

No. 176

July 2018

Deadline for next issue:
Wednesday 15 August 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



Carmichaelia juncea.
Photo: Simon Walls.

Kauri dieback: research into how native plants impact zoospore spread

Monica Gerth, Victoria University of Wellington (monica.gerth@vuw.ac.nz)

By now, most New Zealanders (and especially members of the NZPCN) have heard of kauri dieback. This devastating disease kills kauri trees of all ages. There is no cure and it is spreading rapidly. For example, in the Waitākere Ranges Regional Park, the number of infected trees has more than doubled in the past 5 years. New technologies to help stop the spread of the pathogen, and/or provide a cure, are desperately needed.

As a microbiologist, my research is focused on the microbe causing the disease: *Phytophthora agathidicida*. *Phytophthora* spp. are a group of plant pathogenic microbes that cause root rot and dieback diseases in thousands of plant species. It was a *Phytophthora* species (*P. infestans*) that caused the Irish potato famine in the 1840s. Another *Phytophthora* (*P. cinnamomi*) affects over 40% of the native plant species and half of the endangered ones in the south-west of Western Australia.

Phytophthora are notoriously difficult to control or eradicate. Often referred to as ‘fungus-like’, *Phytophthora* are actually more closely related to diatoms and brown algae. The practical implication of this biological oddity is enormous: *Phytophthora* are unaffected by most agrichemical fungicides. For example, *Phytophthora* lack many common fungicide targets, such as the ergosterol biosynthesis pathway and chitin-based cell walls.

Another complicating factor is that *Phytophthora* have several life cycle stages that are not found in most true fungi (Fig. 1). In addition to a mycelial growth phase (similar to fungi), *Phytophthora* produce two key types of spores: oospores and zoospores. Oospores are ‘survival’ spores and may persist in plant tissues or the surrounding soil for years after the host plant dies. Zoospores are ‘dispersal’ spores. They are key to the epidemic spread of disease, facilitating host-to-host transmission. Zoospores can swim through water-logged soils to reach potential hosts. *Phytophthora* zoospores specifically detect and swim towards compounds released by the roots of their host plants, a process called chemotaxis. This host targeting greatly increases their chances of finding a suitable infection site. Once a zoospore locates a host plant, it encysts and initiates infection.

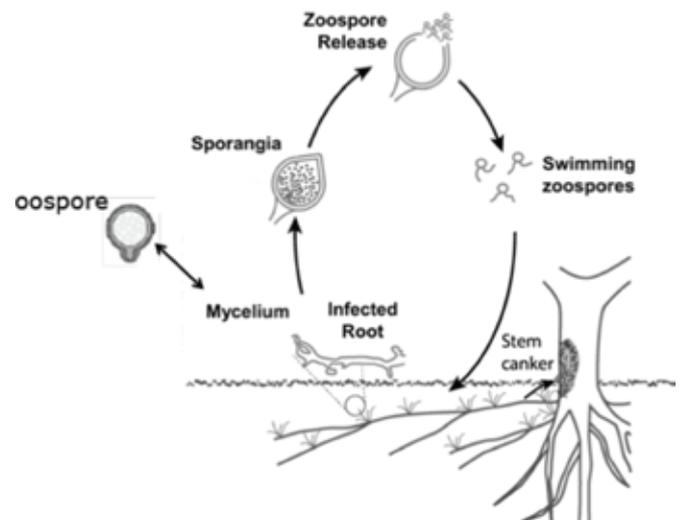


Fig. 1. Major life cycle stages of *Phytophthora agathidicida*

PLANT OF THE MONTH – *CARMICHAELIA JUNCEA*



Carmichaelia juncea. Flowers (left) and immature fruit (right). Photos: Simon Walls.

The plant of the month for July is the *Carmichaelia juncea*, one of at least 23 *Carmichaelia* species native to the New Zealand region. Like all the other native species, *C. juncea* is palatable to introduced herbivores and, as a result, is under serious threat. The species was historically widespread, with a few records from the North Island and widespread records from the South Island, but is now presumed extinct in the North Island, and is found only in South Westland and Tasman of the South Island with a small remnant population on coastal conglomerate bluffs, near Cape Farewell, North West Nelson.

Carmichaelia juncea is a pioneer species, being found mostly in open gravelly flood prone areas in riverbeds, where there is little competition from other species. It is a prostrate sprawling species that looks brown and half dead most of the time, making it easy to overlook. The plants are almost leafless, relying on the stems (cladodes) to carry out most of the photosynthesis. The white to purple flowers are borne in clusters at nodes along the stems, and can be so prolific at times they cover the entire plant. When mature, the small fruiting pods burst open to disperse the seed.

The species is easily distinguished from most other *Carmichaelia* species by its prostrate sprawling habit. It is most similar in appearance to *C. appressa*. Both species are prostrate and sprawly, but *C. appressa* is found only in coastal mid Canterbury and has much shorter and more highly dividing branches, giving it a sprawling look, rather than the long trailing look of *C. juncea*.

The species is endemic to New Zealand and is currently listed as Threatened—Nationally Vulnerable, because its population has shrunk significantly in the last few hundred years and is so vulnerable to browse and habitat degradation. The South Westland populations appear to be fairly stable, but fluctuate dramatically because of floods. Hares are the main herbivore threat to all populations and exotic grass and weed species crowd out the species in some Westland areas. Some monitoring of the species has been carried out but probably not enough recently.

The genus *Carmichaelia* is almost entirely endemic to the New Zealand region with only one species, *C. exsul*, from Lord Howe Island. It is in the pea family, Fabaceae, along with other distinctive New Zealand native genera such as *Clianthus*, *Montigena* and *Sophora*. The genus name *Carmichaelia* is named after Captain Dugald Carmichael, a Scottish army officer and botanist, who wrote *A Flora of Tristan Da Cunha*; the species epithet *juncea* means 'rush-like' (like a *Juncus*) referring to the habit and look of the plant.

You can view the NZPCN website factsheet for *Carmichaelia juncea* at: http://www.nzpcn.org.nz/flora_details.aspx?ID=56

One key part of our research is to understand how native plants may be impacting the movement of zoospores in the environment. We know from studies of other *Phytophthora* spp. that the zoospores can be attracted, or repelled, by root exudates of various plants. Sometimes this is a general response to common plant metabolites; other times is it movement towards a host-specific chemical signal. However, when we began our project, nothing was known about *P. agathidicida* zoospores and what they respond to. With funding from the National Science Challenge: New Zealand's Biological Heritage Ngā Koiora Tuku Iho, we've started testing root extracts from kauri and companion plants. Interestingly, we've found it to be important to harvest roots from mature plants growing in the field, under natural conditions. Reliable access to samples was initially a challenge, though recently we have partnered with Otari-Wilton Native Bush reserve; this has been a huge help to our research, though kauri roots remain challenging to obtain in Wellington!

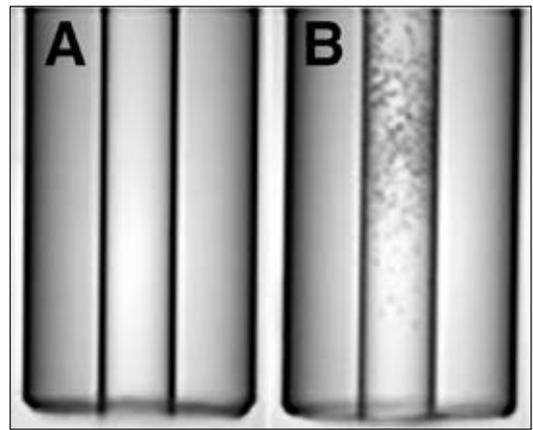


Fig. 2. A typical assay to measure zoospore chemotaxis. Here, the number of zoospores attracted into a capillary tube containing either a negative control (A) or an attractant (positive control, (B)) is quantified.

We are seeing interesting differences between the plants tested—a few don't seem to do much at all, but others are strongly attractant and a smaller number are even repellent! It is still early days though, and much remains to be explored. We welcome input from NZPCN members for suggestions. Long-term, we hope our research may provide insights into management strategies such as co-planting, that may help slow the spread of the disease.

In the meantime, please respect the rāhui and forest closures. Humans are a major cause of the spread of *Phytophthora agathidicida*. The spores are spread via soil movement along tracks. Staying away from kauri forests is currently our best option for keeping our kauri, our taonga, safe.

New Zealand Plant Conservation Network annual awards

It is again time again to honour those who have made an outstanding contribution to native plant conservation in New Zealand. The New Zealand Plant Conservation Network is now calling for nominations for the 2018 awards.

Award categories are:

- Individual
- School
- Council
- Community
- Plant Nursery
- Young Plant Conservationist of the Year (under 18 years at 30 June 2018)

The nomination form is attached to the end of the newsletter and is available from the Network website (www.nzpcn.org.nz)

We look forward to your nominations; you may make multiple nominations under the different categories. Anyone is eligible to make nominations, not just Network members. Nominations close on **Friday 5 October 2018**.

The awards will be presented at the **2018 Network Annual General Meeting**.

Myrtle rust response in Australia

Linda Broadhurst, President, Australian Network for Plant Conservation Inc. (anpc@anpc.asn.au)

On behalf of the Australian Network for Plant Conservation, I would like to draw your attention to the release of two documents relating to the environmental threat posed by the myrtle rust pathogen in Australia.

- ‘*Myrtle Rust in Australia – a draft Action Plan*’ is now published in PDF format at www.apbsf.org.au. This document is open for public comment until 31 August 2018. The intent of the *draft Action Plan* is to provide a framework for a nationally coordinated environmental response to myrtle rust—that is, for the conservation of native biodiversity at risk. Such a response has been lacking to date.
- ‘*Myrtle Rust reviewed: the impacts of the invasive pathogen *Austropuccinia psidii* on the Australian environment*’ is now published in PDF format at www.apbsf.org.au. This is the first overall synthesis of the environmental effects of this pathogen. The intent of the *review of impacts* is to provide the evidentiary basis for the proposed actions, and to show their urgency.

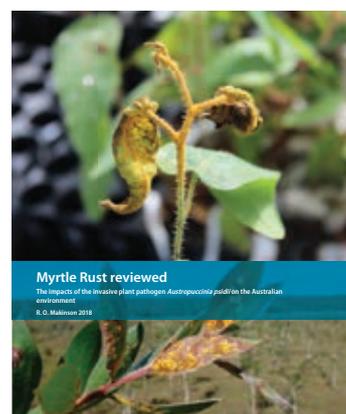
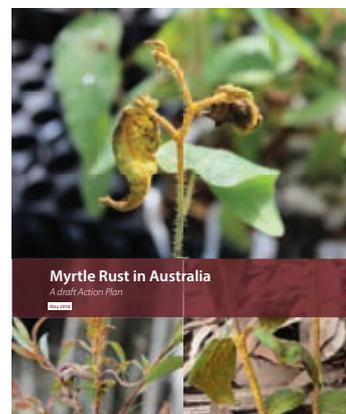
Uptake of the draft Action Plan, and resourcing of its recommended actions, are not a given. No agencies are yet committed to it. Uptake will depend in part on public and professional feedback during the comment period. Australia has, to date, lacked any nationally coordinated response to the environmental dimensions of this pathogen. Some momentum has been established over the last year at Commonwealth level, but needs reinforcement at all levels of government.

The Review and draft Action Plan were co-funded by the National Environmental Science Program (NESP) of the Commonwealth Department of Environment, and the Plant Biosecurity Cooperative Research Centre (PBCRC). As of June 30, the PBCRC sadly no longer exists, but much of its legacy is preserved at the www.apbsf.org.au website.

Myrtle rust disease, caused by the pathogenic fungus *Austropuccinia psidii*, is already causing the steep decline of a number of Australian native plant species, at least four of which are now approaching extinction after only a few years of exposure. Forty-five species are nominated in the draft Action Plan for priority conservation actions. The beginnings of ecosystem-level decline are starting to become apparent in rainforest, coastal heathland and some *Melaleuca* wetland communities, and cascade declines of other biota are on the cards in some cases.

I urge you or your organisation to consider providing comment on the draft Action Plan, to the email address shown on it, by August 31. We understand that comments received will be collated and circulated to the government agencies who would need to lead and provide core funding for any environmental response. A strong expression of stakeholder views, whether critical of the draft Action Plan or supportive, will help to demonstrate the seriousness of the issue, and to secure attention to it in both government and non-government circles.

Until such time as the national coordination elements of the draft Action Plan may be implemented, we all continue to rely on the largely informal links already forged around the environmental aspects of the myrtle rust problem. The ANPC is represented on the informal (and un-resourced) Myrtle Rust Environmental Impacts Working Group, and can facilitate links to other stakeholders where these are lacking.



Global Partnership for Plant Conservation

Susan Sharrock, GPPC Secretariat (suzanne.sharrock@bgci.org)



A conference of the Global Partnership for Plant Conservation will be held in Cape Town, South Africa, from 28–30 August. This will be followed by a meeting of the Global Strategy for Plant Conservation Liaison Group, convened by the Secretariat of the Convention on Biological Diversity.

These meetings will bring together plant conservation scientists, policy makers and practitioners from across the world to consider the future of plant conservation and, in particular, to develop ideas for a global plant conservation strategy for the post-2020 period. In preparation for the meeting, a survey, available in [English](#) and [French](#), is being carried out to invite views on the nature and content of a Global Strategy for Plant Conservation beyond 2020 and how it might be integrated into the post-2020 global biodiversity framework.

We would be grateful if you could take part in this brief survey and encourage your partners, colleagues and networks to do the same. For those interested in attending the GPPC Conference, more information is available [here](#).

Whanganui Regional Museum Botanical Group Golden Anniversary

You are invited to a special celebration of the 50th anniversary of the Whanganui Regional Museum Botanical Group on Saturday 27 and Sunday 28 October 2018. A varied programme has been planned. There are now flights by Chathams Air between Auckland and Whanganui: <https://www.airchathams.co.nz/Airline-Info/whanganui-schedule/>. The hosts can arrange pick-up from and delivery to Whanganui airport. Please book your own accommodation; some is available at the Quaker Settlement (twin share \$45 each, per night, or your own room \$60 (including linen and towel), sleeping house \$30 each (take your own bedding and towel). Contact: www.quakersettlement.co.nz/facilities-bookings/charges-and-fees/

By arriving a day or more before, or staying on after Sunday, you can check out some of the other local botanical options. Members of the Botanical Group may be available to show you around if you would like a guide. Places to explore include Gordon Park Scenic Reserve (10 ha of swamp forest with an all-weather track); the James McGregor Arboretum at Kowhai Park on the true left of the awa; coastal dunes at Castlecliff (see a local dune restoration project or unmanaged dunes to the west, with interesting garden escapes among lots of splendid spinifex; Bason Botanical Gardens. For the more adventurous, consider a day trip to the Waitahinga Trails (mainly tracked black beech forest). The Botanical Group has plant lists available for most of these places.

Potential attendees are invited to contact Margi Keys, the anniversary committee's convenor (see below), for details. Earlybird registration (\$50 per person) is open till 31 July after which date it becomes \$60 pp. Registrations should be made with Margi Keys (email: margikeys93@gmail.com or ph: 06 344 1250).

Auckland Council Regional Environment and Natural Heritage Grant

Adam Abdeldayem, Senior Grants Advisor, Auckland Council (adam.abdeldayem@aucklandcouncil.govt.nz)

I am happy to inform you that the Auckland Council Regional Environment and Natural Heritage Grant 2018/2019 is currently open and will be accepting grant applications until **31 August 2018**.

The Regional Environment and Natural Heritage Grants Programme is a contestable community grants programme that offers grants between \$5000 and \$40,000 for eligible projects that target the protection, restoration or enhancement of Auckland's environment with a focus on strategic regional initiatives for natural heritage and sustainable living. The programme is open to individuals, Mana Whenua organisations, community groups, trusts and other organisations that contribute to the protection and improvement of regionally significant areas within Auckland in addition to regional initiatives that promote the efficient and sustainable use of resources.

Information about the grant guidelines, eligibility criteria and the link to apply can be accessed via this [link](#).

UPCOMING EVENTS

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

The Global Partnership for Plant Conservation Conference

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

Register at: <http://www.sanbi.org/events/global-partnership-plant-conservation-conference>

12th Australian Plant Conservation Conference

APCC12: 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.

John Child Annual Bryophyte and Lichen Workshop

Date: 8–13 November. **Location:** Pureora Forest Lodge. Open to 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 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 1 August at 7.30 p.m. for a talk by Jessica Beever titled 'Auckland moss stories-two rogues and several taonga'. **Venue:** Unitec Room 115-2017.

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

Field trip: Saturday 18 August to a location (TBC) in Motukaraka Island/Omana Regional Park. **Leader:** Geoff Davidson.

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

Waikato Botanical Society

Field trip: Sunday 9 September to Arnolds Bush (Piarere) (combined with Rotorua Botanical Society). **Grade:** easy.

Meet: Piarere Hall (on SH29, 750 metres north east of SH1).

Rotorua Botanical Society

Meeting: Monday 27 August at 7.30 p.m. for the annual Rotorua Botanical Society Lecture to be given by Graeme Jane and Gael Donaghy titled 'Of horses and mountains of Central Asia – Russian Caucasus and western Tien Shan Mountains, Kazakhstan.

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 9 September to Arnolds Bush (Piarere) (combined with Waikato Botanical Society). **Meet:** Piarere Hall (on SH29, 750 metres north east of SH1). **Grade:** easy.

Leader: Mark Smale, ph: 07 859 3729; mail: smalem@landcareresearch.co.nz

Whanganui Regional Museum Botanical Group

Golden Anniversary: Saturday 27 and Sunday 28 October, see article above. Earlybird registration : \$50 per person, open till 31 July after which date it becomes \$60 pp.

To register: Margi Keys, email: margikeys93@gmail.com or ph: 06 344 1250.

Wellington Botanical Society

Field trip: Saturday 4 August to the DOC covenant, Makara Farm. **Meet:** at 9.30 a.m. at the former NZ Post Office village, off Opau Rd.

Co-Leaders: Richard Herbert, ph: 04 232 6828 or 027 4455942; Lynne Pomare, ph: 04 934 1187, 021 054 9699

Meeting: Monday 20 August at 7.30 p.m. for the Annual General Meeting followed by the A P Druce Memorial Lecture to be given by Prof Bruce Clarkson, University of Waikato, titled 'Botanist Tony Druce's methods and our memories'.

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 19 August to Canaan Downs Takaka Hill. Meet: 9.00 a.m. at the Cathedral steps; contact the leader if intending to come.

Leader: Don Pittham, ph: 03 545 1985; email: pitthamd@xtra.co.nz.

Meeting: Monday 20 August at 7.30 for a talk by Brian Patrick titled 'Nature's rainbow: discovering New Zealand's amazing butterflies.

Venue: Jaycees room Founders Park.

Canterbury Botanical Society

Meeting: Monday 6 August at 7.30 p.m. for a talk by Jeremy Rolfe on the key changes in the threatened status of NZ vascular plants.

Venue: Upper Riccarton Library, 71 Main South Road.

Field Trip: Saturday 11 August for a beginner's guide to the *Coprosma* species in the Port Hills forests and shrublands. **Meet:** at 9.00 a.m. in Malcolm Avenue, on the corner opposite the Z petrol station, 23 Colombo Street. **Cost:** \$4 suggested petrol reimbursement. **Bring:** lunch, thermos, warm jacket, raincoat, walking boots.

Contact: Alice Shanks, please let her know if you intend to come; email: alice@caverock.net.nz; ph: 027 366 1246 so she can let you know if the trip is cancelled.

Meeting: Monday 3 September at 7.30 p.m. for a talk by Yuriy Malakhov (student grant recipient) titled 'Benthic microalgae of the estuary'

Venue: Upper Riccarton Library, 71 Main South Road.

Botanical Society of Otago

Meeting: Wednesday 8 August at 5.20 p.m. for a talk by Lloyd Esler titled 'Botanical experiences in the South'. **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.

Field trip: Saturday 25 August to Sullivans Dam. **Meet:** at 9.00 a.m. at the Botany Department car park.

Contact: David Lyttle, ph: 03 454 5470; email: djl1yttle@gmail.com.



NEW ZEALAND PLANT CONSERVATION NETWORK

PLANT CONSERVATION AWARDS: 2018

The New Zealand Plant Conservation Network is now accepting nominations for the 2018 awards. The purpose of these awards is to acknowledge outstanding contributions to native plant conservation.

The award categories are:

- Individual** involved in plant conservation
- Plant nursery** involved in plant conservation
- School** plant conservation project
- Community** plant conservation project
- Local authority** protecting native plant life
- Young Plant Conservationist** of the Year (under 18 years on 30 June 2018)

More information about the awards and additional nomination forms are available on the Network website - www.nzpcn.org.nz. You can make multiple nominations under different categories. Anyone is eligible to make nominations, not just Network members. The awards will be presented at the **2018 NZ Plant Conservation Network AGM** in November. Winners will be informed in advance of the meeting. Nominations close on **Friday 5th October**.

NOMINATION FORM

Category (please circle):

Individual *Plant* *Nursery* *School*
Community *Local Authority* *Young Plant Conservationist*

NAME OF NOMINEE: _____

Contact details for person, school, nursery, community group or local authority:

Address: _____

Phone: _____ Email: _____

