NEW ZEALAND PLANT CONSERVATION NETWORK

TRILEPIDEA

Newsletter of the New Zealand Plant Conservation Network

No. 194

January 2020

Deadline for next issue: Friday 21 February 2020

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

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NEW ZEALAND

Ground truthing coastal turf communities in South Wairarapa

A short note on a long walk

Matt Ward

Recently, I had the pleasure of doing a coastal turf community survey for Greater Wellington Regional Council along a stretch of the south-eastern Wairarapa coastline. The survey was undertaken from the Waitetuna Stream in the south to the Orerei River in the north. The purpose of the survey was to detail the abundance, location and health (native species present) of any coastal turf plant communities as described in Rogers (1999) and Rogers & Wiser (2010). The survey turned up several threatened species which made the effort more than worthwhile.

A coastal turf is described as a community of tightly woven, diminutive ground smothering herbs, grasses and sedges inhabiting the coastal landforms exposed to continual salt-laden onshore winds (Rogers 1999). These conditions you would obviously expect to exist in the lower North Island. However, the pressures of land use change, sea level rise and recent climatic events appear to be threatening those of the lower North Island's eastern coast.

The Wairarapa's south eastern coast was not Initially included as an area thought to have coastal turf (Rogers 1999): Although, a later study (Rogers & Wiser, 2010) did recognise the area as one of importance for these coastal turf communities. However, the later study provided species present in the Wairarapa with little detail of frequency, which has led to this survey.

The length of coastline surveyed includes 30 km from Waitetuna Stream to Orerei River as studied in Rogers & Wiser (2010). Three days were taken to survey the stretch of coast starting in the south and travelling north. The inland paper road was used to travel as far as Waitetuna Stream, then double back and start the recording of potential coastal turf. During the three-day survey any other native species encountered (between turfs) were also noted, as a record for future surveys. The first interesting find was several specimens of *Carex buchananii* (At Risk – Declining), a species I had not seen wild, and potentially not noticed in this area for some time (Druce, 1991). The coastal fan north of Mataopera Stream (Fig. 1) was also an amazing location for

Figure 1. Coastal fan north of Mataopera Stream.

Figure 2. *Zoysia minima* dunes.

Figure 3. Coastal turf being actively eroded.

species richness. In the several areas of coastal turf, I noted the following species: *Eryngium vesiculosum* (Threatened – Nationally Vulnerable); *Zoysia minima* (At Risk – Declining); *Raoulia australis* (At Risk – Declining); *Poa billardierei* (At Risk – Declining); *Colobanthus muelleri*; *Pimelea carnosa*; *Disphyma australe* subsp. *australe*; *Poa cita*; *Carex pumila*; and last but not least *Ficinia nodosa*. The *Zoysia minima* present on the fan was thriving and, in some places, it appeared to be forming miniature dunes (Fig. 2). Recent erosion was evident along the sea face of the fan, an occurrence which would become commonplace during the survey (as seen in Fig. 3).

As I travelled north once reaching the southern limit of the survey, I noted 37 patches of coastal turf. The most diverse community contained 10 native species, and the least contained just one. Time constraints restricted my task to identifying only the natives present, as pondering the juvenile adventive grasses present would have taken an age. One adventive species that could not be ignored was *Plantago coronopus* – Buck's horn plantain, it was in every turf community quite often as the dominant species out competing the natives. Of the native species present three were stable in more than 50%, 70% & 75% of the turf communities (*Samolus repens var. repens, Selliera radicans, Fincinia nodosa* respectively). Other native species noted in the turf included: *Apium prostratum subsp. prostratum* var. *filiforme*; *Calystegia soldanella*; *Cotula coronopifolia*; *Cyperus ustulatus*; *Festuca multinodis*; *Isolepis cernua* var. *cernua*; *Isolepis prolifer*; *Juncus caespiticius* (At Risk – Declining); *Lachnagrostis billardierei* subsp. *billardierei*; *Lilaeopsis novae-zelandiae*; *Ranunculus acaulis*; *Salicornia quinqueflora*; *Spergularia tasmanica*. Other rare or endangered plants noted between turfs included: *Centipeda aotearoana* (At Risk – Naturally Uncommon); *Crassula mataikona* (At Risk – Naturally Uncommon); *Sophora molloyi* (At Risk – Naturally Uncommon); *Tetragonia tetragonoides* (At Risk – Naturally Uncommon).

The area of each turf community ranged in size dramatically. Areas varied from the largest noted being 600m^2, to the smallest being just 1m^2. Two types of substrate were noted, either sandstone or worked greywacke pebbles and consolidated sand. Recent erosion of coastal turf areas saw the specimens nearest the sea fall and in some situations re-establish on the lower layer of shoreline. Most turf communities noted were surviving in the shelter of solid rock (sandstone), which was acting as a micro headland (Fig. 4).

Fig. 4. Coastal turf with headland protection. Photos: Matt Ward, 2019.

In summary, all the previously known coastal turf communities mentioned in earlier studies

of the area were still present, though generally reduced due to erosion. With a maximum of ten native species noted in any single turf community, they do not match the richness of other areas studied by Rogers (1999), and Rogers & Wiser (2010), however, they are representative and worthy of recognition. A total of 26 native species were recorded in the turf communities, with an additional 70 species observed whilst transiting between turfed areas. Some more turfed areas not noted before were recorded and found in excellent health. The coastal turf communities of the South Wairarapa appear to be clinging on for life, despite the adversity they face.

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Unravelling the mystery of 'Gollum' –a possible cause for the gelatinous 'blobs' seen in New Zealand forests

Peter J. de Lange (pdelange@unitec.ac.nz), School of Environmental & Animal Sciences, Unitec Institute of Technology, Auckland

In 1977 the New Zealand Wildlife Service confirmed that Rakiura / Stewart Island did indeed hold a viable population of the nocturnal kākāpō (*Strigops habroptilus*). Within months much of the kākāpō habitat on that island was criss-crossed with tracks and following the discovery of a nesting bird, management intensified. Wildlife staff appreciated that this was their last chance to save this singular parrot from extinction (Best 1979; Balance 2010).

As the Tin Range above Port Pegasus became flooded with Wildlife officers, scientists and trainees, (as well as a few lucky volunteers) other notable observations of the flora and fauna of that remote part of the island started to be made. One keen observer and active participant in the kākāpō research of that time was Wildlife Service trainee Mike Avis, later a Department of Conservation Area Manager based at Havelock, Marlborough Sounds, and now working for the Marlborough District Council.

When I started with the Department of Conservation in 1990, Mike was based at Cape Reinga, working for the then Te Paki Field Centre. At the end of each day's field work, over a few beers Mike would entertain us with stories of his trainee years and especially his time working with Rakiura / Stewart Island kākāpō.

One of his tales intrigued me. Mike mentioned a mucilaginous 'snot' that hung off the stunted trees of the southern Tin Range. Mike wanted to know what caused it, because he said no one seemed to know. Instead, said Mike, the Wildlife staff, trainees and volunteers universally called this snotty jelly 'Gollum' in allusion to the laughable idea that it was emplaced by the fictitious deranged Gollum of 'The Lord of the Rings' trilogy (Tolkien 1954a-c), during an imagined wandering by him across the Tin Range in search of his precious 'tin ring'. People figured that the jelly-like grozz festooning trees was the result of Gollum's repeated throat-clearing, gobbing and hoicking onto the surrounding vegetation.

Of course this was the early 1980s–then no one could have ever imagined that between 1999 and 2000 New Zealand's landscape would indeed be used to film 'The Lord of the Rings'. So in a funny sort of way Gollum did indeed shamble across the country–just not on Rakiura / Stewart Island.

Digression aside though, Mike maintained that the mysterious 'Gollum' slime was considered quite a nuisance as much of the kakapo work was necessarily done at night, and this meant that those working on the bird often ran into strands of 'Gollum' festooning the trees and bushes, or inadvertently handled it in the dark. Not only was this unpleasant but when 'Gollum' dried on one's clothes it left a trail of spectacular stains, leaving one with the impression that the occupant of 'Gollum'-soiled clothing was emulating the handkerchief, of someone suffering from a really severe, suppurating sinus infection. Often as not the soiled clothing would not wash clean, and so had to be tossed. Understandably Mike wanted me to tell him what 'Gollum' was.

At the time I had no idea, though I knew what Mike was talking about because I had also seen similar globular, gelatinous slime festooning the tree trunks and low hanging branches in the 'cloud forests' of the Coromandel Range (Table Mountain especially), Kaimai Ranges, Mt Pirongia, Pureora, Hauhangaroa, Kaimanawa and Ruahine Ranges. Like all good biological mysteries this query was tucked away to ponder and wait for the next time 'Gollum' presented itself.

I had to wait quite some time, 27 years in fact, when, along with Dan Blanchon I was part of a lichenologist party investigating the lichen diversity of the cloud forest of Mt Te Aroha, which at 952 m is the second highest peak in the 'Waikato Region'. Whilst clambering through the stunted silver beech (*Lophozonia menziesii*) that is the dominant tree of the upper mountain slopes and summit, I finally found some patches of 'Gollum' (Fig. 1, 2).

Fig. 1 (left). A mass of 'Gollum' muciliage on Te Aroha. This colony was noted near the base of silver beech (*Lophozonia menziesii*) within a bryophyte mat shaded by the fern *Parablechum procerum*. Photo: P.J. de Lange.
Fig. 2 (right). Two further 'Gollum' colonies growing on silver beech (*Lophozonia menziesii*) branch, over a bryophyte mat with *Cladia* sp., *Hymenophyllum armstrongii* and *H. villosum*. Photo: P.J. de Lange.

Naively thinking that a photograph would suffice for identification purposes (see https://www.inaturalist.org/observations/8761910), I took a few and passed these to Dr Phil Novis. Phil is a phycologist who works for Landcare Research. In fact, he is one of the very few people left in this

country with expertise in identifying fresh water 'algae'; specifically, those unicellular microscopic ones which produce red snow, gelatinous structures like 'Gollum', rock snot, and other slimy growths that are mostly ignored or avoided by other 'botanists'.

When Phil saw my photographs he lamented the fact I had not provided a sample. A fair point. I get pretty frustrated when people do the same for me. In the absence of specimens, Phil tentatively suggested the pendulous mucilage might be a cyanobacterium (blue-green alga) of some sort, possibly *Tolypothrix*. Phil also noted that Dr Jessica Beever had sent him something similar that she had scooped up from a bryophyte mat she had found on Rangitoto Island. In that mucilage Phil had provisionally identified *Gloeocystis* a genus of green algae. Phil was keen for further samples if and when the opportunity arose.

So suitably intrigued and determined to get a name on 'Gollum" I decided that the next time I saw one of these snotty patches that I'd spoon some into a suitable collecting vessel and send it on to Phil.

As it so happens the opportunity came again, whilst climbing once more through the cloud forest of Te Aroha in January 2019. There on the lower trunk and branches of wind shorn, stunted silver beech, globs of 'Gollum' presented themselves like the random residue of a dedicated consumptive's coughing fit. The sputum-like jelly blobs of 'Gollum' were, as previously noted in 2017, lying on top of a complex bryophyte-dominated mat comprising an array of liverworts (mostly Lepidoziaceae), mosses (species in the Dicranaceae), lichens (*Bunodophoron*, *Cladia* aff. *inflata*, *Notoparmelia* spp.) and the filmy ferns *Hymenophyllum armstrongii* and *H. villosum*. Pleased with the find, and much to my colleague's amazement (he thought 'Gollum' was simply 'gross') a few samples were spooned into a snap lock bag and these were couriered to Phil Novis.

A few days later, when the mucilage was examined by Phil he found it to be formed by the desmid, *Mesotaenium* c.f. *macrococcum*. *Mesotaenium macrococcum* (Fig. 3.) is a desmid that occurs in dense, usually monospecific populations that are embedded in a mucilaginous mass, often on wet, sandy or nutrient poor soils. This 'mucilaginous mass' can form extensive colonies.

Fig. 3. The desmid *Mesotaenium macrococcum s.s.* a Japanese sample, as seen under light microscope. The Te Aroha sample discussed in this article is somewhat similar to this species. Photo (c) 1995–2018 Protist Information Server.

Desmids are single-celled (sometimes filamentous or colonial) microscopic green algae that are almost exclusively confined to freshwater habitats (Broady et al. 2012). They are distinguished from many other green algae in that they lack cilia (flagella) in any part of their life cycle, and that they sexually reproduce by conjugation. Conjugation is a form of sexual reproduction whereby the contents of two, usually vegetative cells fuse. Thick-walled zygospores result; these after a resting period germinate to produce two to four individuals (Broady et al. 2012). Desmids are typically unicellular–which is unfortunate as they take the name 'Desmid' from an old Greek word for 'chain', which was first coined for them because some Desmids are chain-forming; alas, as is so often the way, we now know that these chain-formers are the exception to the rule and that the majority are not chain-forming, presenting instead as individual unicells (Broady et al. 2012).

While we now know that the Te Aroha 'Gollum' is caused by a species of *Mesotaenium* we can't say that this desmid genus is responsible for the other 'Gollum' occurrences that I have seen, or indeed those Mike Avis reported from Rakiura / Stewart Island. It would be fun to find out. I really feel this could be quite an entertaining research topic.

Acknowledgements

I'd like to thank Mike Avis for asking me about 'Gollum' all those years ago, and Phil Novis for not only so generously looking into the Te Aroha sample but also for his willingness in 2017 to offer opinions on my images of 'Gollum'. Thanks also to Theo de Lange for company in the field and Andrew Marshall for adding to my knowledge of slang terms for nasal discharges. I should also thank John R.R. Tolkien for creating Gollum, such a singular character, who, rather like Helen of Troy (she whose face launched a thousand ships), has been the subsequent muse for the naming by taxonomists the world over of numerous singularly misshapen, bug-eyed often troglodytic or deep-sea animals, as well as a vernacular for a rather singular gelatinous grozz found festooning trees and moss covered slopes in Aotearoa / New Zealand.

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How a lizard garden stimulated an interest in locally rare plants

Paul Callister

Kapiti conservation group Ngā Uruora has been revegetating parts of an abandoned, formerly weed infested, quarry near Paekakariki for many years now. In the initial planting stage, the standard set of pioneer species was mainly used. This has since been expanded to include Paekakariki's collection of *Entelea arborescens* as well as a grove of regionally rare *Streblus banksii* (Shepherd et al. 2019).

In 2017, as a result of lizard surveying in the area by Trent Bell of EcoGecko, it was suggested that we also build a lizard garden in another section of the quarry.

Aided by funding from WWF, we built rock piles and began planting. This money also allowed us to build a perimeter fence to keep out sheep that regularly escape from a neighbouring farm.

We initially drew on a range of sources regarding what plants lizards might like, including information on the Department of Conservation and Te Motu Kairangi-Miramar ecological restoration websites. Our main focus is on skinks so we wanted low growing plants that gave them both habitat and food. To work out what plants should be growing in our area we consulted a plant list drawn up for the Kapiti Coast District Council by Matt Ward, which was informed by work compiled much earlier by Tony Druce. We also looked up plants on the Plant Conservation Network website.

Some of the plants we have put in are already well established on other parts of the escarpment. An example is *Coprosma propinqua*. However, we quickly realised that many of the recommended plants

for our area were either missing from the escarpment or were very rare. These included *Melicytus crassifolius* and *Melicytus orarius*.

Our initial *Melicytus* came from two sources. The *M.crassifolius* was purchased from the late Fred Allen's Kiwi Plant nursery. The *M.orarius* came via Otari assisted by local resident and Otari employee Finn Michalak. Since then we have found one lone *M.crassifolius* on the escarpment, so are also propagating from that.

We have very isolated remnants of *Disphyma australe* subsp. *australe* (iceplant) and *Acaena novae-zelandiae* (bidibid) growing on the 90-hectare escarpment. Both are now growing well in the lizard garden. While a common plant in New Zealand, *Pimelia prostrata* is very rare in our area. We have only a few dozen plants growing on cliffs where sheep have not been able to access them. Consequently, we have now grown a significant number of these from cuttings.

While not a universally loved plant, we thought we should add some *Aciphylla squarrosa*. With none growing on the escarpment we turned to Robyn Smith of the nearby Whitireia Park Restoration Group. Robyn provided seeds and we now have plants growing on several local sites. Robyn also provided some cuttings of *Leucopogon fraseri,* which we are trying to establish.

While primarily a rocky site, there is a small area of sand. *Comprosma acerosa* is rare locally, so we have established a small area of this plant.

Again, while a popular garden plant, we did not have any *Sophora molloyi* growing on the escarpment. We have seen examples growing on similar windswept sites on nearby Kapiti Island. Te Rito Community garden in Porirua supplied us with these plants. Although a common plant on the Kapiti Coast, there was little M*uehlenbeckia complexa* growing on our lizard site. Te Rito donated hundreds of these plants for our garden.

For many years, we have been getting rid of boxthorn from the area. But it was not a hard decision to replace one prickly plant with another, *Discaria toumatou*. This was supplied by Otari from plants originally growing in Palliser Bay.

We are also trying to establish *Metrosideros colensoi*, *Atriplex cinerea*, *Scandia geniculata*, and *Sonchus kirkii*. Given that none of our volunteers are expert botanists, we have put labels next to examples of each plant so we can get to know them. Walkers on Te Araroa trail, which goes past the lizard garden, can also see what we are trying to establish.

This has been both an interesting and challenging project. We are grateful to all the organisations and individuals who have helped us establish the lizard garden.

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Pneumatopteris pennigera – a record-breaking gully fern?

Marley Ford

Pākauroharoha, commonly known as gully fern (*Pneumatopteris pennigera*), is a common native fern found in gullies throughout New Zealand but is apparently absent from Stewart Island (Brownsey & Smith-Dodsworth 2000). Gully fern is a member of the Thelypteridaceae family, a nearly worldwide-spread plant family (Brownsey & Perrie, 2016).

Pākauroharoha has been recorded with a trunk (caudex) of up to 1 m in the efloraNZ (Brownsey & Perrie, 2016), but a recent find has beaten this record by almost double. On 14 June 2019 at Pae O Te Rangi Reserve in the Waitakere Ranges a plant was found with a measured 'trunk' of 1.89 m (Fig. 1). The fern was found on the streamside under regenerating rawirinui (*Kunzea robusta*) growing with swamp kiokio (*Parablechnum minus*) and hangehange (*Geniostoma ligustrifolium*).

The accurate reporting of plant dimensions (not recorded in formal treatments) is always useful. It helps us get a better documentation of just how variable our native plants can be. Of course, it is understandable that herbarium evidence on the full range of plant dimensions is often lacking, as it takes considerable dedication and effort to collect, press, and curate such specimens. Furthermore, large specimens take up considerable space to store, and their collection may result in the death of the individual seen.

The advent of the easily reproduced digital image provides a way to circumvent this.

Fig. 1. Marley Ford next to a 1.89 m pākauroharoha at Pae O Te Rangi Reserve. Photo: H.M. Smith, 14 June 2019.

Acknowledgement

I thank Peter de Lange for his comments on the article.

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Remarkable plants of Aotearoa New Zealand

I am writing a book called "Remarkable Plants of Aotearoa New Zealand". It is a collection of illustrated essays/stories on a selection of about 25 species. Each essay will cover taxonomy and evolution, structural adaptations, ecological importance, and cultural values, including conservation issues. I am keen to locate distinctive populations, groves or individuals of the selected species and to identify exceptional photographs that I can purchase.

If you know of such places and images, or of people who do, please let me know.

The selected species or broader categories include: tree fuchsia, mahoe, *Olearia paniculata*, weeping broom, karaka/kopi, nikau, kanuka and/or manuka, tutu, matagouri, supplejack, *Tecomanthe*, kiekie, mistletoe (especially the large flowering species), *Dactylanthus*, *Gastrodia*, *Lepidium*, megaherbs (*Myosotidium*, Mt Cook Lily), vegetable sheep, divaricating *Pittosporum*, horopito, *Lepidothamnus* (silver pine, dwarf pine), silver fern, bracken, lichens (great diversity, large size), Bryophytes (basal liverworts like *Treubia*, large mosses such as *Dawsonia*), *Auricularia* (to represent NZ fungi). The list is open for review.

My thanks.

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Rauolia eximia, Mt. Hutt, Canterbury

Top: A "flock" of vegetable sheep resting in the tussock. Bottom: A 'woolly' exterior protects from drought and cold an internal system of branches, masses of fine roots and a self-produced humus.

UPCOMING EVENTS

If you have events or news that you would like publicised via this newsletter please email the Network (events@nzpcn.org.nz).

Auckland Botanical Society

Field Trip: Next field trip Saturday 15 February to Martins Bay.	
Meeting: Next meeting Wednesday 4 March (includes AGM).	

Rotorua Botanical Society

Field Trip: Saturday 1 February to Maungawhakamana, Tarawera Valley. **Meet:** 8.00am at the Convention Centre carpark, Fenton Street, Rotorua or 9.00am at the Kawerau Info Centre, Plunket Street, Kawerau. **Grade**: Medium-Hard.	**Leader:** Angela Simpson, email: simpson.angela1@gmail.com, ph. 021 239 2554.

Wellington Botanical Society

Field Trip: Saturday 1 February to 320 Hawkins Hill Road to botanise 12 ha of mixed regenerating forest and shrubland. Meet: 9.00am at Brooklyn Wind Turbine car park. Car pool at car park.	**Leader:** Mick Parsons, email parsonsroad@gmail.com, ph. 027 249 9663.
Meeting: Monday 17 February with speaker Lara Shepherd, Research Scientist, Te Papa Tongarewa.	**Topic:** Kōwhai – NZ's unofficial national flower.

Nelson Botanical Society

Field Trip: Sunday 16 February to Beeby's Knob, an alpine area. Limited numbers as trip restricted to four 4WD vehicles. **Meet**: 8.00am at Cathedral steps.	**Leader:** Beryce Vincenzi, email beryce_vincenzi@xtra.co.nz, ph. 03 545 1985. Please register with Beryce by Friday 14 February to book a place on the outing.

Canterbury Botanical Society

Meeting: Monday 3 February at 7.30pm with speaker Carlos Lehnebach, Botany Curator at Te Papa Tongarewa Museum of New Zealand. **Topic:** What does it take to name and save our native orchids.	**Venue:** Upper Riccarton Library community meeting room, 71 Main South Road, Riccarton.
Field Trip: Saturday 8 February to Te Waihora – Williams and Lakeside Wildlife Management Reserves. **Meet**: 9.00am at Halswell Bowling Green carpark, 301 Halswell Road. **Grade:** Rough and uneven, with wet areas and mud.	**Contact:** Alice Shanks, email alice@caverock.net.nz, ph. 027 366 1246.

Botanical Society of Otago

Meeting: Wednesday 19 February at 5.20pm with Speaker Bill Lee, Manaaki Whenua Landcare Research. **Topic**: Eco-evolutionary stories about plant diversification in New Zealand.	**Venue:** Benham Seminar Room, Room 215, Second Floor, Zoology Benham Building, 346 Great King Street, Dunedin.
Field Trip: Friday 21 February to Invercargill. This is a weekend trip to explore sites of interest in the Invercargill area.	**Contact:** David Lyttle, email: djl1yttle@gmail.com, ph. 03 454 5470.