TRILEPIDEA

Newsletter of the New Zealand Plant Conservation Network

No. 172

April 2018

Deadline for next issue: Monday 16 April 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

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PLANT OF THE MONTH

Celmisia glandulosa var. *latifolia.*

PLANT OF THE MONTH – *CELMISIA GLANDULOSA* VAR. *LATIFOLIA*

Celmisia glandulosa var. *latifolia*. Photo: Jeremy Rolfe.

The plant of the month for March is *Celmisia glandulosa* var. *latifolia,* one of three *Celmisia glandulosa* varieties endemic to New Zealand. This little species is adapted to damp and boggy sites in the subalpine to low alpine zone. It is generally found in open seepages and bogs, or very damp grassland and scrub, often in areas that are perpetually damp year round. Variety *latifolia* is found only on Mt Taranaki and the Pouakai Range in the North Island.

Plants can grow either as sparsely scattered individuals or as dense clumped mats. The leaves are wide and club shaped with serrations that have fine pointed tips. Single white composite flowers are held on long scapes, well above the leaves, and are very large relative to the plant. The other two varieties of *Celmisia glandulosa*, var. *longiscapa* and var. *glandulosa* differ from var. *latifolia* by both having narrower leaves (5–15 mm rather than 10–20 mm in var. *latifolia*), and variety *longiscapa* has longer scapes (flower stalks). Neither of the other two varieties is found growing with var. *latifolia*, so they are not easily confused.

Celmisia glandulosa var. *latifolia* is currently listed as At Risk—Naturally Uncommon, because of its very restricted distribution, but relative abundance within its range. The species' habitat could be prone to weed invasion, especially with climatic warming, and ever increasing number of visitors moving weed species into the areas which it inhabits. It does not seem prone to being browsed by exotic herbivores. Probably one of the main threats to the existence of variety *latifolia* is a large volcanic eruption occurring on Mt Taranaki, which could bury its entire habitat in ash.

The genus *Celmisia* consists of at least 70 species, most of which are endemic to New Zealand and a few to Australia. The genus *Celmisia* is apparently named after Kelmis, one of Idaean Dactyls, a group of skilled mythical beings associated with the Mother Goddess Rhea in Greek mythology. *Glandulosa* means 'with glands', and *latifolia* is derived from the Latin 'latus' meaning broad, so 'broad leaved'.

You can view the NZPCN website factsheet for *Celmisia glandulosa* var. *latifolia* at: http://www.nzpcn.org.nz/flora_details.aspx?ID=418

About the birds and the bees and the flowers of Bartlett's rātā; pollination studies to assist conservation of a Threatened—Nationally Critical species

Carlos A. Lehnebach, Museum of New Zealand Te Papa Tongarewa, (CarlosL@tepapa.govt.nz) and Karin van der Walt, Otari Native Botanic Garden and Wilton's Bush Reserve (Karin.VanderWalt@wcc.govt.nz)

Understanding the way threatened species reproduce is crucial to their conservation. The ability to reproduce threatened species enables us to restore or reinforce declining populations, or establish *ex situ* collections through seed banks, cryopreservation or living collections. Although most plant species can be propagated through cuttings or seed, preference is given to seed propagation because the offspring is genetically variable and vigorous (cuttings are clones of the parental plant).

Bartlett's rātā (*Metrosideros bartlettii*) is New Zealand's most threatened tree species and is currently listed as Nationally Critical (de Lange et al., 2013). This rare species, with its unique white flowers, is now confined to 13 trees within three populations in the wild. Besides habitat destruction and possum browsing, natural regeneration of the species has been hampered by its irregular flowering and low seed viability. The arrival of the myrtle rust disease to New Zealand has further jeopardised the survival of this species.

Bartlett's rātā is common in cultivation with numerous trees in private and public gardens in both North and South Islands. Unfortunately, these trees are mostly clones (cuttings from a single tree) and therefore genetically identical. To increase the genetic diversity within cultivated Bartlett's rātā and uncover the cause(s) for the production of poor quality seed, we have conducted several pollination experiments and observations on two trees growing at Otari Wilton's Bush (Otari Native Botanic Garden and Wilton's Bush Reserve) in Wellington. These trees flowered for the first time last year (November 2017), almost 25 years after they were planted. An absolutely unexpected event!

As part of our study, we have followed the development of the flowers from bud to anthesis (i.e., flower is fully open) and conducted several pollination experiments to determine whether this species is able to form seeds using its own pollen or if it requires pollen from a genetically distinct tree. To do this, we tagged and observed over 400 flowers. Some flowers were emasculated (stamens were removed) before the anthers opened (Figure 1, middle) and then covered with bags to prevent pollen from the same tree reaching the stigma. When the stigma was mature, half of these virgin flowers were pollinated with pollen from the same tree (hand self-pollination) and the other half with pollen from a genetically distinct tree (hand cross-pollination) growing in the Auckland University grounds and bagged again. We removed the bags only after we noticed the stigma's surface has oxidised and the petals had fallen off (Figure 2, middle). Some flowers were left untouched (stamens were not removed) but bagged to test whether they can self-pollinate. Other flowers were left un-bagged and used as controls. We have also looked into the viability of the pollen grain (Figure 1, right), and determined the time when the stigma (female part of the flower) is receptive by using a peroxide test.

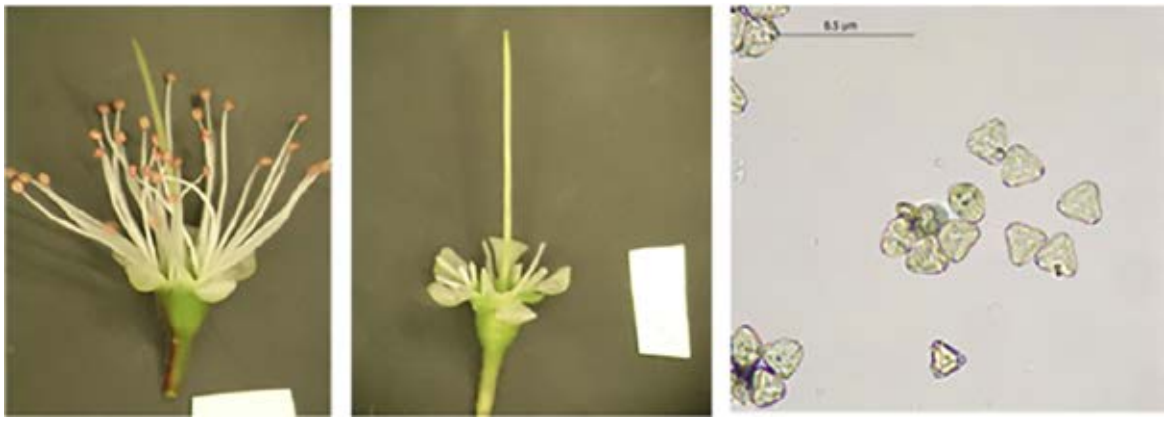

Figure 1: Flowers of the Bartlett's rātā before (left) and after removing the stamens (middle), and pollen grains under light microscope (right). White bar = 5 mm.

It has been over four months since we conducted these experiments and our preliminary results suggest the Bartlett's rātā is a self-incompatible species. That means its flowers will produce seeds only if they are pollinated by pollen from a genetically distinct tree. From all our pollination experiments only those flowers pollinated with pollen from the tree growing at Auckland University have formed fruit/capsule. Self-incompatibility is a great strategy to promote outcrossing and genetic diversity but it is bad news for the last 13 trees left in the wild as habitat fragmentation reduces connectivity between trees making the transfer of pollen between genetically distinct trees less likely.

But our study is still work in progress. We have to analyse our data and wait for a few more weeks for the capsules to mature (Figure 2, right) and split open. To prevent seed loss we have bagged these branches again. After collecting the seeds, we will investigate seed viability and we will try to germinate them. If it all goes well, we will have a few more seedlings of this extremely rare tree that are genetically distinct. Fingers crossed!

Figure 2: A bumble bee visiting flowers of Bartlett's rātā at Otari Wilton's Bush (left), capsules developing a month after flowers were hand-cross pollinated (middle) and mature capsules in mid-March (right).

Acknowledgements: We would like to thank Bruce Burns, Eleanor Burton, Peter de Lange, Rebel Drummond, Anne Gaskett, Jane Humble, Jeremy Rolfe and the staff at Otari Wilton's Bush for their help with this study.

Reference

de Lange, P.J.; Rolfe, J.R.; Champion, P.D.; Courtney, S.P.; Heenan, P.B.; Barkla, J.W.; Cameron, E.K.; Norton, D.A.; Hitchmough, R.A. 2013: Conservation status of New Zealand indigenous vascular plants, 2012. New Zealand Threat Classification Series 3. Department of Conservation, Wellington. 70 p.

Newsletter copy request

In the over 10 years that I have been compiling the monthly newsletter this issue must be the thinnest. Surely there must be reports from field trips and week-long summer camps that would be interesting reading for members in other parts of the country. Please don't use poor writing skills as an excuse for not sending in material; I am happy and available to polish the text in articles that are submitted. The copy deadline is around the 15th of each month; send your submissions to info@nzpcn.org.nz.

Eric Scott
NZPCN Administrator

UPCOMING EVENTS

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

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.	**More details:** to be provided in the near future, so stay tuned at www.anpc.asn.au/conferences/2018.

Auckland Botanical Society

Meeting: Wednesday 4 April at 7.30 p.m. for a talk by Tim Curran titled 'Plant and garden flammability study'. **Venue:** Unitec Room 115-2017.	**Contact:** Maureen Young, email: youngmaureen@xtra.co.nz.
Field trip: Saturday 21 April to Awhitu Regional Park. Leader: Tricia Aspin.	**Contact:** Maureen Young, email: youngmaureen@xtra.co.nz.

Kaipatiki Project presents EcoFest North 2018: 17 March to 15 April

Sustainability and environment themed events: Auckland North, 17 March – 15 April. **Keystone events:** • **Totally Sustainable Talks:** An evening of enviro banter, inspiration and knowhow from local community and thought leaders on Thursday 5 April, 2018 7–9.30pm at The Vic Theatre, Devonport, followed by a networking function. Free and suitable for anyone who wants to make the planet a better place and meet others who do too!	**More information:** www.kaipatiki.org.nz/ecofest/

Rotorua Botanical Society

Field trip: Saturday 28 April to Piripai Spit. **Meet:** the car park, Rotorua, at 8.00 a.m. or The Hub, Whakatane, at 9.00 a.m. **Grade**: easy.	**Leader:** Sarah Beadel, ph: 07 345 5912 or 021 924 476; email: Sarah.Beadel@wildlands.co.nz

Wellington Botanical Society

Field trip: Saturday 7 April to the Wainuiomata catchment with members of the Nelson BotSoc. **Meet:** at 9.45 a.m. at the main gate, Whitcher Grove Rd, off Moores Valley Rd, Holmdale, Wainuiomata. (If traveling by car, please tell the co-leaders if you can take passengers.)	**Co-leaders:** Chris Horne, ph: 04 475 7025; Sunita Singh, ph: 04 387 9955 or 027 4052 987.
Meeting: Monday 16 April at 7.30 p.m. for a talk by Dr Alex Fergus titled 'Flora of New Zealand's and Australia's sub-Antarctic islands.	**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 15 April to Uri o te Wai Bishops Peninsula. **Meet:** at 9.00 a.m. at the Cathedral steps.	**Leader:** David Grinsted, ph: 03 542 4384, email: davidgrinsted@gmail.com
Meeting: Monday 16 April at 6.00 p.m. for a pot luck dinner followed at 7.17 p.m. by the AGM and then at 8.00 p.m. a talk by Catherine Kirby (author of Field Guide to New Zealand's Epiphytes, Vines & Mistletoes).	**Venue:** Jaycee rooms, Founders Park.

Botanical Society of Otago.

Field trip: Saturday 7 April for a botanical photography trip to McPhees Rock. Bring your camera and a tripod if you have one. **Meet:** at the Botany Department car park at 8.30 a.m. (Sunday 8 April is the bad weather reserve day). **Bring:** your camera, warm clothing and wet weather gear.	**Contact:** David Lyttle, ph: 03 454 5470; email: djl1yttle@gmail.com.
Meeting: Wednesday 11 April at 5.20 p.m: for a talk by Dr Bronwyn Lowe titled 'The whys and hows of identifying plants used in Māori textiles'**. . 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.