



TRILEPIDEA

Newsletter of the New Zealand Plant Conservation Network

No. 174

May 2018

Deadline for next issue:
Friday 15 June 2018

SUBMIT AN ARTICLE TO THE NEWSLETTER

Contributions are welcome to the newsletter at any time. The closing date for articles for each issue is approximately the 15th of each month.

Articles may be edited and used in the newsletter and/or on the website news page.

The Network will publish almost any article about plants and plant conservation with a particular focus on the plant life of New Zealand and Oceania.

Please send news items or event information to events@nzpcn.org.nz

Postal address:
c/- 160 Wilton Road
Wilton
Wellington 6012
NEW ZEALAND

PLANT OF THE MONTH, p. 2



Kunzea tenuicaulis.
Photo: Jeremy Rolfe.

Farmer being sued over native plant destruction

On May 1 it was reported in 'The Press', on 'Stuff' (www.stuff.co.nz/environment/103507786/court-action-over-alleged-endangered-plant-destruction) and on Radio New Zealand that Forest and Bird is taking a Canterbury farmer to the Environment Court. Based on those reports, the following news item appeared on the Network website.



A Canterbury farmer has laid waste to a threatened native shrub, knocking out a third of its national population in one fell swoop. Once abundant along the east coast, shrubby tororaro, *Muehlenbeckia astonii*, is now down to 3700 plants, most of those on private farmland on Kaitorete Spit near Banks Peninsula. Forest and Bird's Jen Miller said farmer Brent Thomas sprayed the shrubs with a herbicide before the land was sown with oats for winter feed. About 1000 shrubs were lost.

Muehlenbeckia astonii. Photo: Jeremy Rolfe.

Forest and Bird's Jen Miller said farmer Brent Thomas sprayed the shrubs with a herbicide before the land was sown with oats for winter feed. About 1000 shrubs were lost.

"And so we've sought an enforcement order which is effectively seeking that the owner does no more work and attempts some rehabilitation of the site... our advice is it's possible but will take many decades", said Miller, who claimed that the damage was done within a month of Mr Thomas buying the farm earlier this year. "It's hugely disappointing this has never been purchased by perhaps the Department of Conservation or Environment Canterbury... it's too special, it's too wonderful and important nationally for this kind of thing to happen to it."

Landcare Research ecologist, Susan Walker, said the shrub was important in Māori medicine and considered a taonga. "It is a slow growing hardy plant that had managed to survive for thousands of years but had been pushed to the edge by intensive farming on the Canterbury Plains," she said. "[It's] tragic really, especially given the significance of this population and the state it's in and you know you sort of think, well how was this allowed to happen, surely this was a population that should have been an absolute priority for protection on private land."

Department of Conservation manager, Andy Thompson, said an attempt was made to purchase the land when it went on the market in February, but it had already been sold. He said that when we spoke to the new owner in March, just a few weeks later, 1000 of the shrubs had already been destroyed. Mr Thompson accepted assurances from the farmer that he did not realise how rare and important the shrubs were. "I was sitting beside him when we showed him the maps of where the plants were and if I hadn't seen his jaw drop myself I would probably be sceptical of that reaction but I have to say he's been quite genuine in his concern for the plants and also about what we're trying to achieve in the future."

PLANT OF THE MONTH – *KUNZEA TENUICAULIS*



Kunzea tenuicaulis. Photo: Jeremy Rolfe.

The plant of the month for May is *Kunzea tenuicaulis* or 'geothermal kanuka', one of 10 *Kunzea* species endemic to New Zealand. As the common name suggests, the stronghold for *K. tenuicaulis* is the geothermal area of the central North Island, where it can be found in active geothermal fields from Kawarau to southern Lake Taupo. The species generally lives in warm geothermal soil within the gas zone of active vents, where it forms thick shrubland or low forest, with the trunks often being covered in brightly coloured lichens. When close to vents, it forms low shrubby clumps, but increases in size slightly

further away and becomes a small stunted tree in sheltered areas. The leaves are very small and alternate, and have a pungent menthol odour when crushed, a characteristic of all species in the genus. The small white flowers are borne in clusters at the end of the branchlets and can be seen from August to January. Like other members of the Myrtaceae, *K. tenuicaulis* exhibits flower masting behaviour, where the species flowers more prolifically in some years than others, probably because of temperature differentials across the successive seasons in the preceding year. This species is similar in appearance to most other *Kunzea* species, but can be distinguished by its early flowering, grey bark that flakes off in irregular shards, fine twiggly branches and the fact that it is always associated with active vents.

Kunzea tenuicaulis is an endemic with a current conservation status of At Risk—Naturally Uncommon, because it has a restricted distributional range, with very limited suitable habitat in the North Island. The species is genetically the most distinct of any of the New Zealand *Kunzea* species (de Lange, 2014)

It does not have many immediate threats. A potential threat may be hybridisation with other *Kunzea* species near urban areas, where other species are planted; this is currently known to occur. The population is spread across multiple geothermal areas, so is unlikely to be wiped out by small scale eruptions, but could be taken out by a very large eruption. The species can be easily grown from seed, and is sometimes sold in garden centres as *Kunzea ericoides* var. *microflora*.

The genus *Kunzea* is named after Gustav Kunze, a 19th century German botanist; the species epithet '*tenuicaulis*' means thin stalk, referring to the branchlets.

You can view the NZPCN website factsheet for *Kunzea tenuicaulis* at: http://www.nzpcn.org.nz/flora_details.aspx?ID=554

References

de Lange, P.J. 2014: A revision of the New Zealand *Kunzea ericoides* (Myrtaceae) complex. *Phytokeys* 40: 1–185.

DOC is now trying to buy 109 hectares from the farmer to be turned in to a reserve, protecting 1500 shrubs. Mr Thompson said it would not be possible to replant the 1000 shrubs that Mr Thomas had removed because the land had been sprayed and the species did not do well when it was transplanted from one area to another.

Forest and Bird wants to know if Mr Thomas intends to remove the 900 shrubs on the land he would continue to own once the proposed DOC purchase went through.

Mr Thomas responded to RNZ's questions through a public relations consultant, who said due to poor cell phone reception Mr Thomas was not able to give an interview. In a statement, Mr Thomas said he was horrified to find himself in this situation and was continuing to work towards reaching a collaborative long-term solution.

Royal Society Te Apārangi 2018 Leonard Cockayne Lecture

Eric Scott, NZPCN Administrator (mescott43@gmail.com)

The 2018 Leonard Cockayne Lecture is being presented by Professor Philip Hulme FRSNZ from the Bio-Protection Research Centre, Lincoln University. His address is titled 'Ornamental to Detrimental: the Invasion of New Zealand by Non-Native Plants'. In his talk, Professor Hulme presents Cockayne's belief that non-native plants would never pose a threat to our native flora and shows how mistaken that view was. In one remarkable slide (to me anyway), Professor Hulme shows that of 300 islands worldwide, New Zealand has the most introduced plants (a small consolation for South Islanders is that the North Island has more than the South). As Professor Hulme pointed out, some plants have taken up to 100 years before they have 'jumped the fence' and become established in the wild. That fact and the significant increase in introductions in the mid 20th century, mean that we face a potentially increasing problem. Professor Hulme considers ways that we might counter this threat. They include a more targeted national strategy to deal with undesirable plants that presently occur in only a few regions. He also considers other strategies involving the public and relevant industries. The talk was well presented with good images so, when the talk is being given in your city, I recommend that all interested in this major threat to our flora go along to hear this acknowledged world expert. For the next couple of venues click on the following link: <https://royalsociety.org.nz/what-we-do/supporting-teaching-and-learning/teaching-and-learning-opportunities/>

A gentle stroll to a lighthouse (and the other 7 hours

Philip Smith, O2 Landscapes (p.smith@o2landscapes.com)

As much as 7 hours of steep hill climbs and descents sounds like a recipe for marital discord, my wife and I decided that we would brave the long path to Cape Brett (Fig 1) over a weekend in April. Being from good, solid, lighthouse-keeping stock (my Irish forebears manned many southern lighthouses, including Nugget Point, Waipapa Point and Stephens Island), I have a bit of a thing for exploring our coastline's peninsulas and other protuberances. Especially when the lure of *Nestegis apetala* is on offer.

Despite having planted coastal maire (*Nestegis apetala*) in a wide array of projects and situations (from coastal peninsulas to the foot of high-rise buildings in Central Auckland), before this trip, I had never seen this attractive (and extremely useful) species in the wild. It was therefore gratifying to see so many plants of *N. apetala*



Fig. 1. Looking along the spine of Cape Brett's Peninsula.

at various points along the peninsula, including gnarled old specimens (with serpentine branching structures) (Fig. 2) and young plants recruiting within the understorey.

In early stages of the track (following an obligatory glance at *N. apetala* at Oke Bay), my attention was drawn to species of a completely different scale. The dry, kanuka-dominated woodland through which one commences the first incline from Oke Bay possesses a suite of delicate grasses and herbs, such as hedgehog grass, *Echinopogon ovatus*, and a diminutive daisy, *Lagenophora lanata*. I am always happy to encounter these kinds of ethereal habitats (whether in secondary dune forest or dry ridges), because they are so often out-competed by more aggressive exotics where fewer limits are placed on plant growth.

As with other high points in Northland, such as Whangarei Heads (where *Pseudowintera insperata* and *Pimelea acra* inhabit distinctive plant communities) or the Waima Range, the combination of altitude and a coastal location sets up the conditions for a diverse range of habitats to occur along the spine of Cape Brett. Within what seemed to me to represent the coolest forest type, *Raukaua anomalus* (a species regularly associated with cool habitats) grows in the company of *Toronia toru* and *Myrsine salicina*, and significant numbers of *Alseuosmia*—the latter carrying out its customary trick of mimicking the qualities of other species from the same habitat.

Preparation for a trip such as this normally involves perusal of distribution data from NZPCN to arm myself with some awareness of what I might encounter—although it is obviously best not to set too much store in some older records, lest it leads to frustration. In this case, I did find one of the objects of ‘data desire’, *Fuchsia procumbens*, which grows by the side of the track on one of the final hills descending eastwards towards Deep Water Cove, and I suspect that this little subshrub was more widespread in areas off the track. It was not, however, apparent (at least to me) amidst the milieu of weeds (predominantly kikuyu) that lend Deep Water Cove such a peculiar atmosphere—especially the small rock face inhabited by an especially domestic-looking grouping of begonias.

I managed to avoid sighting *Colensoa physaloides* (one of the species that was noted in NZPCN records), whether that was because of its absence or my haste in the middle sections of the track (based on our desire not to arrive at the hut after nightfall) is unknown. My apprehension regarding the benefits



Fig. 3. Monstrous brooms occupy high points of the peninsula.



Fig. 2. One of the myriad forms of *Coprosma* aff. *neglecta*; a common understorey element in both forest and shrubland.

of keeping moving was later vindicated as we approached and walked over Cape Brett itself (during daylight, I should add), where narrow sections of track fall suddenly away towards precipitous cliffs. The thought of negotiating these in the dark, which I am certain happens on a semi-regular basis (given the possibility of under-estimating this walk), does not fill me with great enthusiasm.

What did fill me with great enthusiasm, on the other hand, was the presence of monstrous native brooms (*Carmichaelia australis*) (Fig. 3) at high points where the view opens out to the southern side in the direction of Whangamumu Harbour.

Quite apart from their size, the interwoven branching structure of these specimens was noteworthy. *Helichrysum lanceolatum* is not a shrub that I regularly see in the north of the country, yet here it was tumbling down hillsides in its characteristic fashion, forming an attractive association with *Veronica* (syn. *Hebe*) *ligustrifolia* (Fig 4) and *Coprosma rhamnoides*.

As we moved into the outer (eastward) parts of the peninsula, we shifted from very much walking within the forest canopy to registering it from outside. Here, patches of diverse northern coastal forest (Fig. 5) sit amidst large tracts of the dominant mantle of kanuka, in which the vibrant green tones of coastal maire (*Nestegis apetala*), tawaroa (the northern coastal form of *Beilschmiedia tawa*) and puriri endure, in addition to good signs of regeneration. Having been itching to see coastal maire in the wild for a long time, there was no shortage of specimens to take in, both adjacent to the track and within the distant canopy. Meanwhile, on the lower slopes descending towards the seashore, whau makes an occasional appearance, whilst the northern kowhai, *Sophora chathamica* punctuates the kanuka.



Fig. 4. The pale foliage and pale lilac flowers of the shade-tolerant *Veronica ligustrifolia* inhabit the understorey of kanuka woodland.



Fig. 5. The deep green mosaic of northern coastal forest, with a composition that is now rare on the mainland.

By the time we reached the final stages of the track, I was pleased to have a clearer idea of our distance to the hut, which afforded the opportunity to observe some of the plants amidst the wind-blasted shrubland with a little more time up my sleeve. The most surprising of these was an orange-flowered form of *Parsonsia capsularis* var. *grandiflora* (Fig. 6) that winds its way through the vegetation on the southern side of Cape Brett itself.

Quite apart from the prevalence of intense pink forms of *Parsonsia capsularis* in the southern parts of the country (which I have seen in several places within Canterbury), I had read about red and orange variants of *P. capsularis* var. *grandiflora*—including Carse’s description of the colour occurring in a shade that is “red like the flesh of a pumpkin”. I’m not quite sure what this says about the state of our present-day pumpkins, as I’ve never seen one I’d call red. That, notwithstanding, this particular variation, which I would describe as an apricot hue, was an extremely interesting find; one which was manifested in several individuals that I viewed.



Fig. 6. An orange-flowered form of native jasmine growing through small trees and shrubs near Cape Brett itself.

In the wind-scoured bare ground that one passes through before climbing over the final hill to the Cape Brett lighthouse and hut, *Pimelea urvilleana* (Fig 7) grows amongst *Leucopogon fraseri*. Given the proliferation of species within recent years, a definitive statement on the identity of certain *Pimelea* spp. sometimes makes me break in a cold sweat, but its stature, stout stems and general cut of its jib fit with my experience of having planted a great deal of *P. urvilleana* in gardens and public plantings.



Fig. 7. *Pimelea urvilleana* in wind-blasted ground, growing with *Leucopogon fraseri*.

As is the case with many coastal shrublands, the bulk of this plant community consists of hummocks of compact manuka and kanuka, beneath which large numbers of *Coprosma* aff. *neglecta* (Fig. 8) form weeping mounds. Needless to say, after 6.5 hours of walking, the option of slowing down to absorb some of the plants within this area was a welcome stop. Having laboured the point about the length of the walk in (which more than justifies the effort), it is only left to say that the first day's exertions were not repeated on the return leg—wherein common sense had already prevailed, and we took the far less taxing route of a short(ish) walk back to Deep Water Cove, a leap into the ocean, and the comfort of a water taxi.



Fig. 8. One of the myriad forms of *Coprosma* aff. *neglecta*; a common understorey element in both forest and shrubland.

The Unitec Herbarium (UNITEC) reaches new milestone

Peter J. de Lange (pdelange@unitec.co.nz) and Dan J. Blanchon (dblanchon@unitec.co.nz), Department of Natural Sciences, Unitec Institute of Technology, Auckland, New Zealand

The Environment and Animal Sciences Pathway at Auckland's Mt Albert Unitec Institute of Technology campus offers a Bachelor of Applied Science. For that degree, students undertaking environmental studies are taught a range of field skills, ecology and notably taxonomy (Fig. 1). To aid with teaching field ecology and taxonomy, in 2001 the faculty started what was initially intended to be a 'small' teaching herbarium. However, student and staff research interests have seen that herbarium grow rapidly. In 2012, the herbarium was registered with Index Herbariorum with the code 'UNITEC'. In April, UNITEC accessioned its 10,000 specimen, notably a lichen, *Usnea inermis*. As UNITEC is a relatively 'new' herbarium in New Zealand we thought it would be useful to document its history, holdings and activities.



Fig. 1. Unitec students and staff undertaking field studies of mushroom diversity in a regenerating kauri (*Agathis australis*) / tanekaha (*Phyllocladus trichomanoides*) forest at Mataia, a QE II Covenant near Glorit, Kaipara. Photo: Dan Blanchon.

UNITEC Herbarium founded: 2001

Index Herbariorum: UNITEC (Registered 2012)

Staff: Dr Dan Blanchon FLS (Curator), Associate Professor Dr Peter de Lange FLS, Associate Professor Dr Mark Large FLS, Hayley Nessia, Matt McClymont.

Holdings: 10,000 specimens including 44 algae, 184 fungi, 165 liverworts, 5438 lichens, 216 mosses, 375 ferns and fern allies, 266 gymnosperms, 3312 flowering plants.

Types: *Buellia insularicola* (Holotype) (Fig. 2.), *Lecanora kohu* (Holotype) (Fig. 3), *Cladia blanchonii* (Isotype) (Fig. 4)

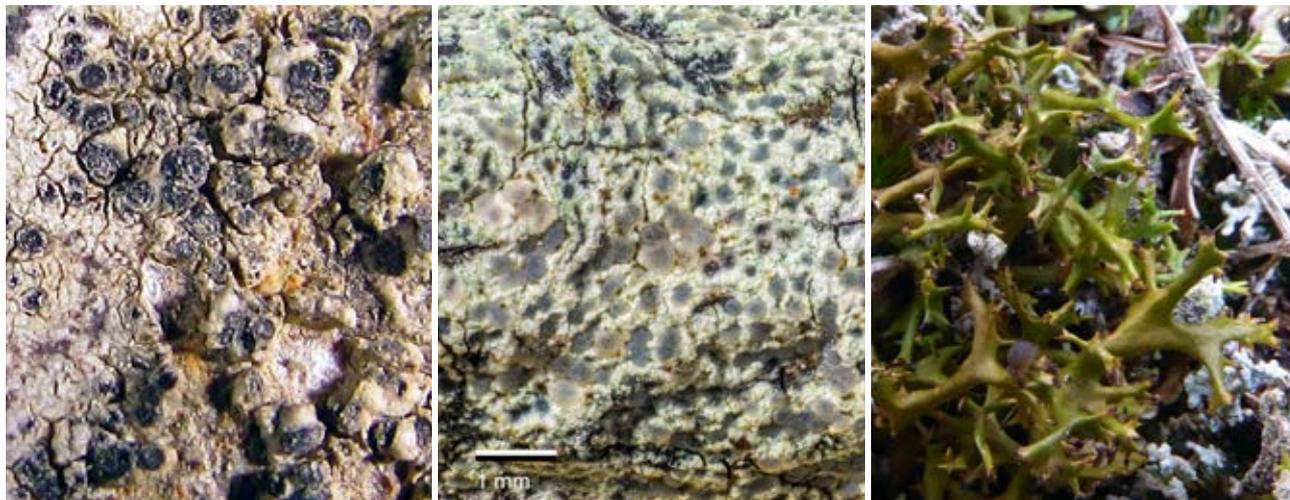


Fig. 2 (above left). *Buellia insularicola* Elix et de Lange. Image of type material from Cheeseman Island, Kermadec Islands group. Photo: John (Jack) Elix.

Fig. 3 (above centre). *Lecanora kohu* Printzen, Blanchon, Fryday et de Lange. Images from the Holotype collected from Rangitira (South East Island), Chatham Island group. Photo: Jeremy R. Rolfe.

Fig. 4 (above right). *Cladia blanchonii* Parnmen et Lumbsch in the wild, Unitec Campus. The Unitec Institute of Technology campus grounds is the type locality. Photo Peter J. de Lange.

Scope: The Flora and Lichenized Mycobiota of New Zealand. UNITEC has an emphasis on the northern part of New Zealand particularly the lichens of the Kermadec Islands, Northland, Kaipara (Mataia), Waitakere Ranges, urban Auckland, Auckland Regional Parks, Hauraki Gulf Islands (notable collections from Rangitoto, Motukaikoura and Tiritirimatangi), Waikato and Chatham Islands. Herbarium collections also reflect participation in Auckland Bioblitz (Auckland Domain, Auckland Botanical Gardens, Dingle Dell, Kepa Bush/Pourewa, Miranda, Smiths Bush, and Twin Streams (Opanuku Stream Catchment)). Invasive plants are also well represented reflecting staff research interests and the courses taught by the faculty.

The herbarium also holds DNA vouchers linked to the Applied Molecular Solutions Research Group (www.unitec.ac.nz/ams) and associated laboratory, and international lichen research consortia (PhyloRamalina, Lecanomics, Parsys).

The earliest collections are those donated collections from 1965 (Judy Nicholson, mainly South Island), with other later donations from the 1980s and 1990s, before active collecting began in 2001.

History: UNITEC was founded in 2001 by Carol Elliott (nee Lockett) and Dan Blanchon. It is a teaching and research herbarium, supporting the studies of an active lichen group, as well as ongoing investigations of invasive and native plants. Students learn herbarium specimen collection and preparation in three different courses in the Bachelor of Applied Science, and students volunteer in the herbarium to assist with accessioning and curation. The herbarium supports taxonomy education, particularly in lichenology, mycology, botany and biosecurity.

The herbarium focus on lichens was greatly encouraged by the late Dr David Galloway FLS, FRSNZ; we also contributed to its collections. Currently, the herbarium lichen collections reflect key research links with Otago University, Ngāti Whātua Ōrākei, Auckland Museum, Auckland Council, Department of Conservation, Wildland Consulting Ltd, the Berlin Botanical Gardens and Museum of Natural History, Germany; the Field Museum of Natural History, Chicago, USA; and Universidad Complutense de Madrid, Spain.

Active research linked to the herbarium includes a revision of the New Zealand members of the lichen genera *Parmotrema* and *Ramalina*, the New Zealand members of the Lobariaceae—notably the *Pseudocyphellaria crocata* complex and *Sticta*. Voucher specimens are also held from a study of the lichen diversity of New Zealand mangrove (*Avicennia marina* subsp. *australasica*) forests, and those found in Auckland Council permanent monitoring plots (both continuous forest and urban bush fragments).

Lichen checklists for the Kermadec and Chatham Islands groups are also being prepared. Outside New Zealand, Herbarium staff are also engaged with the Field Museum in research on the Cook Islands bryophytes and lichens, and New Zealand *Frullania*.

UNITEC currently does not have containment status.

Key Collectors: Peter de Lange (c. 1400 algae, bryophytes, flowering plants, fungi and lichens); Dan Blanchon (c. 1300 algae, bryophytes, flowering plants, fungi and lichens); Andrew Marshall (lichens); Carol Elliott (nee Lockett) (lichens); Carol West c. 300 lichens); Christy Reynolds (lichens); Orhan Er (lichens, vascular plants); Marley Ford (lichens, flowering plants); Jacqueline Margetts (flowering plants); Sue Wake (flowering plants); Leslie Haines (flowering plants); Neil Davies (flowering plants); Rick Kooperberg (lichens); Glenys Hayward (lichens); Jennifer Bannister (lichens); Allison Knight (lichens); Nathan Solomon (flowering plants); Jan Weaver (flowering plants); Vicki Sergeant (fungi); Hayley Nessia (fungi, lichens); Tim Martin (lichens); Robert Lücking (lichens); Bibiana Moncado (lichens); Judy Nicholson (nee MacDuff) (flowering plants); Linden Moyle (ferns).

The herbarium also holds some collections from Catherine Beard (bryophytes, lichens), John Braggins (bryophytes), David Galloway (lichens), David Houston (bryophytes, lichens), Matt Renner (bryophytes) and Matt von Konrat (bryophytes).

Recent Publications linked to UNITEC collections

- Blanchon, D.J.; P.J. de Lange; D.J. Galloway 2015: New records of *Ramalina* (Ramalinaceae, Ascomycota) for mainland New Zealand. *New Zealand Journal of Botany* 53: 192–201.
- de Lange, P.J.; D.J. Blanchon 2015: Lichen notes from the Kermadec Islands. II. *Ramalina*. *Bulletin of the Auckland Museum* 20: 171–181.
- Elix, J.; P.J. de Lange 2017: A new species and new records of buellioid lichens (Physciaceae, Ascomycota) from the Kermadec Islands. *Australasian Lichenology* 80: 41–45.
- Elix, J.A.; A. Knight; D. Blanchon 2017: New species and new records of buellioid lichens (Physciaceae, Ascomycota) from New Zealand and Tasmania. *Australasian Lichenology* 80: 46–52.
- Er, O.A.H.; C.L. Reynolds; D.J. Blanchon 2015: Additional lichen records from New Zealand 49. *Pertusaria puffina* A.W.Archer & Elix. *Australasian Lichenology* 77: 28–31.
- Hayward, G.C.; D.J. Blanchon; T. Lumbsch 2014: Molecular data support *Ramalina ovalis* as a distinct lineage (Ramalinaceae, Ascomycota). *The Lichenologist* 46: 553–561.
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- Large, M.F.; H. Nessia; E. Cameron; D. Blanchon 2017: Changes in stomatal density over time (1769–2015) in the New Zealand endemic tree *Corynocarpus laevigatus* J. R. Forst. & G. Forst. (Corynocarpaceae). *Pacific Science* 71: 319–328.
- Marshall, A.J.; D.J. Blanchon 2017: Additional lichen records from New Zealand 50. *Australasian Lichenology* 80: 58–61.
- Nessia, H.R., A.R. Dale; J.K. Perrott; N.W. Waipara; G.D. Aguilar; D.J. Blanchon 2014: Comparison of species richness and frequency cover of forest floor plants and lichens in sites invaded and uninvaded by the invasive club moss *Selaginella kraussiana* (Kunze) A. Braun. *Plant Protection Quarterly* 29: 66–70.
- Printzen, C.; D.J. Blanchon; A.M. Fryday; P.J. de Lange; D.M. Houston; J.R. Rolfe 2017: *Lecanora kohu*, a new species of *Lecanora* (lichenised Ascomycota: Lecanoraceae) from the Chatham Islands, New Zealand. *New Zealand Journal of Botany* 55: 439–451.
- Ranft, H.; B. Moncado; P.J. de Lange; R. Lücking 2018: The *Sticta filix* morphodeme (Ascomycota: Lobariaceae) in New Zealand with the newly recognized species *S. dendroides* and *S. menziesii*: Indicators of forest health in a threatened island biota? *The Lichenologist* 50:185–210.
- Reynolds, C.L.; O.A.H Er; L. Winder; D.J. Blanchon 2017: Distribution and community composition of lichens on mature mangroves (*Avicennia marina* subsp. *australasica* (Walp.) J.Everett) in New Zealand. *PLoS ONE* 12(6).
- Sparkes, J.H.; P.J. de Lange; D.J. Blanchon 2014: Notes on *Caloplaca allanii* Zahlbr. (Teloschistaceae) a poorly known West Auckland, North Island, New Zealand endemic. *New Zealand Journal of Botany* 52: 304–309.

Book Review: *New Zealand Lichens* (2018 Revision)

by Bill and Nancy Malcolm, Micro-Optics Press. 307 p. A5

Allison Knight (allison.knight.nz@gmail.com)

This is a brilliant revision, with much more depth and breadth than its title implies. Over 300 pages are packed full of surprises for anyone interested in lichens, from novice, to teacher, to expert. There are over 700 superb photographs, drawings, microscopic and even SEM images. Use of fresh material, clever stacking techniques and close-up photography makes the lichens leap off the page and reveals minute features. Clear line drawings and micrographs throw fresh light on microscopic or internal structures ranging from cross-sections of fertile and non-fertile material, green algae and cyanobacteria, sexual spores and ascus tips, asexual campylidia and conidiophore reproductive structures and much more, such is the wide range and depth of detail. Yet all this complexity of life form is written about in such an entertaining and accessible style that any interested reader could follow it.

A brief foreword and introduction give a first taste of the essence of the lichen lifestyle, the richness of New Zealand's over 2000 species of lichens and the value and uses of lichens worldwide. The next 200-odd pages are divided into 22 wide-ranging sections full of fascinating detail. This is relevant to anyone anywhere in the world keen to know more about lichens. That the illustrations are mainly of New Zealand examples is largely irrelevant.

The quirky section headings cry out to be explored further. '*Home is almost anywhere*' explores the reasons why lichens can live in a greater variety of places than any plants, and why New Zealand has so many leaf-living lichens, typically found only in the tropics. '*You scratch my back and I'll scratch yours*' delves into the complexity of the lichen symbiosis, including the recent discovery of a basidiomycete yeast that rocked the established view of lichen species each containing one unique fungus, nearly always an ascomycete. The accompanying yeast appears to play an important role in the cortex of Parmeliaceae, one of the largest families of macro-lichens worldwide, yet it remained undetected for over 140 years. '*Origins*' covers 10 pages on the evolution of the lichen lifestyle, whereas '*Dog-eat-dog competition*' adds another four pages on how species evolve. '*Growth forms*' is self-explanatory; the main forms are illustrated over 18 pages, with '*Some exceptions*' devoting another 10 pages to deviations from the three core growth forms.

Two sections on '*Light-trappers*' deal with the green algal partners and the cyanobacteria; '*Getting the best of both worlds*' devotes five pages to the cosy arrangements of tripartite lichens, which contain both green algae and cyanobacteria. '*Gas exchange*' describes and illustrates various adaptations developed to aid the diffusion of gases essential for photosynthesis and notes their taxonomic importance. '*Drying out*' investigates the miraculous ability of lichens to survive levels of desiccation that would kill other plants, and how this contributes to astonishing longevity and ability to live in extreme conditions. '*Identity crisis*' considers the conundrum that arises when a single species of lichen can associate predominantly with either a green alga or with a cyanobacterium and sometimes switches between the two forms.

The long-standing mystery of how the various partners in a symbiotic relationship can come together over and over again to form a consistently recognisable 'species' deserves to be thoroughly investigated and the book does this admirably. Fully 30 pages are devoted to sexual reproduction, another four pages to unravelling the dispersal and relationships of consistently sterile lichens, followed by sizeable sections on asexual spores and on vegetative reproduction. '*Lichen substances*' turn out to be the myriads of unique chemicals that lichens are capable of manufacturing and this 10-page section discusses the biological intricacies and taxonomic implications of the major substances. '*Spot tests*' continues the chemical theme for another 10 pages, showing how simple tests can help discriminate between lichen species and explaining the chemistry behind them.

Have you ever wondered what uses lichens have? The 18 pages on '*Uses worldwide, past and present*' offer plenty of answers. '*Braving the elements*' is not quite the response to a hostile environment that you might first think. Lichens have an astonishing capacity to concentrate and survive levels of radioactivity, copper, iron, zinc, sulphur and the gas form of nitrogen that would be toxic to other

organisms. 'Pollution damage' discusses lichens as sensitive indicators of pollution and elaborates on the remarkable rise and fall of populations of acid-tolerant *Lecanora conizaeoides*. The challenge and history of giving binomial species names to a disparate collection of organisms from different kingdoms that live together in symbiosis is treated superbly in 'Lichen names', the last of the 22 sections.

The image gallery of New Zealand lichens that follows is further testimony to Bill's consummate skill as a photographer and artist. Over 300 species are displayed in colour in the next 79 pages. These are a godsend to New Zealand lichenologists but should also have broader appeal. The New Zealand lichen flora contains a good sprinkling of cosmopolitan lichens as well as many with bipolar, subtropical or temperate distributions. Even the endemic species are mostly in genera that occur overseas. A very thorough index covering 13 pages helpfully gives both old and new names and, to round it all off, there are two pages of further reading to further whet the appetite.

Thoroughly recommended—a wonderful book with something for every biologist to marvel over. For purchasing details, see the flyer at the end of this newsletter.

UPCOMING EVENTS

The Global Partnership for Plant Conservation Conference

Conference: *Supporting the Worldwide Implementation of the Global Strategy for Plant Conservation.* **Location:** Cape Town, South Africa. **Date:** 28–30 August, 2018.

Register now at: www.sanbi.org/events/global-partnership-plant-conservation-conference

International Federation of Landscape Architects 55th World Congress

Location: Singapore at the Sands Expo and Convention Centre. **Date:** 15–21 July 2018. In conjunction with the Singapore Garden Festival. **Themes:** 'Biophilic City; Smart Nation; Future Resilience.

To register: <http://www.ifla2018.com/conference-registration>

12th Australian Plant Conservation Conference

Hosted by: Centre for Australian National Biodiversity Research (CANBR) at CSIRO. **Venue:** CSIRO Discovery at the Black Mountain Science and Innovation Park, Canberra. **Date:** 12–16 Nov 2018.

- presentations on the latest findings relevant to plant conservation and native vegetation rehabilitation
 - practical workshops on ecologically sound techniques
 - field trips demonstrating plant conservation in action
 - social activities to enhance networking.
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More details: to be provided in the near future, so stay tuned at www.anpc.asn.au/conferences/2018.

John Child Annual Bryophyte and Lichen Workshop

Date: 8–13 November 2018. **Location:** Pureora Forest Lodge. Open anyone and everyone with an interest in the mosses, liverworts, and lichens of New Zealand, from beginner to expert. **Accommodation:** Pureora Forest Lodge (<http://www.pureoraforestlodge.org.nz/facilities.html>), other possibilities at Pureora and in the surrounding area. **Bring:** all necessary field gear. **Cost:** approximately \$300. **Tom Moss Award:** open to any student studying any aspect of Australasian bryophytes and/or lichens; see <http://www.wellingtonbotsoc.org.nz/awards/moss.html> for details. **Estimate of numbers:** If you are interested in attending the workshop this year, please email Dhahara Ranatunga (dranatunga@aucklandmuseum.com) as soon as possible.

Organisers: Thomas Emmitt, email: temmitt@doc.govt.nz, and Dhahara Ranatunga, email: dranatunga@aucklandmuseum.com.

Auckland Botanical Society

Meeting: Wednesday 6 June at 7.30 p.m. for a talk by Jack Hobbs titled 'Wildflowers of Siberia and Mongolia' followed by a book auction. **Venue:** Unitec Room 115-2017.

Contact: Maureen Young, email: youngmaureen@xtra.co.nz.

Field trip: Saturday 16 June to Waterfall Farm, Dome Valley.
Leader: Leslie Haines.

Contact: Maureen Young, email: youngmaureen@xtra.co.nz

Kaipatiki Project

Field trip: Saturday 23 June, 10.00 a.m. to 12.00 midday. **Location:** Pa Harakeke, Merrill Place, off Eskdale Road, Birkdale. Come and learn about the Harakeke and celebrate Matariki. Kai provided.

Register: office@kaipatiki.org.nz.

Waikato Botanical Society

Meeting: Monday 18 June at 5.30 p.m. for the Winter Talk Series.
Venue: to be confirmed.

Contact: Linda Watson, email: watsonlinda092@gmail.com

Field trip: Saturday 23 June to Lake Koromatua and Lake Cameron. **Meet:** at 10.00 a.m. at Melville High School, Collins Road.

Leader: Kerry Jones,
ph: 027 747 0733;
email: km8j1s@gmail.com

Rotorua Botanical Society

Field trip: Sunday 10 June to the Okataina Scenic Reserve Bushwalk. **Meet:** the car park, Rotorua, at 8.30 a.m. or 9.00 a.m. at the entrance to the Outdoor Education Centre. **Grade:** medium with hopefully only a little hill climbing but off-track.

Leader: John Hobbs,
ph: 07 348 6620;
email: julfoxfoxhot@gmail.com.

Meeting: Monday 18 June at 6.00 p.m. for the Annual General Meeting followed by a talk by Richard Pender titled 'The Hawaiian Flora: Biogeography, Adaptive Radiation, and Adaptive Shifts'.

Venue: DOC Rotorua Office, 99 Sala St, Rotorua, go in Scion (Forest Research) north entrance and turn left before the locked gates.

Field trip: Sunday 1 July to Waimangu Scenic Reserve. **Meet:** the car park, Rotorua, at 8.30 a.m. or at Waimangu Visitor Centre 9.00 a.m. **Grade:** easy. **Cost:** locals rate, \$19.00 pp.

Leader: Martin Pearce,
ph: 07 349 1929;
email: mpearce21@xtra.co.nz

Combined Wanganui Botanical Group, OSNZ and Forest & Bird

Meeting: Tuesday 19 June at 7.30 p.m. for a talk by Dr Phil Garnock-Jones titled 'Native Flowers: Up Close and Personal'.

Venue: Davis Lecture Theatre, Watt St.

Wellington Botanical Society

Field trip: Saturday 9 June to Paewakawaka Reserve and Oku St Reserve, Island Bay (NOT Queen's Birthday Weekend). **Meet:** 9.30 a.m. at 46a Derwent St entrance to reserve or meet for lunch at Oku St Reserve, Oku St entrance, at 12.30 p.m.

Co-leaders: Chris Horne, ph: 04 475 7025, and Karin Sievwright, ph: 027 404 6975.

Meeting: Monday 18 June at 7.30 p.m. for a talk by Jan Clayton-Greene titled 'A Region Redesigned – South Marlborough; Flora Response to the Kaikoura Earthquake.'

Venue: Victoria University Lecture Theatre M101, ground floor Murphy Building, west side of Kelburn Parade; enter building off Kelburn Parade about 20 m below pedestrian overbridge.

Nelson Botanical Society

Field Trip: Sunday 17 June to Maungatapu Track. **Meet:** at 9.00 a.m. at the Cathedral Steps. **Leader:** Jane Connor.

Contact: Jane, ph: 03 548 4342 or email: jbconnor@icloud.com if intending to come.

Meeting: Monday 18 June at 7.30 p.m. for a talk by Rowan Hindmarsh-Walls titled 'The Unique Habitats and Plants of Ata Whenua/The Fiordlands.

Venue: Jaycee Rooms Founders Park.

Canterbury Botanical Society

Meeting: Saturday 9 June at 10.30 a.m. for the Annual General Meeting followed by a talk, the speaker to be confirmed.

Venue: St Ninian's Presbyterian Church, Puriri St.

Botanical Society of Otago

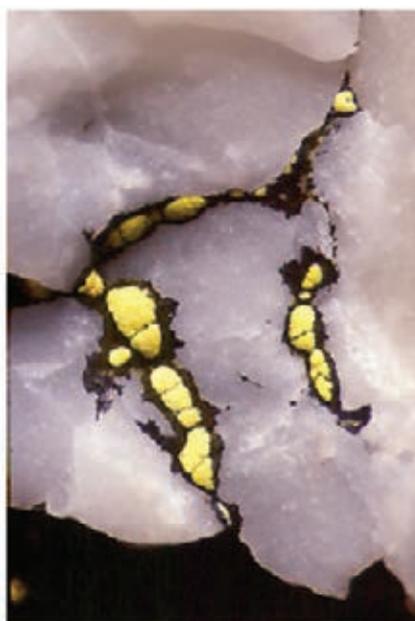
Field trip: Saturday 9 June to Pā Harakeke at Orokonui Ecosanctuary. **Meet:** at 9.00 a.m. at the Botany Department car park.

Contact: Gretchen Brownstein, ph: 021 065 8497; email: brownsteing@landcareresearch.co.nz

Meeting: Wednesday 13 June at 5.20 p.m. for a talk by Dr Matthew Larcombe, Department of Botany, University of Otago, on settling the native status of *Hardenbergia violacea* in Tasmania.

Venue: the Zoology Benham Building, 346 Great King Street, behind the Zoology car park by the Captain Cook Hotel; use the main entrance of the Benham Building to get in and go to the Benham Seminar Room, Rm. 215, 2nd floor and please be prompt as we have to hold the door open.

Contact: Allison Knight, email: allison.knight.nz@gmail.com.



New Zealand Lichens

by Bill and Nancy Malcolm, 2018, Micro-Optics Press

Fungi can't make their own food, but nonetheless they thrive because they've evolved reliable ways of getting food from other creatures by what we humans call theft and barter. Some of them take on algal and /or bacterial partners that can make food by trapping sunlight. That "life style" is called a lichen. This book explains how a lichen's partners interact, shows what lichens look like on the outside and how they're built on the inside, and recounts the bizarre uses that they've been put to over the centuries.

307 pages, illustrated with more than 700 colour photographs, microscope views, drawings, and diagrams.

Price NZ\$69 (includes GST and shipping inside New Zealand).

Order from Bill by **e-mail** at nancym@micro-opticspress.com or by **post** at P.O. Box 320, Nelson 7040, or by **phone** at 03-545-1660. Payment options PayPal or direct credit.

