NEW ZEALAND PLANT CONSERVATION NETWORK

TRILEPIDEA

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Deadline for next issue: Friday 16 July 2021

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 info@nzpcn.org.nz

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NEW ZEALAND

PLANT OF THE MONTH, p. 2

Pittosporum dallii.
Photo: Simon Walls.

One month left to submit your applications for the 2021 David Given Threatened Plant Scholarship

Alex Fergus (fergusa@landcareresearch.co.nz)

Thanks to everyone who has inquired to date about the David Given Threatened Plant Scholarship (DGTPS). Now is the time to submit your applications and organise your referees to submit their forms!

As a quick refresher, the scholarship funds research that assists the protection and recovery of New Zealand's threatened plant species and their communities. One scholarship is awarded every two years and will provide up to $8000 towards the cost of a research project. The scholarship is open to New Zealand residents or citizens but the work could involve overseas researchers who collaborate with the New Zealand principal researcher. Threatened species and communities can be either nationally or regionally threatened and 'plant' encompasses all vascular and non-vascular plants, as well as fungi.

There are no formal application forms for this scholarship and written applications should address the list of subject areas identified in the brochure that can be found at the end of this newsletter but also on our website at:

https://www.nzpcn.org.nz/nzpcn/awards/david-given-scholarship/

We also ask you to identify two referees in your application who can be consulted for their opinion on the merit of the proposed research and the applicant's aptitude for delivering the research. A referee form is available in the brochure, and both referees need to submit their forms before the application closing date.

The DGTPS panel may refrain from making an award if, in their opinion, there is no applicant of sufficient merit or no project which directly assists the protection and recovery of New Zealand's threatened plant species and their communities.

Applications close on Friday 30 July 2021. The DGTPS panel will deliberate during August and notify the applicant by Friday 27 August 2021, permitting time to undertake relevant project logistics for the 2021/2022 field season. The name of the successful applicant will be announced on the NZPCN website shortly after they have confirmed their acceptance of the scholarship. The applicant will be asked to assist the DGTPS panel in writing a short article for the NZPCN newsletter *Trilepidea* upon receiving the scholarship. Scholarship recipients are also required to deliver a short report summarising the projects results upon completing the research. This report or extracts thereof will also be published in *Trilepidea*.

If you have any questions relating to the DGTPS please contact Alex Fergus, fergusa@landcareresearch.co.nz

PLANT OF THE MONTH – *PITTOSPORUM DALLII*

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The plant of the month for June is the Kahurangi pittosporum, *Pittosporum dallii*, one of 21 *Pittosporum* species native to the New Zealand region. This species is the only native tree species restricted to Kahurangi National Park. *P. dallii* has a very restricted distribution and only lives on a geological formation called the 'Devil river volcanics' between the upper Takaka valley in the south and the Snow River in the north. Its habit ranges between open beech forest and sub-alpine scrub, but most of the current population is restricted to inaccessible bluffs or areas of high human usage. The species is highly palatable to ungulates such as goats and deer and its last refugia are areas where ungulate browse pressure is lower.

Pittosporum dallii is a shrubby tree species of up to five or more metres tall, generally with many widely spreading branches and thick smooth trunks. The large leaves are dark shiny green with distinctly serrated edges, and the creamy white flowers are borne in large clusters near the tips of the branches. The flowers are very fragrant, especially at night.

Pittosporum dallii: (far left) female tree, Cobb Ridge 27 December 2013; (left) male flowers, Cobb Ridge, 13 January 2010. Photos: Simon Walls.

The species is very distinctive and is easy to distinguish from any other larger leaved *Pittosporum* species found in that area (*P. patulum* and *P. tenuifolium*) by its quite large and broad serrated leaves, and its restriction to a particular volcanic rock formation.

Pittosporum dallii mature plant, Devil boulder field 26 November 2009. Photo: Simon Walls.

The species is endemic to New Zealand and has a current conservation status of 'Threatened – Nationally Vulnerable', as it has a very restricted distribution and is now quite uncommon within its range. As the tree is very palatable, it is especially targeted by goats, deer and possums, making browse pressure the main threat to the species. Before the existence of the Department of Conservation, or Kahurangi National Park, the New Zealand Forest Service established a sanctuary for this species in the head of the Snow River, to allow for study to aid the protection of the dwindling population. After the establishment of Kahurangi National Park this sanctuary was no longer required and was disestablished.

The genus *Pittosporum* is widespread across many of the Gondwanan continents except South America and has about 200 species across its range. The genus name *Pittosporum* is named after the sticky seeds of many species in the genus, from the Greek 'pitta' meaning pitch or tar, and 'spora' meaning seed. The species was named after Mr James Dall, a Golden Bay plant collector who never actually saw the species in the wild.

You can view the NZPCN website factsheet for *Pittosporum dallii* at: https://www.nzpcn.org.nz/flora/species/pittosporum-dallii/

New locations for embergeria rust (*Puccinia embergeriae* McKenzie et P.R.Johnst.), Pucciniaceae, on the Chatham Islands

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Embergeria or Chatham Islands sow thistle (*Sonchus grandifolius* Kirk) (Fig. 1) is the largest indigenous representative of the sow thistles in the New Zealand archipelago. The species is endemic to the Chatham Islands, where it is known from all of the larger vegetated islands except the Motchu Har / Forty-fours, Rakitchu / Rangitutahi / Sisters, Motchu Hop' / Star Keys and Tcharok' / Tarakokoia / The Pyramid.

Fig. 1. Embergeria / Chatham Island sow thistle *(Sonchus grandifolius*). (left) plant in flower, near Taniwha, Wharekauri, Rēkohu (Chatham Island); (right) Close-up of capitula. The floret colour in this species is variable grading from pale yellow cream or apricot through pink to magenta, in part this happens during the capitula maturation but there are also some plants that have naturally highly coloured capitula, Ocean Mail Beach, Rēkohu (Chatham Island).

Embergeria was formally described as *Sonchus grandifolius* by Wellington-based botanist Thomas Kirk (18 January 1828 – 8 March 1898) using specimens collected by Henry H. Travers (October 1844 – 16 February 1928) from an unspecified location on the Chatham Islands (Kirk 1894). These specimens were lodged in what is now the herbarium of Te Papa Tongarewa Museum of New Zealand by that museum's resident botanist John Buchanan (13 October 1819 – 18 October 1898), where they were then worked on by Kirk. The genus *Sonchus* L. in which embergeria was placed by Kirk is the same genus to which the more familiar, common sow thistles *Sonchus asper* L. and *S. oleraceus* L. (often referred to as puha or puwha) also belong. There embergeria remained until 1965 when Egyptian-based botanist Loufty Boulos (14 May 1832 – 27 April 2015) erected the genus *Embergeria* Boulos, in which he placed *Sonchus grandifolius* and the Australian *S. megalocarpus* Hook.f. as *Embergeria grandifolius* (Kirk) Boulos and *E. megalocarpa* (Hook.f.) Boulos (Fig. 2A–D) respectively (Eichler 1965). The Chatham Islands species was made the type of that genus, and so when *E. megalocarpa* was placed in its own genus *Actites* Lander, as *A. megalocarpus* (Hook.f.) Lander (Lander 1976), the Chatham Islands plant became the sole representative of the genus *Embergeria*. There it remained until 2014 when it was decided to return it to *Sonchus* (Garnock-Jones 2014).

Taxonomic changes aside, embergeria (the vernacular by which it is now widely known) remains one of the iconic Chatham Islands endemic plants. The species is a feature species of those intact, indigenous dune fields and coastal headlands on the islands. At one time, embergeria was regarded as seriously at risk of extinction but fencing of the coast, replanting of ailing populations and translocation to secure sites have reversed the trend and the species is now listed as 'At Risk / Recovering' (de Lange et al. 2018). Whilst this is good news for the species, a rust fungus, *Puccinia embergeriae* McKenzie et P.R.Johnst., endemic to it has not fared so well.

Fig. 2. *Actites megalocarpus*, Mornington Peninsula, east of Portsea, Victoria. A. flowering plant. B. Closeup of foliage. C. Capitula top view. D. Capitula side view.

Puccinia embergeriae (Fig. 3) was first recognised in the wild from specimens collected from Kaingaroa Point (Fig. 4A,B) and nearby Kaingaroa Beach during a November 1992 field trip there by New Zealand-based mycologists Eric McKenzie and Peter Johnston (McKenzie & Johnston 2004). These initial collections were of the rusts uredinial stage during which the rust produces asexual urediniospores (Fig. 4). Later in April 1993, aside from the uredinia, telia (the sexual spores of the species) were found, enabling a complete description of the rust fungus to be made (McKenzie & Johnston 2004). To date *Puccinia embergeriae* has only been found on embergeria so, in common with many rust species, it is very host-specific. Even in places where the other indigenous *Sonchus* on the islands, *S. kirkii* Hamlin, grows alongside rust-infected embergeria plants the rust holds true to its sole host *S. grandifolius*. This probably means that *Puccinia embergeriae* has had a long-standing relationship with its host plant embergeria. Heenan et al. (2010) suggested that embergeria and *Kirkianella* Allan (L.) (also now treated as *Sonchus* (Garnock-Jones 2014) diverged from each other sometime between 1.41 and 12.68 million years ago. This is plenty of time for the host specific relationship of *Puccinia embergeriae* and embergeria to develop.

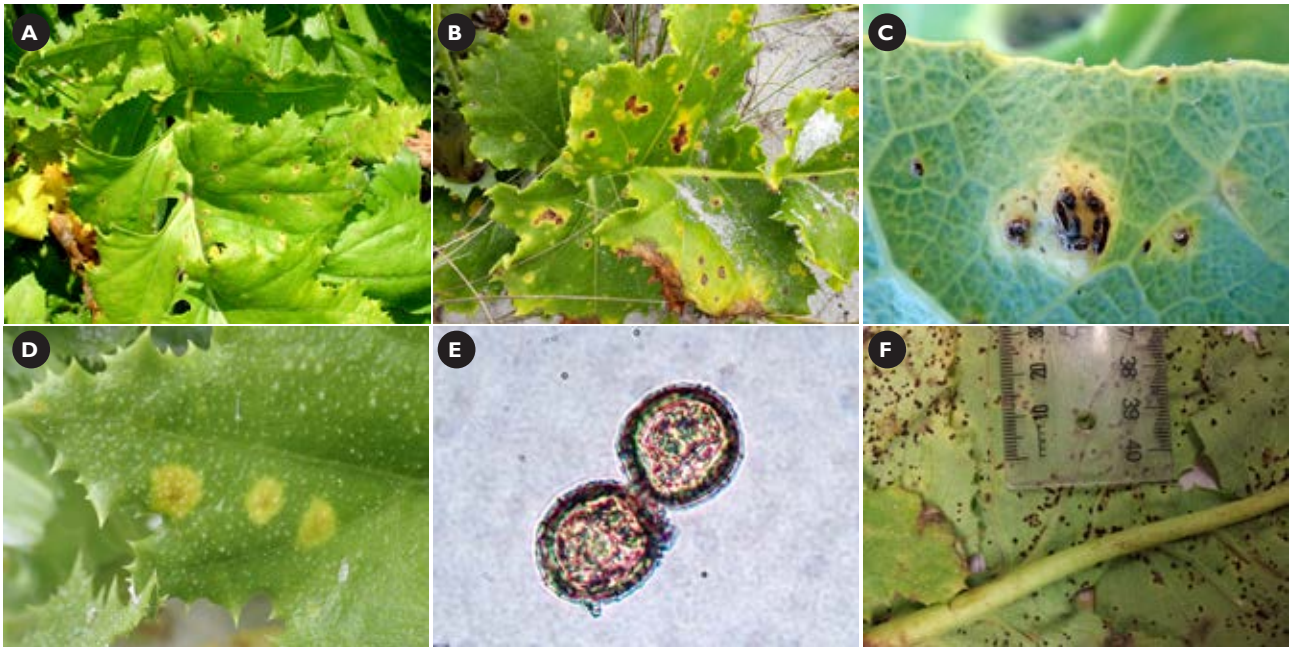

Fig. 3. *Puccinia embergeriae* – showing rust lesions on the foliage of the host plant *Sonchus grandifolius* A. Infected host plant, Kaingaroa Point, Rēkohu (Chatham Island) (January 2006). B, *Puccinia* infected leaf of *Sonchus grandifolius* (adaxial leaf surface), south-west of Kaingaroa Point, Rēkohu (Chatham Island). C. Adaxial host tissue showing embergeria rust lesions, Waitangi West Beach, Rēkohu (Chatham Island). D. Abaxial host tissue showing embergeria rust urediniospores. E. Urediniospores, 6000x magnification (Waitangi West Beach, Rēkohu (Chatham Island) (UNITEC 12703)), F. Teliospores (Department of Conservation, Te One Office, Rēkohu (Chatham Island)

Although 'embergeria rust', as it has come to be known, has been formally recognised for 17 years now, very little is known about the species' distribution. Until 2004 all known collections of the rust had been made from Kaingaroa Point (the type locality for the species), and nearby Kaingaroa Beach (McKenzie & Johnston 2004). In 2006 when I first saw this rust in the wild at Kaingaroa Point with the

Fig. 4. *Sonchus grandifolius*. Population at Kaingaroa Point, Rēkohu (Chatham Island) as seen in January 2006. This is the type locality for *Puccinia embergeriae*. This location is now completely overgrown with marram grass (*Ammophila arenaria*), so the host plant and rust are now extinct at this location.

late John Sawyer (de Lange 2015), John and I knew of the rust but assumed it would be very hard to find. Amazingly it wasn't. Embergeria plants infected with *Puccinia embergeriae* are easily spotted (Fig. 3A), as the rust forms 5–15 mm diameter, more or less circular, lesions on the host plant leaves (Fig. 3B, C). On the upper leaf surfaces of embergeria these lesions form the classic 'traffic light', bulls-eye pattern (Fig. 3B) seen in many rusts, so called because the outer less infected tissue is pale greenish, progressing toward the centre through more or less concentric zones of infected tissue, of yellow / yellow-green, then orange and sometimes red. On the underside of the infected leaf, where the darker central portion of the lesion is topside, is where you find the rust spores (Fig. 3C, D–F), and in the case of *Puccinia embergeriae* these are pale yellow-brown in urediniospores (Fig. 3D, E) and blackish brown in teliospores (Fig. 3F). So as far as field identification of indigenous 'New Zealand' rusts go *Puccinia embergeriae* has proved easy to spot. However, what was also evident, even in 2006 when the host plant embergeria was very common at Kaingaroa Point, was that the rust was very uncommon. John and I examined many hundreds of plants but only found the rust twice.

The ease of identifying *Puccinia embergeriae* in the field is a boon for surveys for it. From our field recognition of it in 2006 John and I encouraged Department of Conservation staff to search for the rust during their routine plant surveys and management of embergeria populations. Despite these efforts, only one further population was found by Department of Conservation Staff at Ocean Mail in 2004 (*B. Gibb s.n.*, PDD 1017710), an occurrence on planted embergeria (see below). Otherwise following 2006, field knowledge of embergeria rust remained effectively confined to its confirmed and assumed continued presence at Kaingaroa Point.

Then during a July 2014 visit to the islands, I found *Puccinia embergeriae* growing on planted embergeria in the gardens of the visitor car park, Department of Conservation, Te One (*P.J de Lange CH2525*, PDD

105386). Discussion with Department staff confirmed that the embergeria plants had been raised from seed collected at Kaingaroa Point. So, presumably, that is how the rust got there. Unfortunately, despite the importance of this find, the rust infected plants were accidentally removed. The find did, however, raise the possibility of translocating rust infected plants to new sites – which of course may seem a bit odd to some people. Moving diseased plants to new sites? We need to remember the rust is endemic and its relationship to its host plant probably 'ancient' (see above). Admittedly limited observations of rust infected embergeria suggests that infected plants are still capable of flowering and setting viable seed with minimal 'obvious' damage to the host plant. Not all rusts are evil.

In this respect the discovery in 2008 of embergeria rust at the former Oratia Native Plant Nursery, Oratia, west Auckland was encouraging. Evidently, the embergeria host plants had also been raised from seed collected from Kaingaroa Point (G. Davidson pers comm. October 2008), and presumably, that seed was admixed with rust spores. Here again, we do not know for certain though as embergeria does not flourish in humid climates like Auckland, the rust infected plants died within weeks of the rust being identified. In this case, this observation is also not supported by voucher material.

I left the Department of Conservation in August 2017. My last visit as a Department of Conservation employee to the Kaingaroa *Puccinia embergeriae* had been during May 2008, at which stage *Puccinia embergeriae* and its host plant were still abundant at Kaingaroa Point. I returned to the islands during January 2018 for a four day visit, which allowed for a brief search of Kaingaroa Point where I was horrified to see one embergeria plant left and no rust at all. The former embergeria colony was now completely covered in marram grass (*Ammophila arenaria* (L.) Link). So, at the type locality for embergeria rust, there was now a good chance it had gone extinct.

This was confirmed when during a November 2018 visit to Kaingaroa Point, a thorough search for embergeria found that it had indeed been extirpated at that location – no host, no rust. However, further west of Kaingaroa Point, a large population of embergeria was found, and that supported six plants infected with *Puccinia embergeriae*. That population was revisited during February 2021 and the same number of rust infected plants were found – no others were seen. Further surveys south and west of there found a large embergeria population but no rust.

During the same field trip, *Puccinia embergeriae* was also observed within embergeria plantings at Ocean Mail c.10 km west of the newly discovered Kaingaroa population. At this site, it has first been observed there in 2004 by then Department of Conservation botanist Bridget Gibb (PDD 101710) within a location where embergeria had been planted. Although we cannot be certain, it seems rather likely that the Ocean Mail population is not a natural occurrence as the seed source for the plantings of embergeria at this location was Kaingaroa Point, and hitherto there had been no embergeria in that location. So, it seems likely that *Puccinia embergeriae* spores somehow hitched a ride in seed collected from Kaingaroa Point. Irrespective, considering we were worried the rust was possibly in terminal decline, the 2018 Ocean Mail rediscovery was good news. Later in January 2020, *Puccinia* was also rediscovered on the dunes above Kaingaroa Bay, near the rehabilitated rubbish dump. Here it had been found in 1992 by Eric McKenzie and Peter Johnston (PDD 61888), then again in 2006 by the late Ross Beever (*R.E. Beever 2670*, PDD 94472). Though also good news it was restricted to recently planted embergeria, also it transpires of Kaingaroa Point provenance.

So, at the onset of 2020, we knew of three extant *Puccinia embergeriae* populations, one natural, two probably stemming from accidental translocation of infected host plants (c.f., Denchev et al. (2015)). What was peculiar though, was that despite patient searching we still had not found the rust anywhere else on the islands.

On 23 December 2020, I was on Rēkohu (Chatham Island) again, and during that visit, I took the opportunity to walk Waitangi West Beach. This large sandy beach is a known stronghold for *Atriplex billardierei* (Moq.) Hook.f.. However, it also supports populations of other uncommon Chatham Islands plants such as pīngao (*Ficinia spiralis* (A.Rich.) Muasya et de Lange), kopakopa (*Myosotidium*

hortensia (Decne.) Baill.), and embergeria. Toward the southern end of the beach, careful searching of embergeria located a new, presumably natural, population of embergeria rust (*P.J. de Lange CH4026*, UNITEC 12703 (PDD)) (Fig. 5).

Fig. 5. Embergeria (*Sonchus grandifolius*) plants infected with *Puccinia embergeriae* at Waitangi West, Rēkohu (Chatham Island).

The embergeria rust population at Waitangi West is so far the largest I have seen. Most plants within the southern third of the beach are infected with the rust. In common with all embergeria rust infections I have seen, the plants though sporting numerous rust lesions on the foliage, were heavily flowering and/or setting fruit. Visually at least, the rust still does not seem to seriously damage the host's ability to reproduce.

Later in February 2021, a coastal *Lepidium* L. survey provided the opportunity to check a wide range of embergeria populations for the rust. However, despite diligent searching, no further populations were found in those embergeria populations present along the coastline between Ocean Mail and Wharekauri, and on the coastline of Waitangi West Farm, on Rēkohu (Chatham Island). A brief inspection of embergeria populations at the northern end of Rangihaute (Pitt Island) found no sign, nor did a thorough check of host plants on Wharekaikite (Rabbit Island).

Embergeria rust as an endemic disease will probably always remain a conservation issue that most people will struggle to see worthy of management effort. However, it is now a part of the ecology of *Sonchus grandifolius*, a rust engaged in a dance with its host that has gone on for millennia. We need to remember that such relationships are an important part of our contribution to global diversity. It is to be hoped that this article will now stimulate further finds of embergeria rust on the Chatham Islands.

Acknowledgements

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Resolving taxonomic uncertainty to guide the conservation of New Zealand orchids

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The white sun orchid *Thelymitra longifolia* was one of our first orchids to be given a scientific name. That was almost 250 years ago. Since then, more than 110 species have been described for NZ (Schönberger *et al*., 2019) and at least a dozen more await formal recognition.

Orchids are the second largest group of flowering plants in the world (> 20,000 species) and one of the top 10 largest families of flowering plants in NZ. Unfortunately, they are also one the most threatened plant groups in the country with 35% of the species currently considered of conservation concern (de Lange et al., 2018). The main threats to these orchids are habitat destruction, disruption of their partnerships with pollinators and mycorrhizal fungi, and, to a lesser extent, illegal collection and trade.

Based on overseas examples, effective orchid conservation normally requires a thorough understanding of the species biology and their interactions with other organisms. For instance, some orchids depend on pollinators for their reproduction and all of them depend on mycorrhizal fungi, which are essential for seed germination, seedling establishment and subsequent growth. The reliance and specificity of these interactions can make conservation efforts difficult as the identity of these partners is generally unknown and little or nothing is known about their ecology. Nowadays advances in DNA technologies can assist to fill these gaps but investing funding and time to investigate these interactions can be contentious, especially when the plant's taxonomic status (e.g. is this a new species or only a local variation of an otherwise widespread species?) is uncertain.

For the last two years, our research has focused on resolving the status of a number of terrestrial NZ orchids known only by tag-names (Table 1). Although the morphological distinctiveness of some of these orchids has been acknowledged for decades, their taxonomic status has never been investigated or resolved.

Table 1: List of taxonomically indeterminate orchids, voucher specimens (if assigned) and tag-name (if one given) to be studied in the next three years. * Orchids not included in de Lange et al (2018).

Genus	category	species	voucher specimen	tag name
**Corybas*	aff.	*iridescens*	No voucher	pale
Corybas	aff.	*oblongus*	WAIK 8626	swamp
Corybas	aff.	*rivularis*	AK 288094	Pollok
Corybas	aff.	*rivularis*	CHR 534752	rest area
Corybas	aff.	*rivularis*	CHR 518025	Kaimai
Corybas	aff.	*rivularis*	CHR 518313	whiskers
Corybas	aff.	*rivularis*	AK 251833	Kaitarakihi
Corybas	aff.	*sulcatus*	CHR 300648	
Corybas	aff.	*trilobus*	WELT SP104146	tridodd
Corybas	aff.	*trilobus*	CHR 534742	Trotters Gorge
Corybas	aff.	*trilobus*	CHR 537604	Rimutaka
Corybas	aff.	*trilobus*	CHR 518304	pygmy
Microtis	aff.	*unifolia*	AK 296182	late flowering
**Prasophyllum*	aff.	*colensoi*	No voucher	green
Pterostylis	aff.	*banksii*	WAIK 12546	late flowering
Pterostylis	aff.	*graminea*	CHR 513330	sphagnum
Pterostylis	aff.	*montana*	AK 3500	
Spiranthes	aff.	*novae-zelandiae*	CHR 518297	Motutangi
Thelymitra	aff.	*brevifolia*	AK 347116	
Thelymitra	aff.	*longifolia*	CHR 537579	
Thelymitra			WELT SP79140	Ahipara
Thelymitra			AK 229531	rough leaf
Thelymitra			CHR 518036	darkie

Sadly, some of these orchids have already made it to the Threatened and At Risk categories in the latest assessment of the conservation status of NZ indigenous vascular plants (de Lange et al., 2018). For others, our knowledge is so limited that their threat of extinction cannot be assessed; these orchids have been listed under the Data Deficient category. Clarifying the taxonomic status of these entities will not only advance our knowledge of New Zealand orchid biodiversity but also will help conservation agencies with decision making regarding the management of these orchids and their habitats, and prioritise funds, research, and conservation actions. This is very important as taxonomic uncertainty often leads to unnecessary conservation efforts and the ineffective use of resources.

One of the orchids at the top of our priority list is *Thelymitra* "Ahipara", a sun orchid discovered more than 30 years ago and currently ranked as Threatened – Nationally Critical (de Lange et al. 2018). This orchid is found only in the Far North and, unlike most sun orchids, it grows in wetlands (Figure 1), sometimes among rushes and partially submerged in water, others above the water level on rotting kauri stumps. Another point of difference between this orchid and other NZ sun orchids is its chromosome number, 2n=60. Molloy & Dawson (1998) suggested this orchid has evolved in Australia and dispersed to NZ. The closest relative of this orchid in NZ seems to be another undescribed orchid, *Thelymitra* "darkie". Both orchids share the same chromosome number and column morphology, and are restricted to the Far North (Irwin 2006). Drainage of wetlands is likely the main threat to the survival of *Thelymitra* "Ahipara", followed by browsing from rabbits (Norbury 1996). Similar to many other sun orchids, it seems it can self-pollinate so it does not rely entirely on pollinators for its reproduction. However, nothing is known about its mycorrhizal partner nor whether the interaction is of the generalist or specialist kind.

Figure 1. Habitat of *Thelymitra* "Ahipara" in the Far North.

Another group of orchids we are studying is the spider orchids (*Corybas*). Currently there are more than 10 spider orchids with tag-names in NZ. Six of them are of conservation concern and they are categorised as Threatened – Nationally Critical and At Risk – Naturally Uncommon (de Lange et al., 2018). The two spider orchids classified as Threatened – Nationally Critical are restricted to the Auckland region (Figure 2), have very small population size, and their habitats are under threat by land use transformation and stochastic events such as landslides and erosion. Therefore, understanding their taxonomic status is imperative. Determining species boundaries in spider orchids is difficult mostly because of the variability in flower colour patterns, even within the same population! People normally associate differences in flower colour with taxonomic uniqueness, or hybridisation, but in spider orchids this feature may be linked to their intricate pollination system. Unlike most flowering plants, spider orchids do not reward their pollinators with nectar. Instead, the flowers exploit the reproductive instinct of their fungus gnats (*Mycetophila*: Diptera) pollinators, by using a mixture of volatile compounds, some of which are also found in mushrooms, and different floral textures. Pollination happens when the gnats, believing they are visiting a mushroom, mate on the flower and/or lay eggs on it. To keep this deceptive system operating, and preventing fungus gnats from learning to avoid the flowers, maintaining novelty, .i.e. colour variability, is crucial.

Figure 2. These two spider orchids (*Corybas*) are known by tag-names only; *Corybas* "tridodd" (left) and *Corybas* "Kaitarakihi" (right). Both orchids are listed as Threatened – Nationally Critical. White bar = 5 mm. Photo of *Corybas* "Kaitarakihi" by Pam Shearer.

A less cunning orchid included in our taxonomic project belongs to the genus *Prasophyllum*; commonly known as leek orchids. Currently, there are two species of leek orchid recognised in NZ, *Prasophyllum hectorii* and *P. colensoi*. The first one, also known as the swamp leek orchid, is only found in wetlands of the North and Chatham Island. Similar to other wetland-dwellers, habitat destruction has caused it to decline and its current conservation status is At Risk – Declining. In contrast, the second one is widespread across the North and South Islands, and offshore islands including sub-Antarctic Islands. It grows in a range of habitats (wetlands, herbfields, grasslands) and from coastal to alpine settings The flowers of *P. colensoi* are rather modest, with small light green or brownish-purple petals and sepals (Figure 3). Unlike its flowers, the taxonomic history of this species is far from simplistic (Alderton-Moss & Lehnebach 2020). Hooker described this species in 1853, providing a very short description and a mention of material collected by William Colenso and David Lyall. About thirty years later, Colenso described *P. pauciflorum* from a single specimen collected west of Napier (Colenso, 1885).

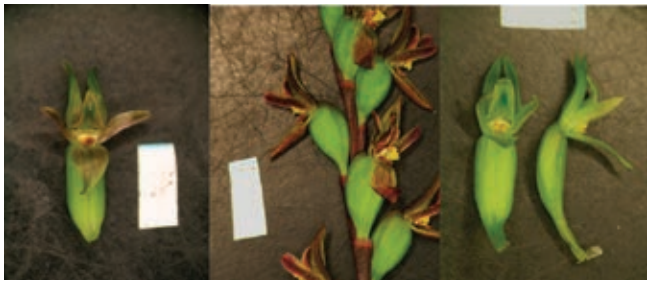

Figure 3. Diversity in flower colour and shape observed in North (left) and South Island (centre and right) samples of the leek orchid *Prasophyllum colensoi*. South Island samples are from the same population. White bar = 5 mm

In 1946, Hatch suggested the Australian species *P. rogersii* was also found in NZ (Hatch, 1946). Both, *P. pauciflorum* and *P. rogersii* sensu Hatch are now considered synonyms of *P. colensoi*. Two other species were segregated from *P. colensoi* and described by H.B. Mathews in 1928, but his manuscript was never published. Almost 20 years ago, Bruce Irwin noted *P. colensoi* is a highly variable species and suggested at least two species could be segregated from it. These two forms are known as *Prasophyllum* A and *Prasophyllum* B. Features such as the length and position of the sepals and petals, and the length of the column wings (two small projections near the reproductive organs) can help to differentiate between these two forms (Irwin, 2001). Currently, we are gathering information from DNA analyses and herbarium specimens to test Irwin's hypothesis and evaluate whether these two forms should be segregated from *P. colensoi*. Our preliminary analyses have not detected an exact correspondence between colour forms and genetic groups, suggesting floral features may not indicate taxonomic uniqueness. In addition, the genetic data shows some geographic structure so samples are grouped mostly according to their geographic origin. However, a few samples from Taranaki and the Hawke's Bay area formed a genetically distinct sub-group. This unexpected finding may lead to the resurrection of an old name or the recognition of a new species. We are currently working on further analyses and will soon start writing a manuscript with these results. Meanwhile, in a recent taxonomic twist, *P. colensoi* has been removed from *Prasophyllum* and it is now placed in *Paraprasophyllum* (Clements & Jones, 2019).

In a few months we will start our last fieldwork season. We are aiming to collect samples from all the orchids mentioned in Table 1. If you are familiar with any of these orchids or come across an unusual orchid, get some photos of the flower(s) and overall plant, upload on iNaturalist and please get in touch! Who knows, you may stumble across a new species!

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Calling prospective sponsors for the 2022 NZPCN conference in Queenstown

Alex Fergus & Joanna Smith

Our forthcoming conference was announced last month, and we are excited at the possibility of seeing many of you in Queenstown in March 2022. Our biennial conferences are well regarded as the best place to meet people who are passionate about plant conservation and to network and collaborate on shared issues and challenges. The focus of our next conference will be restoration ecology in New Zealand. Queenstown is an ideal location to host a restoration focused conference given the extent of the conifer to native ecosystem conversion underway and the ever-increasing number and size of local restoration projects.

As in previous years, we are seeking sponsors to support specific elements of the conference programme. This could be the conference dinner, plenary sessions, workshops, or field trips. Our goal in seeking sponsorship is to bring down the cost as much as we can for our members and for the public, so we can engage with as many people as possible, and share our collective skill bases widely.

For businesses or organisations unfamiliar with the NZPCN conference format, we are committed to engaging with our conference participants through a motivating and informative programme of speakers, workshops and field trips, each facilitating networking and business opportunities for sponsors. Participants will include staff from central and local government, crown research institutes, NGOs, universities, botanic gardens, nurseries, as well as students and private individuals. Sponsors will receive acknowledgement prior to, during and after the conference through conference materials, the NZPCN website and social media, and will have the opportunity to engage with conference participants at social events. We ask anyone who might be keen to sponsor part of the conference to get in touch with Alex if they would like to know more and we can supply you with a conference sponsorship document.

Contact details: fergusa@landcareresearch.co.nz or call 027 261 6896

And a quick summary of the 2022 conference:

Conference dates: 20 – 23 March 2022

Conference theme: Restoration Ecology in New Zealand

Topics within theme

- Challenges to scaling up restoration projects
- Eco-sourcing
- Engagement and education
- Iwi/hapu led restoration processes and case-studies
- Monitoring restoration projects
- Restoration after conifer removal
- Restoring threatened native plant populations
- Species richness and restoration

Timetable

Sunday 20 March: Workshops and evening registration and welcome event

Monday 21 March: talks/presentations

Tuesday 22 March: talks/presentations and conference dinner

Wednesday 23 March: field trips

Botanist Colin Ogle awarded Coast Care "Pīngao & Toheroa Trophy"

At the recent Coast Care Conference held in Whanganui, Colin Ogle was awarded the Pīngao & Toheroa Trophy Award. Sounds a mouthful—pīngao is a native sand building plant—and toheroa is New Zealand's iconic clam—but the award is very prestigious. It is "to celebrate the exceptional contributions of an individual to coastal restoration" and is awarded "only when someone of very high calibre comes to our attention."

It is not the first award Colin has received. In 2003 the New Zealand Botanical Society presented him with the Allan Mere Award and in 2004, Colin received the Loder Cup for services to Conservation of Vegetation. As was mentioned at the Coast Care Conference, "Nobody else has received all three awards."

Betsy Young presents the Coast Care "Pīngao & Toheroa" trophy to Colin Ogle. The award consists of a large piece of swamp kauri, a little sprig of pīngao woven to represent tutukuku panels and a toheroa shell. Photo: Simon Hoyle – Southlight.

Colin grew up on a farm in Hawera. He says, "My parents were keen gardeners and were involved in the local horticultural society. Through them, in my teenage years, I met other Taranaki horticulturalists, including Sir Vic Davies from Duncan & Davies Nurseries, (New Plymouth), Bernie and Rose Hollard from Hollards' Gardens (Kaponga) and Sir Russell Matthews of Tūpare Gardens in New Plymouth. It must have rubbed off on me."

He went into secondary school teaching and was soon head of Biology—a subject he loved teaching, especially to senior students, introducing them to field work. However, when he became Head of Science, he found the administration work load too much and in 1978 applied for a position as scientist with the Wildlife Service, despite a reduction in salary.

This work involved carrying out big regional surveys as part of a team. It was also a chance to see kokako, kākā and yellowhead for the first time. When the Service became part of the Department of Conservation in 1987, Colin was appointed Conservancy Advisory Scientist for the Whanganui Conservancy which, back then, extended from Taranaki across to the Desert Road and the Manawatu River.

He says, "This was near the beginning of the concept of ecological districts with the Foxton Ecological District extending over the coastal area from South Taranaki down to Paekākāriki." Colin would spend a lot of time in the field. One example was when he led a survey team of new graduates from Massey based at Mangaweka for four months." His 'hobby surveys' also covered exotics. "I did a study of eucalyptuses in the district, identifying 70 to 80 different types. I still get requests to identify them."

After retiring from DOC in 2000 Colin did a couple of paid roles including part time lecturing at Massey and surveying the proposed Waipipi windfarm site, but otherwise has continued his research, field work and presentations on a voluntary basis.

When he was given his award at the Coast Care Conference, it was noted that "He has written about wildlife and wildlife habitats in Northland and birds at Waitutu in Southland. His most recent publication was on monocot, (grass or grass-like flowering plants) weeds in the Manawatū Ecological Region."

A list of his publications extends over 23 pages with over 200 entries. Some look 'understandable' such as 'Threatened Plants in New Zealand." Others have you heading off to the internet to find out, such as "Monitoring of *Pterostylis micromega* at Ihupuku Swamp, Waverley 1995–1997.' (A species of greenhood orchid endemic to New Zealand).

The Coast Care presentation to Colin included the following: "When one is privileged enough to work with him or share time in the field or a meeting room with him, one realises just how much he has contributed to the country's knowledge on coastal matters, particularly plants and habitats."

But the following is just as important: "He's always been willing to share and teach and has influenced and continues to influence many people around him. He is very patient!" A previous winner of the Pīngao & Toheroa Trophy, Jim Dahm, described Colin "as New Zealand's leading botanist."

You are just as likely to see him in his role as Chair of the Friends of the Gordon Park Scenic Reserve gathering seeds or planting out seedlings, or hearing him give a lecture or a presentation such as the one he will be doing soon as part of the Nature Talks series, or leading a trip to Taihape or elsewhere, as part of the Whanganui Summer Programme.

Congratulations Colin on your awards and years of service to the environment.

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UPCOMING EVENTS

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

Auckland Botanical Society

Meeting: Wednesday 7 July at 7.30pm. **Speaker:** Howell Davies, Auckland Council arborist. **Topic**: An Urban Forest strategy, the mechanisms and tools needed to design and deliver a flourishing future for the ngahere.	**Venue:** Unitec, School of Natural Sciences, 139 Carrington Road, Mt. Albert (Gate 3, Building 182, Room 3002).
Field Trip: Saturday 17 July. Lichen Workshop 10.00am to 3.00pm at Unitec. **Meet**: Unitec, Carrington Road Gate 4**,** Building 114, Rooms 11-3007 (lab), 114-3015 (lab), 115-3016 (lunch room).	**Leader:** Dan Blanchon, ph. 09 815 4321 ext. 7355.

Waikato Botanical Society

Field Trip: Saturday 17 July to inner Raglan Harbour. **Meet:** Countdown Dinsdale at 9.00am or Raglan Museum and i–site at 10.00am. **Grade:** Easy.	**Leader:** Kerry Jones, email km8j1s@gmail.com, ph. 027 747 0733.

Rotorua Botanical Society

Field Trip: Saturday 10 July to western Matata dunes. **Meet:** Rotorua Council carpark at 8.00am or corner of Kaokaoroa Street and Clem Elliot Drive, Matata, at 9.00am. **Grade**: Easy.	**Leader:** Angela Simpson, email simpson.angela1@gmail.com, ph. 021 239 2554.

Wellington Botanical Society

Field Trip: Saturday 3 July to Whareroa Farm, TeAraRamaroa. **Meet:** Whareroa Farm car park (exit SH1 at MacKay's Crossing).	**Leaders:** Lara Shepherd, email lara.shepherd@tepapa.govt.nz, ph. 027 363 5854 and Leon Perrie, email leonp@tepapa.govt.nz.
Meeting: Monday 19 July at 7.30pm. **Speaker:** Dr Roger Uys, Senior Terrestrial Ecologist, GWRC. **Topic:** Wellington's dunelands – a naturally uncommon ecosystem.	**Venue:** Victoria University Lecture Theatre M101, ground floor Murphy Building, west side of Kelburn Parade.

Nelson Botanical Society

Field Trip: Sunday 18 July to Brook Waimarama Sanctuary.	**Leader:** Chris Ecroyd, email candjecroyd@gmail.com, ph. 03 544 7038.
Meeting: Monday 19 July at 7.30pm. **Speaker:** Ivan Rogers, DOC Motueka. **Topic:** Relationships between lizards and plants.	**Venue:** Jaycees Room, Founders Park.

Canterbury Botanical Society

Meeting: Monday 5 July at 7.30pm. **Speaker:** Dr Matt McGlone. **Topic**: What's cooking with *Kunzea*?	**Venue:** Upper Riccarton Library community meeting room, 71 Main South Road.

Botanical Society of Otago

Meeting: Wednesday 14 July at 5.20pm. **Speaker:** Melissa Hutchison. **Topic:** Almost an island—the remarkable flora and habitats of Banks Peninsula (via Zoom).	**Venue:** Room 215, 2nd Floor, Zoology Benham Building, 346 Great King Street.
Field Trip: Saturday 24 July to some local volcanic domes (Mt Kettle and Mt Cutten). **Meet:** Botany Department carpark (464 Great King Street North) at 9.00am.	**Leader:** Robyn Bridges, ph. 021 235 8997. If wet will be postponed to Sunday 25 July.

David Given Threatened Plant Scholarship

To fund research into the biosystematics and conservation management, protection and recovery of New Zealand's threatened plants, fungi and their communities.

Objective

The scholarship will be granted for research that assists the protection and recovery of New Zealand's threatened plant species and their communities.

Eligibility and conditions

Applicants must be New Zealand residents or citizens but the work could involve overseas researchers who collaborate with the principal researcher.

Threatened species and communities can be either nationally or regionally threatened.

Plant species include vascular and non-vascular plants. Fungi are also covered by this scholarship.

Application

Please address the following areas in any written application for the scholarship.

***Issue*:** Outline the issue to be investigated and why it is important to study this.

***Research methods*:** Outline the approach you intend to take.

***Impact*:** How will your research contribute to the better conservation of the threatened species or community?

***Uptake*:** How will your research be used by your or other organisations?

Researchers: Outline the skills the researchers involved in the project have to ensure it can be successfully completed? Include current CVs of applicants.

***Funding*:** Do you have other funding that is contributing to this project?

***Budget*:** Outline the main items in your budget including equipment, laboratory and field expenses, and personnel.

***Risks*:** Are there any factors that you consider could limit the success of your proposal? How will you mitigate these?

***Referees*:** List 2 referees who can be consulted for their opinion on the proposed research

Scholarship rules

1. One scholarship shall be awarded every 2 years and provide up to $8000 towards the cost of the research project.
2. The scholarship is to be awarded by a selection committee, which shall comprise:
   a. The President of the NZ Plant Conservation Network (NZPCN)
   b. At least one other member of the NZPCN Council
   c. An independent person appointed by the NZPCN Council
3. The selection committee may refrain from making an award if, in their opinion, there is no applicant of sufficient merit.
4. There are no application forms for this scholarship. Written applications addressing each of the above subject areas should be sent to the New Zealand Plant Conservation Network, Box 16 102, Wellington (info@nzpcn.co.nz) and marked "David Given Scholarship".
5. Referee forms (see below) should be sent to the two nominated referees for completion and posting or email to the Network.
6. **Applications close Friday 30 July 2021.**
7. Scholarship recipients will deliver a short report summarizing the projects results upon completing the research.

David Given Threatened Plant Scholarship
Referee form

The applicant must send this form electronically to each of two referees nominated in the scholarship application. These referees should be familiar with the applicant's recent work.

The referee is requested to complete (continue on a separate sheet if necessary), print and sign this form and send to: New Zealand Plant Conservation Network, PO Box 16-102, Wellington. E: info@nzpcn.org.nz

Applicant: Family name: _____ First name: _____

Referee: Name: _____ Position/Title: _____

Address: _____

_____

_____

Phone: _____ E-mail: _____

1. How long have you known the applicant: _____ Years _____ Months

2. Describe briefly the extent of your knowledge of the applicant's work including publications/papers/other relevant research:

_____

_____

_____

3. Please rate the applicant's performance in the areas named below by placing a tick in the appropriate box using your knowledge of the applicant.

	No opportunity to observe	Below average	Average	Above average	Very good	Excellent
Knowledge of own discipline	☐	☐	☐	☐	☐	☐
Ability to express ideas	☐	☐	☐	☐	☐	☐
Command of research techniques	☐	☐	☐	☐	☐	☐
Critical and/or analytical ability	☐	☐	☐	☐	☐	☐
Initiative and motivation	☐	☐	☐	☐	☐	☐
Ability to plan	☐	☐	☐	☐	☐	☐
Perseverance in pursuing aims	☐	☐	☐	☐	☐	☐
Teaching or tutoring ability	☐	☐	☐	☐	☐	☐

4. Please rate the applicant's aptitude for research (please circle) High Moderate/High Moderate Low

Please comment on reasons for gradings in Section 3, and other matters relevant to the applicant including academic integrity:

_____

_____

_____

Signature of referee: _____ Date: _____ _____ _____

Reports relating to this scholarship application must reach the New Zealand Plant Conservation Network on or before Friday 30 July 2021.