karo, were common and, it was in such vegetation, that we found *Adiantum cunninghamii* surviving, protected by the trees from southerly gales. After lunch we found the tiny *Colobanthus muelleri*, in crevices in the greywacke cliffs, and the pest plants pig's ear (*Cotyledon orbiculata*) and fairy crassula (*Crassula multicava*) also on the cliffs.

FUTURE EVENTS

June 11th:	Field trip Upper Solomon Spur, Wainuiomata water supply catchment. Mick Parsons 972 1148; Chris Horne 475 7025.
June 20th:	Meeting: Propagation of NZ native plants. Jill Broome.
July 2nd:	Field trip Johnston Hill Reserve, Karori. Barbara Mitcalfe 475 7149
July 16th:	Field trip Te Marua Bush workbee. Glennis Sheppard 526 7450, Sue Millar 526 7440.
July 18th:	Meeting: Lichens illustrated. Dr Allison Knight, University of Otago
August 6th:	Field trip Paekakariki Escarpment forest. Ken Fraser 04 905 3714
August 15th:	Annual General Meeting and AP Druce Memorial Lecture by Dr. Carol West
September 3rd:	Field trip Skull Gully, Wainuiomata. Chris Hopkins 564 3980
September 19th:	Meeting: Physical and social dimensions of ecological corridors - A Wellington perspective. Barry Wards, President, Forest & Bird Protection Society.

January 20th-29th: Field trip Taranaki

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- **Nelson Botanical Society**

Anniversary Weekend Camp: 28-31 January 2011 – Cobb Valley
Saturday: Thorn Creek basin under Mt Mytton. Directly after leaving the Cobb track, we encountered pole pitpat (*Pittosporum patulum*), a nationally endangered species. Notable due to their incredible size were understorey stands of *Pseudopanax crassifolius*, with large crowns on trunks as wide as those of mature beech trees. In flushes in the open basin headwaters were *Craspedia* 'short hairs' and *Ranunculus foliosus*, and areas of *Coprosma rugosa, Chionochloa conspicua* and *Aciphylla glaucescens*. Passing through scrub of *Olearia nummulariifolia, Dracophyllum filifolium, Aristotelia fruticosa* and *Ozothamnus vauvilliersii,* we emerged onto scree with *Haastia sinclairii*, *Lobelia roughii*, *Parahebe cheesemanii, P. decora, Montia calycina* and *Epilobium pycnostachyum.* The return trip, with many wasp encounters, reminded us that well-stocked first aid kits are essential this time of year. A quick stop at the trilobite rock near the head of the Cobb reservoir revealed the NW Nelson endemic *Hebe calcicola* with flowering *Traversia baccharoides* and *Olearia virgata,* and *Asplenium trichomanes.*

Sunday: Sylvester lakes and Iron Lake. For many this was a chance to meet *Hebe leiophylla*. Also there was the nationally vulnerable *Pittosporum dallii*. This area is one of its NW Nelson strongholds. At the Galena Creek bridge we passed NZ's oldest known rocks – over 500 million years old! Tall forest eventually gave way to a park-like combination of weather-worn mountain beech, patches of carpet grass and bog pine. There were also many heaths and we were lucky to catch the last flowering of the beech mistletoes *Peraxilla tetrapetala* and *Alepis flavida*. At Lake Sylvester, we scouted – successfully – for one of New Zealand's rarest grasses: *Deyeuxia lacustris*. In the glaciated cirque of Iron Lake, were *Raoulia eximia* and *Celmisia hieracifolia* on a rocky rib, and *Gentianella corymbifera* and *Brachyglottis bidwillii* in the carpet grass. We then headed back, sidling across rockland and scree in which we found *Brachyglottis adamsii, Haastia sinclairii, Epilobium margaretiae* and tight mats of the NW Nelson endemic, *Gentianella decumbens*. We eventually broke out onto a gentle, broad ridge of *Chionochloa pallens*, *Celmisia dallii, Aciphylla anomala* and *Hebe hectorii* subsp. *coarctata.*

After a night with the strongest winds that Golden Bay had experienced for at least 20 years, we reluctantly curtailed our camp and headed homeward only to find that several beeches had fallen across the road and required our collective dismantling to clear a route through them.

March Field Trip: Mt Lodestone
Seven members set off for Flora Hut, stopping to admire *Brachyglottis rotundifolia* and later some very lush *Astelia* aff. *nervosa*. In the open areas of beech forest were three *Dracophyllum* species: *D.filifolium, D. rosmarinifolium* and large trees of *D.traversii.* The comb sedge *Oreobolus pectinatus* and *Drosera spatulata* were nestled right on the track. Above the bush line, *Coprosma decurva* sported dark red berries, and near the top (1462 m) were *Brachyglottis bidwillii* and *B. adamsii*. Growing in and around the rocks was *Leonohebe ciliolata* and some very pretty *Forstera mackayi* in full flower. After lunch at the summit, we found the parasitic *Exocarpos bidwillii* covered in podocarp-like fruit growing amongst a *Pentachondra pumila*, which was perhaps its host. On the way down and not far above the carpark were many *Pseudopanax linearis*, *Libocedrus bidwillii* and a few *Archeria traversii.*

April Field Trip: Taupo Point, Wainui Bay
The walk started at Wainui Bay and followed the Abel Tasman coastal track to the turn-off to Taupo Point. Along the way were *Entelea arborescens* (one of the few sites where it occurs in the South Island) and *Schefflera digitata*, resplendent with purple fruit. A range of estuarine species was encountered next, including *Spergularia tasmanica*, *Selliera radicans, Samolus repens, Sarcocornia quinqueflora* and *Suaeda novae-zelandiae* (with flowers and fruit). Along the outer coast, the weedy slopes held some native species, the more notable being *Arthropodium cirratum, Linum monogynum*, *Lobelia anceps* and *Olearia paniculata*. Exploration under kānuka

on the limestone headland of Taupo Point yielded a surprisingly lush understorey of *Microlaena polynoda*, *Astelia fragrans*, and sapling matai. We found one small patch of *Peperomia urvilleana*. Despite the area's limestone geology, the only calcicole recorded was *Metrosideros colensoi*. *Griselinia lucida* and *Pennantia corymbosa* were particularly common. Also despite the fertile substrate, there were relatively few weeds recorded, one of the more notable being a loquat.

April Talk by Simon Walls, DOC Ranger, Golden Bay: "Threatened Plants of Golden Bay"
Mt Burnett, Farewell Spit, the Whanganui Ecological District, Mangarakau, Gouland Downs, the Cobb Valley, Totaranui and the Golden Bay lowlands were some of the places about which Simon spoke. The flora of each is exposed to its own, unique combination of threats. In addition to mapping and monitoring the at-risk species, replanting and physical protection are some of the tactics used by DOC to protect these species. DOC gets some surprising helpers: kea feed on the berries of *Coprosma acerosa* at Farewell Spit, aiding their dispersal and, at Whanganui Ecological District, sheep are helping keep at bay the weeds that would otherwise overwhelm native salt turf plants.

Easter Camp: Southern Marlborough. Lake Chalice
BotSoccers set off from the Lake Chalice (Mount Richmond Forest Park) car park to the lake, a descent of some 400 metres, passing *Aciphylla ferox*, *Botrychium biforme* and *Olearia cymbifolia*. At one point, *Coriaria sarmentosa* was alongside *C.arborea*, showing us the difference between these species. Several *Epilobium* species made clear their habitat preferences – *E. pubens* hanging off dry banks, *E. nerteroides* near a small waterfall, and *E. microphyllum* and *E. melanocaulon* on river gravel by the lake. Similarly, *Hebe brachysiphon* and *H. salicifolia* at the top of the track gave way to *H. traversii* by a stream bank, and *H. stenophylla* and *H. leiophylla* lower down. Near the hut were several plants of *Aristotelia serrata* × *A. fruticosa,* with a range in leaf size and glossiness. Along the lake edge, emerging through recent silt, were many beds of *Crassula sinclairii*. The highlight of the day was *Centipeda aotearoana*, now classified as naturally uncommon, which grows on ephemeral wetlands and lake margins.

On Saturday, we had arranged access along the southern end of the Wairau Boulder Bank. First impression: it's a weedy place, which has been receiving weed control effort. The clumps of *Muehlenbeckia complexa* often hid *Melicytus* 'Waipapa' laden with white berries and there was also *Plagianthus divaricatus* here and there. Some of the lianes found were *Convolvulus waitaha*, *Einadia triandra* (with tiny red berries) and *Calystegia soldanella*. Of the many low herbs adapted to the bank's conditions were *Atriplex prostrata*, *Lachnagrostis littoralis*, both exotic and native iceplants and *Apium prostratum*. Closer to the Lagoons were the ground-hugging *Selliera radicans*, *Samolus repens* and *Sarcocornia quinqueflora*. We later came upon a large patch of *Pyrrosia eleagnifolia*, growing on sand and small wave-rounded boulders, and one *Coprosma repens*. Investigations of the Kidney Ponds of the lagoons took us through a margin of kanuka and the odd cabbage tree with *Tetragonia implexicoma* underneath. On the flats were *Cotula coronopifolia in* flower, and *Triglochin striata* among swathes of *Juncus kraussii*. And there was more *Samolus-Selliera-Sarcocornia* too.

Our third day was spent up a tributary of the Avon River – White Pine Stream. Again, a landowner kindly gave us access to the conservation land beyond. Once on foot, we passed the hot rock ferns *Cheilanthes sieberi* and *Pellaea calidirupium* and a patch of *Coprosma brunnea*. Beyond, was kanuka with a thick shrub understorey, mainly of C*oprosma rhamnoides* (many covered in red berries), *C. crassifolia* and *Melicytus* 'Waipapa'. Among the shrubs was one young *Senecio* 'Leatham', a Data Deficient species. Our route followed the stream through beech–broadleaved species forest with many matai seedlings, scattered large beech trees and many *Teucridium parvifolium* (Declining). In a basin above the stream were eight very large matai (about 800 mm through), a large titoki in fruit, and several tall *Hoheria angustifolia* and *Pennantia corymbosa*. The understorey here indicated high fertility: *Melicytus micranthus*, *Coprosma rotundifolia*, *Melicope simplex*, *Parietaria debilis* and *Sophora microphylla* seedlings. A few plants of a very narrow-stemmed variety of *Carmichaelia australis* (*C.flagelliformis*) were seen on the way home.

Monday morning we left for Pukaka Valley near Tuamarina. En route, we visited a sizable *Syzygium maire* and then headed to the John Chaytor Family Scenic Reserve, with its mixed broadleaved species–podocarp swamp forest of matai, kahikatea, toro, pukatea, titoki, tawa and kaikomako. The forest floor supported *Astelia fragrans*, *Asplenium* and *Blechnum* species, dense tangles of supplejack and small-leaved *Coprosma* species in abundance.

FUTURE EVENTS

June 19th	Archer Track, Marlborough Sounds. Leader: Sally Warren (03) 546 6637
June 20th	Evening talk by Rebecca Bowater. "Flora and Fauna of Brazil"
July 17th	Beukes' QEII covenant, Neudorf. Cathy Jones (03) 546 9499
July 18th	Evening talk by Chris Ecroyd. "Dactylanthus"
Aug 21st	Tony Whitaker's QEII covenant. Beryce Vincenzi (03) 528 4549
Aug 22nd	Evening talk by Philip Simpson. "Podocarpus"

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- **Canterbury Botanical Society**

April meeting: Classifying Confusing Coprosmas on Computers

David Glenny (Landcare Research) and colleagues have built an online key to the 53 species of the predominantly New Zealand *Coprosma* genus using LUCID, an online interactive computer-based identification system (www.lucidcentral.com/). To quote the website "the key is illustrated with 500 images of species and the features used to identify them and has a factsheet for each species that provides a list of distinct features, comparisons with similar species, description, habitat and distribution details, and references to literature. "

David looked afresh at stipule and fruit colour characters that had been used in the past to delineate coprosma species and found that these were not the most reliable characters to use. Instead he has found that the three key characters below are more reliable:

- Plant form
- Leaf length and width
- Hair distribution, particularly on the petiole, leaf margins and leaf apex

Geoff Henderson raised the question of hybrids. A list of hybrids, in order of abundance, is included in the online notes about the key but the key itself only includes *C. propinqua* × *C. robusta*, which is so common it has its own name *Coprosma* × *cunninghamii*. Joe Cartman observed that this hybrid is a real nuisance to nurserymen when clients insist on eco-sourced single species stock (and noted that some of his best *C. propinqua* collecting trees on the Port Hills that produce the least hybrid fruit, are now well buried by earthquake rockfall).

David used a specimen to take us step by step through the LUCID key and then tutored us as we ran our own specimens though the online key. Thank you David for giving all the confidence to get started with this new tool.

April Field Trip: Smothering Gully Covenant (Hamilton Glens - Omihi)

After a good weather forecast 22 members assembled at the Hamilton Glens road-end. In the kanuka forest surrounding the Smothering Gully sandstone gorge we found many species typical of such secondary forest, including abundant *Asplenium flabellifolium*, *Dichondra repens*, *Poa imbecilla* and *Microlaena stipoides* on the dry ridge-top. As we began our descent beside the bluffs we saw our first southern rata *Metrosideros umbellata*, all quite small plants clinging to the precipitous cliffs. Numerous small patches of turutu (*Dianella nigra*) and occasional karamu (*Coprosma lucida*) could be seen wherever fissures or small ledges provided friendlier habitat. *Korthalsella salicornioides* was parasitizing stunted manuka (*Leptospermum scoparium*) near the cliff edge. As we entered older kanuka forest around from the bluffs we encountered numerous small rata trees, some emerging through the kanuka canopy, others apparently suppressed. Given the shade-intolerance of rata, participants agreed that the cutting of a few strategic light-wells to favour rata growth could be justified. Much time was then spent on our knees, photographing patches of the two diminutive filmy ferns *Hymenophyllum cupressiforme* (nearing

its southern distributional limit) and *H. minimum*. Both occurred as small mats on the forest floor and on sandstone outcrops, a few patches exceeding several square metres in area. We agreed that the ability of the sandstone to retain moisture was probably the factor that allowed this to occur. One bank in particular caught the photographers' attention, where dozens of the orchid *Diplodium alobulum* (formerly *Pterostylis alobula*) stood in full flower over a mat of *H. minimum* and mosses. Differentiating strap ferns from juvenile *Ctenopteris heterophylla* provided a challenge, with *Grammitis magellanica subsp. nothofageti* and (tentatively) *G. ciliata* eventually being named. A short sortie down to the upper end of the gorge revealed climbing rata *Metrosideros diffusa*, and extensive patches of *Blechnum vulcanicum*. A few of us made a quick visit down the new fence-line to the deeply incised lower end of the gorge, where a program to control wilding pines by in-situ drilling and poisoning was taking place. The distinctive seed heads of hedgehog grass *Echinopogon ovatus* were spotted under toe-slope kanuka. The presence of numerous volunteers of mahoe (*Melicytus ramiflorus*) broadleaf (*Griselinia littoralis*) and *Pseudopanax crassifolius* gave an indication that the forest would quickly recover from the effects of former grazing. Even the bellbirds put on a good show, treating us to a daylong chorus. Several valuable additions were made to the existing plant species list.

FUTURE EVENTS

May 6 th:	Talks by student grant recipients: Ellen Cieraad "Why are New Zealand's treelines so low, and what's 'wrong' with the native trees?" and Lizzie Wandrag "Do mutualists matter? The importance of mutualistic relationships for *Acacia* in New Zealand."
May 14th:	Fieldtrip to Orton Bradley Park Native Bush, a QEII covenant
June 11th:	AGM and talk by Sally Tripp and Rosemary Koller "Rare and Unusual Ferns of the Port Hills"
July 1st:	Talk by Nick Ledgard "Native Plant Successions and Introduced Conifer Management"
July 9th:	Field trip: Botanic Gardens – Fern house
August 5th:	Talk by Chris Phillips "Riparian planting of native plants"
August 13th:	Field Trip: Botanic gardens Herbarium

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NOTES AND REPORTS

- **New weed identification key online**

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A new interactive key has been developed that will be a big help for people who need to identify weeds in New Zealand. The computer-based online key draws on the National Pest Plant Accord (NPPA) Key, which was completed in July 2009 (Dawson and Ford, 2007), and the Department of Conservation's consolidated list of environmental weeds in New Zealand (Howell, 2008).

Fig. 1 *Ulex europaeus* (gorse). This iconic weed is the image used on the home page of the new key. Image: Trevor James.

The new key covers more than 500 plant taxa (species, subspecies, varieties, hybrids and cultivars), including about 150 NPPA plants, more than 300 environmental weeds, and many similar species and close relatives. The key is available for use, free of charge, on the Landcare Research website (www.landcareresearch.co.nz/research/biosystematics/plants/weedskey/index.asp or use the shortcut http://tinyurl.com/weedkey).

As with the original NPPA Key, which it replaces, the New Zealand Weeds Key was very much a team effort. Murray Dawson, the lead developer, and Peter Heenan (both of Landcare Research) collaborated with Paul Champion (NIWA), who provided expertise on aquatic species, and Trevor James (AgResearch). Sheldon Navie (University of Queensland) provided data from similar keys he has developed in Australia. All five authors provided images for the key with the majority provided by Trevor James. Further illustrations were contributed by the Department of Conservation, Weedbusters, regional authorities, and other New Zealand and overseas contributors. The key is well illustrated with about 9000 images showing a range of features for each plant, e.g., plant form, leaf, floral, fruit and seed characteristics. Only 11 taxa currently lack images and these will be added when they become available.

The plant names follow the Landcare Research Ngā Tipu o Aotearoa – New Zealand Plants databases (http://nzflora.landcareresearch.co.nz). There are several cases where the taxonomic names used in the new key are more recent than those listed in the NPPA Manual (2008) and the Department of Conservation list of environmental weeds (Howell, 2008). These recent names are recorded within the key with synonyms (older names) in brackets and in comparison tables linking from the home page.

The names in the Weeds Key are linked to related websites such as the New Zealand Plants databases, MAF Biosecurity New Zealand (www.biosecurity.govt.nz), and Weedbusters New Zealand (www.weedbusters.co.nz), all of which provide further information on the plants.

A new feature also allows the user to retrieve lists of NPPA species and environmental weeds, and the suffixes 'NPPA' and 'EW', respectively, have been added to the names of these plants within the key.

The new interactive key to the weed species of New Zealand is a unique and extensive resource. It is a powerful tool that makes it easy to identify weedy plants without having to learn all of the complex botanical terminology.

How to use Lucid keys

Lucid™ keys have an intuitive interface divided into four panes (Fig. 2). The left-hand panes are features (characters and character states used in the key) and the right-hand panes are the entities (all taxa included in the key such as species and subspecies).

On start-up, the top left-hand pane displays a complete list of 'Features Available' and the top right-hand pane shows all the entities in the key. Features in particular are organised in a file directory structure that you can open and close individually (or all at once).

As you start using the key, the character states that you choose appear in the 'Features Chosen' (bottom left) pane and the taxa that lack these features appear in the 'Entities Discarded' (bottom right) pane.

Say for example that you had a sample of gorse (*Ulex europaeus*) that you wanted to identify using the Weeds Key (most New Zealanders would immediately recognise gorse anyway but the principle of using the key is the same). Based on the features you can see on the sample in front of you, you can select from 216 character states (grouped into 48 characters) scored for the more than 500 entities in this key. For gorse, the character state for 'Plant Form' is 'Shrub' and the character state for 'Stem Prickles' is 'Present'. Scoring these two character states takes you down to 28 'Entities Remaining'. If your sample was in flower, you could choose 'Flower Colour' as 'Yellow' (with 11 entities remaining) or 'Flower Type' as 'Pea-shaped' which would give you the correct identification.

You are not limited to these features or this order of entering them. Lucid™ keys are multi-access so you can select whatever features you like anywhere within the key. These keys are also fault tolerant – misinterpreted features (characters that are easily mistaken) can be accommodated.

At any stage of the identification process, you can view images for each entity in a separate (pop-up) window (Fig. 2, inset). There are several other features to these keys, such as a 'Best' button (which takes you to the most discriminating characters) and manual discard (to drag-and-drop taxa from the 'Entities Remaining' to the 'Entities Discarded' panes where it is obvious that they are not the plant that you are identifying).

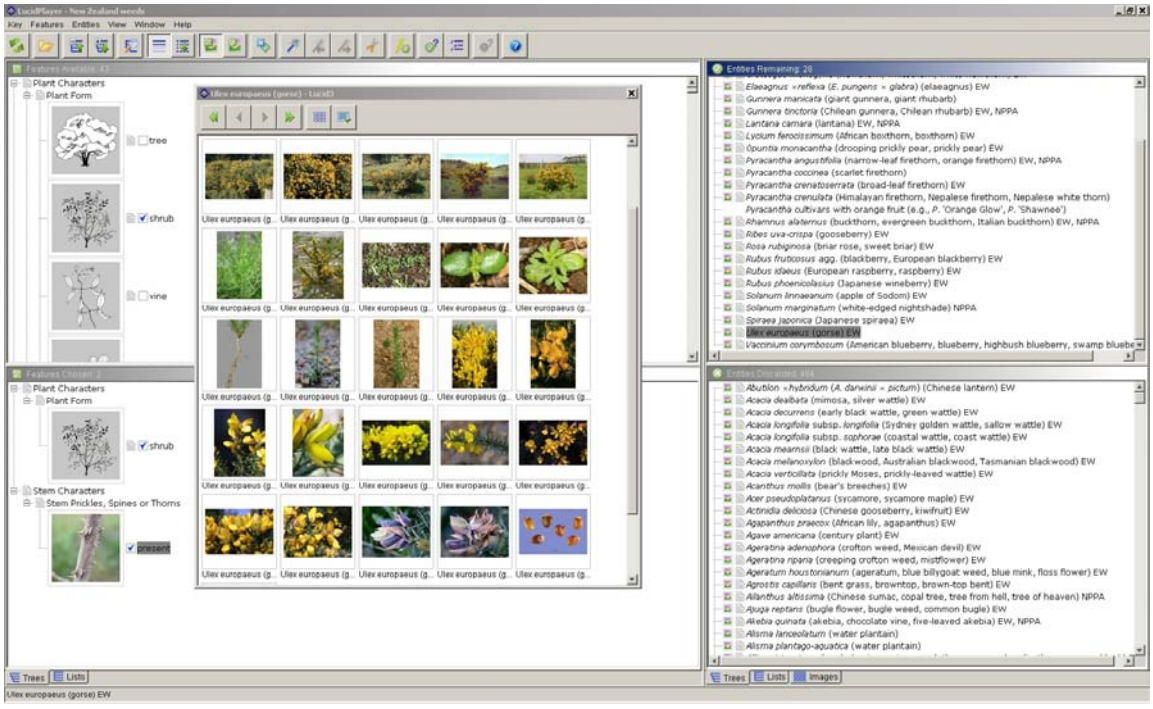

Fig. 2 Screen shot of the new weeds key. Image: Murray Dawson.

Other interactive keys

Other online interactive keys to plants of New Zealand have been developed at Landcare Research – all are free to use and are based on Lucid™ software (developed by the Centre for Biological Information Technology (CBIT) at the University of Queensland in Australia). Most were funded by the Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme.

A key to more than 400 New Zealand native and naturalised grass species and hybrids was completed in July 2008 (Dawson and Ford, 2007). This key (http://tinyurl.com/grasskey) was developed by Kerry Ford and David Glenny (of Landcare Research) and Trevor James (AgResearch). Because grasses are difficult to identify and have specialised terminology and characters to distinguish and describe them, this is probably the most technical key developed at Landcare Research. This key draws upon the information published in the grass flora (Edgar and Connor, 2000).

A key to 61 native plants of schools and marae in New Zealand (http://tinyurl.com/schoolkey) was made available in April 2010. This key was developed by Ellex Stewart while she was based at Landcare Research and funded by a New Zealand Science, Mathematics and Technology Teacher Fellowship. Plants in this key include trees, shrubs, ferns, grasses and flaxes common to schools and marae throughout New Zealand. Because it was developed as a teaching resource, this key is particularly easy to use and probably the best one to provide an introduction to the other keys.

A key to 65 native *Coprosma* (http://tinyurl.com/coprosmakey) was completed in June 2010 by David Glenny and Jane Cruickshank (of Landcare Research) and Jeremy Rolfe (Department of Conservation). This key includes a glossary and fact-sheets to a genus that can be difficult to identify using traditional printed floras and guidebooks.

Two further keys are currently under development. Murray Dawson, Jeremy Rolfe, and the New Zealand Native Orchid Group have started work on a key to the New Zealand native orchids – a family of more than 120 difficult-to-identify plants with high conservation values. This key is scheduled for completion in May 2013.

A team led by David Glenny is working on a genus-level key to native and naturalised flowering plants in New Zealand. Covering more than 1100 genera, this is the largest key being developed so far for New Zealand. Completion is scheduled for June 2013.

In addition to these Landcare Research initiated keys, Chris Ecroyd (recently retired curator of the National Forestry Herbarium, Scion, Rotorua) has produced a key to cultivated pines. His latest version was uploaded in March 2011 and includes 91 *Pinus* species (www.scionresearch.com/latest_pine_key).

This is an impressive collection of plant identification resources considering that there were no widely available interactive keys for New Zealand plants prior to three years ago. We are also fortunate that they are all free to use – give them a go!

Acknowledgements

The development of the new weeds key was funded by the Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme. The TFBIS Programme is funded by the Government to help to achieve the goals of the New Zealand Biodiversity Strategy, and is administered by the Department of Conservation.

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▪ New Names for New Zealand Ferns from Christenhusz et al. (2011)

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Christenhusz et al. (2011) recently presented a linear sequence of extant lycophytes and ferns. Such a standardised linear sequence of taxonomic names is useful for ordering taxa within herbaria, books, checklists, etc. They based the fern part of their sequence on the classification of Smith et al. (2006), which in turn was based on current understanding of the relationships amongst ferns. Smith et al. (2006) did not deal with lycophytes. A premise of both Smith et al. (2006) and Christenhusz et al. (2011) was to (try to) recognise only monophyletic groups. These are groups whose members are all more closely related to each other than they are to any individual not included in the group. Groups where some members were (demonstrably) more closely related to individuals not included in that group were not recognised in these formal classifications.

Christenhusz et al. (2011) recognised five subclasses: Lycopodiidae (lycophytes), Equisetidae, Ophioglossidae (including the Psilotaceae), Marattiidae, and Polypodiidae. The latter four subclasses are more closely related to one another, and then to seed plants, than they are to the lycophytes (Pryer et al. 2004). Consequently, the three principal groups of extant vascular plants now generally recognised are the lycophytes, "ferns" (comprising the latter four subclasses above), and seed plants. The traditional group "fern allies" is obsolete. Like the term "reptiles" amongst tetrapods, the name "pteridophytes" is still useful in a functional sense in encompassing 'seed-free' vascular plants, but it does not reflect relationships (in that the two groups of pteridophytes, lycophytes and ferns, are not each other's closest relative, with ferns being more closely related to seed plants).

Christenhusz et al. (2011) revised several aspects of the classification of Smith et al. (2006), and created several new combinations and new names. In some cases this was based on more recent studies of fern or lycophyte interrelationships, and in others on differing interpretations of the same data available to Smith et al. (2006). Those revisions affecting New Zealand species are discussed below. Table 1 details the species-level changes for New Zealand species.

Phylloglossum

Christenhusz et al. (2011) transferred *Phylloglossum drummondii* to *Huperzia*. This was attributed to the molecular phylogenetic study of Wikström & Kenrick (1997), which found *Phylloglossum* to be embedded within *Huperzia*. However, subsequent molecular phylogenetic studies, not cited by Christenhusz et al. (2011), found *Phylloglossum* to fall outside *Huperzia* (Wikström et al. 1999; Ji et al. 2008). On current evidence, the relationship appears equivocal: *Phylloglossum* may be nested within *Huperzia*; or it may fall (just) outside. Te Papa is retaining *Phylloglossum*, at least for now.

Doodia

Christenhusz et al. (2011) made new names/combinations in *Blechnum* for species previously treated in *Doodia*. This in part stems from a study that I was involved with (Shepherd et al. 2007) that suggested *Doodia* may be embedded in *Blechnum* (making the latter not monophyletic). We suggested at the time that formal classification changes were premature, and there has been little advance since then.

If the desirability of recognising only monophyletic groups in taxonomic classification is accepted, and future studies do confidently demonstrate that *Doodia* and other genera such as *Brainea*, *Pteridoblechnum*, and *Sadleria* are nested within a non-monophyletic *Blechnum*, two approaches are possible. The first is to subsume these other genera into *Blechnum*, in which case the names

made by Christenhusz in *Blechnum* for the species previously treated in *Doodia* need to be used. The second is to divide the species currently recognised in *Blechnum* across multiple, component, monophyletic groups, in which case *Doodia* and the other genera might be retained. At this stage, it is unclear how many genera this second option would result in. It is interesting to note that there is little consistency across similar lumping/splitting decisions in other fern groups. While some genera are being expanded to encompass nested segregate genera (e.g., *Asplenium*, *Hymenophyllum*), others are being split into component parts (e.g., *Cyathea*, *Grammitis*, *Trichomanes*).

As stated in Shepherd et al. (2007), I personally would like to see more sampling of taxa and characters to establish a much firmer understanding of relationships within the Blechnaceae before deciding which of the above two options to adopt. For this reason, Te Papa is retaining the status quo (i.e., recognition of *Blechnum* and *Doodia*) until more is known. There is also an additional practical reason for not immediately adopting a broader circumscription of *Blechnum*, and that is that names in *Blechnum* were not provided (and do not exist) for all of the species of *Doodia* accepted in recent treatments.

Of the names in *Blechnum* provided by Christenhusz for New Zealand *Doodia*, three involve new species epithets (Table 1). This is because the species epithets used in *Doodia* are already used in *Blechnum* for different species. These new names deserve some comment. *Doodia aspera* is common in eastern Australia but may actually be extinct in the wild in New Zealand (although a population identified as *D. aspera* × *D. australis* does persist) (Shepherd et al. 2007). Consequently, the replacement name of *Blechnum neohollandicum* is not as inappropriate as it might first appear. However, I do think the choice of *Blechnum zeelandicum* for *Doodia squarrosa* is unfortunate. Not only is it referring to the Dutch province Zeeland rather than New Zealand, but there is already a *Blechnum* name for New Zealand: *Blechnum novae-zelandiae* T.C.Chambers et P.A.Farrant. The latter, as one of the country's most common ferns, surely deserves its species epithet; effectively New Zealand's *Blechnum*. Why the replacement name for the uncommon *D. squarrosa* should reference Zeeland or New Zealand is much less clear. Confusion is also likely to result from the (inexplicable?) replacement name of *Blechnum norfolkense* Christenh. for the Hawaiian endemic *Doodia kunthiana* Gaudich. This replacement name is undesirably similar to *B. norfolkianum* (Heward) C.Chr. of Norfolk Island and New Zealand.

Platyzoma/Pteris/Gleichenia

Recent treatments of *Platyzoma* have recognised a single species, which is endemic to Australia (Chinnock 1998). *Platyzoma microphyllum* has an unusual sexual system with dimorphic spores, and it has been treated in its own family. However, the molecular phylogenetic study of Schuettpelz et al. (2007) showed *Platyzoma microphyllum* to be embedded within the Pteridaceae and related to *Pteris*. Christenhusz et al. (2011) made new combinations to reflect this relationship. Unfortunately, Christenhusz made new combinations in *Pteris* for several species once placed in *Platyzoma* but which have long been accepted in other genera. Two such species were *Gleichenia alpina* and *G. dicarpa*, which were treated in *Platyzoma* in 1827 (presumably on account of sharing pouched pinnules). The replacement name of *Pteris platyzoma* (for *G. alpina*) and new combination of *Pteris dicarpa* have clearly been made in error and are superfluous; however, they are now a permanent part of the taxonomic synonymy for these species. *Gleichenia alpina* and *G. dicarpa* are appropriately classified in *Gleichenia*, and are only very distantly related to *Pteris*.

Miscellaneous

Christenhusz et al. (2011) recognised the Cystopteridaceae (including *Cystopteris*) and the Athyriaceae (including *Athyrium*, *Deparia*, and *Diplazium*) in contrast to the broadly circumscribed Woodsiaceae of Smith et al. (2006). Similarly, Christenhusz et al. (2011) segregated *Nephrolepis* in its own family (Nephrolepidaceae) instead of placing it in the Lomariopsidaceae like Smith et al. (2006). In both cases, both treatments are defendable because of a lack of strong evidence either way.

The scientific names and family-level classification for New Zealand's ferns as used by Te Papa are available from: http://collections.tepapa.govt.nz/Theme.aspx?irn=3003. This will be updated periodically. Comments are welcome.

Acknowledgements
Thanks to Patrick Brownsey and Barbara Parris for discussion and comments.

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Wikström N, Kenrick P, Chase M (1999) Epiphytism and terrestrialization in tropical *Huperzia* (Lycopodiaceae). *Plant Systematics and Evolution* 218: 221-243.

Table 1. New names provided by Christenhusz et al. (2011) that affect New Zealand species.

Name in prior use	New name provided by Christenhusz et al. (2011)	New name adopted by Te Papa?
Doodia aspera R.Br.	*Blechnum neohollandicum* Christenh. (*non Blechnum asperum* (Klotzsch) J.W.Sturm)	No.
Doodia australis (Parris) Parris	*Blechnum parrisii* Christenh. (*non B. australe* L.)	No.
Doodia mollis Parris	*Blechnum molle* (Parris) Christenh.	No.
Doodia squarrosa Colenso	*Blechnum zeelandicum* Christenh. (*non B. squarrosum* Gaudich.)	No.
Gleichenia alpina R.Br.	*Pteris platyzoma* Christenh. (*non Pteris alpina* Field)	No. Made in error.
Gleichenia dicarpa R.Br.	*Pteris dicarpa* (R.Br.) Christenh.	No. Made in error.
Phylloglossum drummondii Kunze	*Huperzia drummondii* Christenh. & H.Schneid.	No, for now.

THESES

- **University of Waikato Botanical Theses 2005-2010**

PhD

Anandasayanan, Manickavasagar (2006): Isolation and characterization of an RNA Polymerase III encoded gene of *Pinus radiata* and its use in pine transformation. Ph.D. Dissertation, University of Waikato, Hamilton. 224 pp.

The aim of this study was to isolate and validate pine promoters that can be used in pine transformation. Heterologous sequence information was used to screen the pine genome or its transcriptome for orthologs with desirable expression features.

Beard, Catherine M (2006): Physiological constraints on the latitudinal distribution of the mangrove *Avicennia marina* (Forsk.) Vierh subsp. *australasica* (Walp.) J. Everett in New Zealand. Ph.D. Dissertation, University of Waikato, Hamilton. 203 pp.
A series of investigations of frost tolerance, leaf gas exchange, stomatal conductance, chlorophyll *a* fluorescence, water relations and stable carbon isotope analyses of the New Zealand species *Avicennia marina* were undertaken to characterise frost tolerance limits and photosynthetic performance under normal and stressed conditions.

Stephens, Jonathan M (2006): The factors responsible for the varying levels of UMF® in mānuka (*Leptospermum scoparium*) honey. Ph.D. Dissertation, University of Waikato, Hamilton. 268 pp.
The variability in the level of the non-peroxide antibacterial component (UMF®) of mānuka honey produced in New Zealand was studied. A field analysis confirmed considerable variability existed in the honeys, and a number of hypotheses to explain this variability were proposed and examined.

Clarkson, Beverley R (2005): Restiad bog development and nutrient dynamics of the dominant species. Ph.D. Dissertation, University of Waikato, Hamilton. 117 pp.
Vegetation and peat in lowland restiad (dominated by Restionaceae) raised bogs on North Island (Waikato region) and Chatham Island, New Zealand, were sampled to investigate the main environmental controls of pattern and change.

MSc.

Coleman, Emma J (2010): Mechanisms of interference between kahikatea and grey willow in the Waikato. M.Sc.Thesis, University of Waikato, Hamilton. 100 pp.
Research was undertaken to determine the nature of the coexistence between kahikatea and grey willow in the Waikato Ecological Region. Specifically, whether grey willow inhibits recruitment of kahikatea and if anthropogenic disturbance influences this interaction.

Trivedi, Pathik D (2010): Aspects of biology of the weed of arable crops broom corn millet (*Panicum miliaceum* L.). M.Sc. Thesis, University of Waikato, Hamilton. 135 pp.
This thesis described aspects of the biology of broom corn millet. Experiments were designed to understand the conditions under which broom corn millet is most likely to affect New Zealand corn and maize crop growth.

Weavers, Graeme M (2010): Ecological, genetic and cultural status of *Solanum aviculare*, poroporo (Solanaceae). M.Sc. Thesis, University of Waikato, Hamilton. 198 pp.
This research documented the successional role, regeneration dynamics, morphological characteristics, genetic diversity and cultural and conservation status of *Solanum aviculare*. Recommendations were made to assist in the conservation and cultural restoration of this species.

Wilcox, Fiona J (2010): Vegetation recovery and management of kahikatea (*Dacrycarpus dacrydioides*)-dominated forest remnants in the Waikato Region. M.Sc. Thesis, University of Waikato, Hamilton. 120 pp.
The principal aim of this study was to determine whether fencing alone is a sufficient management tool for facilitating the recovery and persistence of indigenous flora in kahikatea-dominated forest patches in the Waikato region.

Carrodus, Susan K (2009): Identification and the role of hybridisation in New Zealand *Pittosporum*. M.Sc. Thesis, University of Waikato, Hamilton. 150 pp.
This study aimed to identify whether *Pittosporum turneri* is derived from hybridisation between a divaricating shrub (*P. divaricatum*) and a non-divaricating tree (*P. colensoi*), and to improve resolution of relationships among very closely related species within the genus *Pittosporum*.

Kapa, Mieke (2009): Ethnobotany, germination and growth of *Eleocharis sphacelata*. M.Sc. Thesis, University of Waikato, Hamilton. 138 pp.
To assist *Eleocharis sphacelata* revegetation efforts, research recorded traditional ecological knowledge held by users, determined best methodologies for germination of seed, and established techniques for improved transfer of juvenile plantlets.

Pudney, Kemble (2009): The autecology of *Lonicera japonica* in a restoration context. M.Sc. Thesis, University of Waikato, Hamilton. 113 pp.
This thesis concerned the autecology of *Lonicera japonica* in relation to ecological restoration in Hamilton. It addressed the place of *L. japonica* in the plant community, its reproduction and spread, and its impacts on other plants.

Fraser, Elizabeth A (2008): Population ecology of *Thelymitra matthewsii* Cheeseman, Orchidaceae, in northern New Zealand. M.Sc. Thesis, University of Waikato, Hamilton. 156 pp.
The uncommon New Zealand terrestrial orchid, *Thelymitra matthewsii* Cheeseman, was studied to increase knowledge of the species life cycle, morphology and ecology, in an effort to enhance future conservation management for the species.

Mandemaker, Andries J (2007): Winter leaf yellowing in 'Hass' avocado. M.Sc. Thesis, University of Waikato, Hamilton. 115 pp.
The focus of this research was to determine the underlying causes of yellowing in 'Hass' avocado leaves during winter. Information on this phenomenon may assist in increasing New Zealand crop yields, therefore maximising grower returns.

Bader, Martin (2006): Tree ferns – ancient survival artists. Ecophysiological adaptations of *Cyathea dealbata* and *Dicksonia squarrosa* with particular regard to light. M.Sc. Thesis, University of Waikato, Hamilton. 151 pp.
Photosynthetic gas exchange, chlorophyll *a* fluorescence and related leaf traits of the tree ferns *Cyathea dealbata* and *Dicksonia squarrosa* were investigated in order to gain an ecophysiological understanding of their adaptability to contrasting light environments.

Crawford, Naomi J (2006): Species delimitations of the Pacific genus *Pritchardia* (Arecaceae) as estimated by molecular markers. M.Sc. Thesis, University of Waikato, Hamilton. 174 pp.
A biogeographic model using the Pacific palm genus *Pritchardia* was used to infer possible dispersal events between isolated island biotas in the Pacific and within the Hawaiian Islands. Relationships within and among *Pritchardia* species were examined to determine the main speciation processes occurring.

Hailes, Sarah F (2006): Contribution of seagrass (*Zostera muelleri*) to estuarine food webs revealed by carbon and nitrogen stable isotope analysis. M.Sc. Thesis, University of Waikato, Hamilton. 104 pp.
To assess the importance of seagrass to secondary production, a dual carbon and nitrogen stable isotope study was conducted using potential food sources and selected macro-invertebrate consumers at four study sites in Raglan, Tauranga and Whangapoua Harbours.

Mackay, D Bruce (2006): Ecology of restored gully forest patches in Hamilton Ecological District. M.Sc. Thesis, University of Waikato, Hamilton. 138 pp.
Research was carried out to evaluate the restoration efforts undertaken around 20 years ago to restore gully and bush remnants in the Hamilton Ecological District. Factors affecting the ecological failure or success of the restoration plantings were investigated.

Van den Bosch, Esther (2006): Aspects of the ecology and control of *Solanum mauritianum* (Woolly Nightshade). M.Sc. Thesis, University of Waikato, Hamilton. 163 pp.
This thesis presents research on *Solanum mauritianum* Scopoli. population control using herbicides, and the regeneration of the surrounding habitat. The allelochemical adaptation of *S. mauritianum* is also investigated along with the species population dynamics.

Wallace, Ian (2006): Ecology/Population dynamics of Californian thistle (*Cirsium arvense*) in a Waikato pasture environment. M.Sc. Thesis, University of Waikato, Hamilton. 110 pp.
Research was undertaken to investigate the reproductive and seed biology of the tall herbaceous weed *Cirsium arvense*, to better understand its population dynamics and aid development of a best management strategy for *C. arvense* infestations.

Cornes, Toni S (2005): Composition, dynamics and condition of indigenous forest in the Raglan Ecological District. M.Sc. Thesis, University of Waikato, Hamilton. 106 pp.
Twenty three indigenous forest patches within Raglan Ecological District were sampled using thirty two 20m x 20m vegetation sampling plots. Forest condition, composition and dynamics were compared in relation to bioclimatic zone, management regime and landform type.

Grove, Elizabeth (2005): Ecology and conservation of *Melicytus* aff. *alpinus* Violaceae in the Central North Island. M.Sc. Thesis, University of Waikato, Hamilton. 112 pp.
Research was undertaken to evaluate the demographic status of, and threats to, taxonomically indeterminate *Melicytus* aff. *alpinus* "Rangipo" in the central North Island. Reproductive characters and the impacts of browsing by introduced animals have been experimentally investigated to determine their comparative contribution to regenerative failure of the taxon.

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BIOGRAPHY / BIBLIOGRAPHY

- **Biographical sketch – Stephenson Percy Smith (1840-1922)**

Val Smith, 80 Mill Road, New Plymouth 4310.

Stephenson Percy Smith was born at Beccles, Suffolk, England, on 11 June 1840, the eldest son of John Stephenson Smith, a timber and corn merchant and later a civil servant, and his wife Hanna Hursthouse. Persuaded by Hannah's brother, Charles Hursthouse, who had published *An account of the New Plymouth settlement,* the family of eight emigrated on the New Zealand Company ship *Pekin,* and arrived in Wellington on 26 December 1849. John Stephenson Smith travelled overland to New Plymouth, and the rest of the family joined him in February 1850.

Percy went to school at New Plymouth and then Omata, leaving when he was 14 to help on the family farm. The outdoors suited him; he was keenly interested in the local flora and fauna, and he took painting lessons from the landscape artist John Gully, who had taken up land nearby. In February 1855 he joined the provincial survey department as a cadet under Octavius Carrington, helping to subdivide the land around the New Plymouth settlement, and in his spare time he made long and rigorous exploratory trips, mainly on foot. During his long career he carried out surveys of the Chatham Islands and the greater part of the North Island, and was promoted through the ranks of the civil service, to become Surveyor-General in 1889.

Streblus smithii

In August 1887 Smith was a member of the official party sent to the Kermadec Islands with Captain Fairchild on the *Stella*, for the formal annexation of the group to New Zealand. On the return voyage he and Thomas Cheeseman were able to spend a few hours ashore on the main island of the Three Kings group; Cheeseman subsequently dedicated a "singular" new plant that he

had discovered there, *Paratrophis smithii*, to his fellow traveller, Mr Percy Smith.

Smith was familiar with the Maori language. In addition to his surveying duties, he collected and recorded information about the traditional history and culture of the Maori people, and after his retirement in 1900 was able to devote himself full-time to this work. In 1892, he co-founded the Polynesian Society and journal, and was its chief contributor for thirty years. He also published a large number of major works, including the monumental *History and Traditions of the Maoris of the West Coast, North Island* (1910). He was a corresponding member of four prestigious overseas organisations, and in 1920 was awarded the Hector Medal and Prize by the New Zealand Institute for his research in Polynesian ethnology.

In Auckland on a three-year transfer, Percy Smith married Mary Anne Crompton, the daughter of W M Crompton, a Taranaki editor, schoolmaster and provincial representative, on 23 April 1863; they had four children. He and his family lived in Auckland again, from 1871 until his retirement, when he returned to New Plymouth. He remained active in government affairs, however, and in 1901 was sent to Niue for five months to help draft a constitution after the island's annexation to New Zealand. He also served on many local bodies, including the Recreation Grounds (Pukekura Park) Board. Appropriately, cultivated specimens of the plant named after him are grown in the park today. Stephenson Percy Smith died at *Matai-moana,* his home near the racecourse, on 19 April 1922, eleven years after the death of his wife.

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Streblus smithii **Moraceae**

Streblus (Greek *streblos:* twisted, referring to the contorted branches of some of the species) is a genus of trees or shrubs with milky juice and alternate leaves, found from Madagascar, Southeast Asia and Malaysia to eastern Australia and the Pacific Islands. Three species are endemic to New Zealand.

Previously referred to as *Paratrophis smithii, Streblus smithii* is a shrub or small tree up to 5 metres tall, occurring naturally only on the Three Kings. It has slender zigzag branches, with corky lenticels in the bark, which exudes a thick white sap when cut. The large leaves are dark green, glossy and leathery, with distinct venation. Male and female flower spikes are on separate plants, solitary or in pairs, the male spikes up to 14 cm long and female up to 4 cm long. The drupes, about 9 mm in diameter, are bright red.

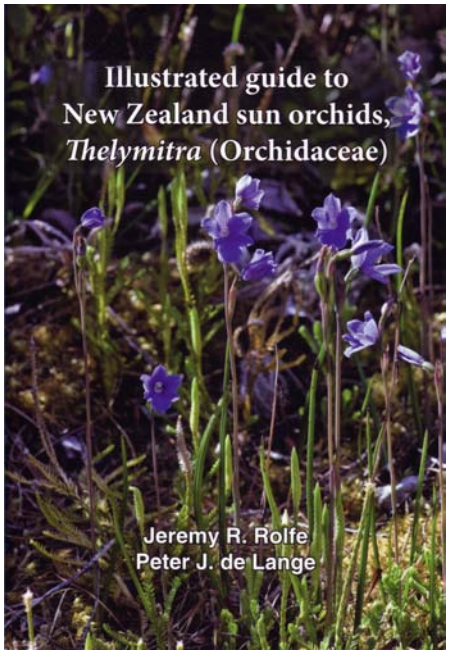
PUBLICATIONS

- **Book Review**

Review of "Illustrated guide to New Zealand sun orchids, *Thelymitra* (Orchidaceae)". J.R. Rolfe & P.J. de Lange (2010) Published by Jeremy Rolfe, Lower Hutt. 64 pp, NZ$25

Reviewed by Murray Dawson

Sun orchids belong to the genus *Thelymitra* and are so-named because they typically open their flowers on hot sunny days. Their showy flowers range in colour from white to pink to dark blue and may also be spotted or striped. *Thelymitra* are found throughout New Zealand commonly in open sites from coastal to subalpine environments.



Jeremy Rolfe and Peter de Lange are two authors from the Department of Conservation who have again teamed up to write a book on this genus. Previous collaborations include *Wild Orchids of the Lower North Island* (reviewed in the *New Zealand Garden Journal*, 2008, Vol. 11(1): 32–33), which provided the impetus for this current book, and the recent *Threatened Plants of New Zealand* (reviewed in the *New Zealand Garden Journal*, 2010, Vol. 13(1): 31–32). For an *Illustrated guide to New Zealand sun orchids*, Jeremy Rolfe provided the photographs, layout and introductory text and Peter de Lange wrote the descriptions.

This new work is a welcome addition to the growing body of guidebooks on New Zealand native orchids (e.g., de Lange et al., 2007; Scanlen and St George, 2010; St George, 1999; St George et al., 2006). Unlike previous titles, this book concentrates on the one genus, *Thelymitra*, and delivers a useful and easy to use guide for their identification.

The Introduction (p. 1) explains that *Thelymitra* is a taxonomically complex genus (like many other native orchids) and comprises some 100 species (mainly in Australasia), with eight species endemic to New Zealand.

As discussed in the taxonomy section (pp. 2–5), the authors accept 12 endemic and indigenous species (*Thelymitra aemula*, *T. carnea*, *T. colensoi*, *T. cyanea*, *T. formosa*, *T. hatchii*, *T. malvina*, *T. matthewsii*, *T. nervosa*, *T. pulchella*, *T. sanscilia* and *T. tholiformis*), two species aggregates (*T. longifolia* agg. and *T. pauciflora* agg.), *T*. aff. *ixioides* and the hybrid *T*. ×*dentata*. Additional taxa (*T*. aff. *longifolia* "Whakapapa", *T*. "rough leaf", *T*. aff. *pauciflora* "Ahipara", *T*. aff. *pauciflora* "Darkie" and *T*. cf. *brevifolia*) with no formal taxonomic status are excluded from the identification key but illustrated in the notes and photosets. The relatively conservative approach of the authors is fully justifiable in lieu of urgently needed taxonomic research to resolve the status of the numerous informal (tag-named) orchid taxa in New Zealand.

Following pages discuss similar orchid genera (p. 5), flower structure (pp. 6–7) and stem bracts (p. 7). These pages provide a concise but informative preamble. For example, the structure of *Thelymitra* flowers is an important diagnostic character and is nicely explained and illustrated.

The key to New Zealand *Thelymitra* (pp. 8–18) is a pictorially-based adaptation of the dichotomous identification key originally published in the *Flora of New Zealand*, Vol. II (Moore, 1970). For the non-expert trying to identify a sun orchid, it is a great help to see images of what the characters actually look like, and these complement the specialised orchid terminology.

The book then divides each species into two sections. The first (pp. 19–43) contains photosets with short text and captions and the second has descriptions (pp. 44–55). For keeping all of the images and all of the descriptions together, I think that it was a valid decision to organise the content this way, regardless of the need to flick between the two sections. However, this separation may have resulted in a few inadvertent contradictions between the captions and the descriptions. For example, the *Thelymitra colensoi* caption (p. 21) states "Flowers 1–4 per stem" whereas the description (p. 45) incorrectly states "Flowers 1–7". Similarly, the *T*. "rough leaf" caption (p. 29) states "up to 5 flowers…" but the description (p. 55) more correctly states "Flowers 1–8".

The photo section contains excellent images that are a credit to Jeremy Rolfe, the main photographer; images contributed by Kevin Matthews are equally impressive. There are about 130 colour photos that provide a tremendously useful guide for identifying *Thelymitra*. Remarkably, Jeremy Rolfe's images have been taken especially for this book; none are shared with *Wild orchids of the lower North Island* (de Lange et al., 2007).

Another strength of this book is the comprehensive descriptions prepared by Peter de Lange. Guidebooks by other authors all too often summarise (to the point of trivialisation) descriptions already published in floras. Not so for an *Illustrated guide to New Zealand sun orchids*. A close comparison of the descriptions in this book reveals that there are a lot of new character measurements and observations not found in the *Flora of New Zealand*, Vol. II (Moore, 1970) or in the other guidebooks that include native *Thelymitra*. This is painstaking and detailed work and provides a valuable contribution to *Thelymitra* taxonomy. Very similar descriptions appear on the New Zealand Plant Conservation Network website (www.nzpcn.org.nz). These were also prepared by Peter de Lange (pers. comm.) but updated for the book so the drafts have diverged with a few differences in the quantitative characters.

The book concludes with a glossary (p. 56) and references (p. 57); both are concise rather than extensive to appeal to a wide readership. Although I am biased, the authors could perhaps have also referenced my paper (Dawson et al., 2007) which updates some of Molloy and Dawson's (1998) discussion of hybridism and amphidiploidy in *Thelymitra*. Amphidiploidy (or allopolyploidy as it is also known) is chromosome doubling of often sterile hybrids to produce fertile progeny. This has been an important process in the evolution of *Thelymitra* and is an interesting story barely mentioned in the book. The authors have perhaps wisely refrained from digressions such as this and have kept the guidebook brief and focussed on identification. I also noticed that the authors have not used common names for *Thelymitra* (unlike their earlier book; de Lange et al., 2007).

I recommend an *Illustrated guide to New Zealand sun orchids*; it is the best reference available for identifying this fascinating group of plants.

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Available from Jeremy Rolfe (co-author and publisher) and the New Zealand Plant Conservation Network (www.nzpcn.org.nz).

- **Publications Received**

Manawatu Botanical Society Newsletter no. 43 March 2011 Trip report for Rangiwahia scenic reserves, *Hypericum*, *Dactylanthus*, book review, upcoming meetings and trips.

 Upcoming events, notices, joint Wellington and Otago Botanical Societies summer camp, *Hebejeebie birleyi*, *Parahebe canascens*, new records for Otago, *Raukaua anomalus*, meeting and trip reports.