



TRILEPIDEA

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Deadline for next issue:
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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.

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NEW ZEALAND

PLANT OF THE MONTH, p. 2



Haastia pulvinaris.
Photo: Colin Ogle.

Unique rhizome fly's home as title winner! NZPCN Favourite Plant, Worst Weed poll

Matt Ward (NZPCN Council Member) (mattdavidward@gmail.com)

The 2017 New Zealand Conservation Network Favourite Plant and Worst Weed election concluded late last year. The 2017 poll was a relatively sedate event, but nonetheless a new winner has been crowned as favourite plant; this is the twelfth species to have won in the 14 years of the competition. In contrast, a returning winner has taken away the title of worst weed.

The winner of the 2017 Favourite Plant with 32.5% of the votes is:

Pua o te reinga, wood rose— *Dactylanthus taylorii*

Dactylanthus taylorii is a threatened species, described as “Threatened – Nationally Vulnerable” (de Lange et al., 2013). *Dactylanthus taylorii* is a unique endemic in New Zealand: it is our only member of the family Mystropetalaceae; it is our only fully parasitic flowering plant; it lacks chlorophyll; and it is dioecious with an approximate 5:1 male bias just to make reproduction and survival that much more challenging. The plant grows in the form of a rhizome, which is mostly buried just below the surface making it very cryptic until in flower. The ‘flowers’ appear only for a few days, although a single rhizome can produce up to 60 inflorescences a season. The female inflorescences slightly resemble a ground dwelling tarantula spider with mostly dark brown scaly fleshy stalks known as spadices that bear simple flowers. The male flower, also very simple in structure, produces a huge amount of squalene rich nectar in an attempt to attract an animal pollinator. The known targeted pollinator of *D. taylorii* is the short-tailed bat, which is also an endangered species, causing a somewhat limited potential for pollination. Because of the low growth habit of *D. taylorii*, it has become a favourite food of ship rats and possums that are not known to perform any



Dactylanthus taylorii female inflorescence. Photo: Dennis Gordon, NIWA.

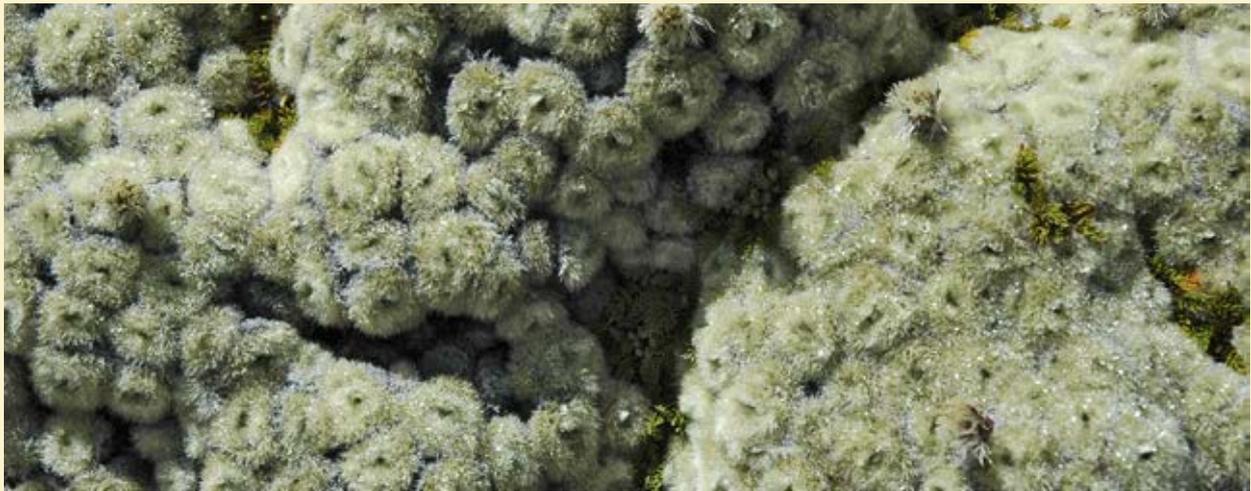


Dactylanthus taylorii male inflorescences. Photo: Nick Singers.



Dactylanthus taylorii being fed on and predated by common brushtail possum—*Trichosurus vulpecula*. Photo: Nga Manu Images.

PLANT OF THE MONTH – *HAASTIA PULVINARIS*



Haastia pulvinaris var. *pulvinaris*. Photo: Colin Ogle.

The plant of the month for January is *Haastia pulvinaris*, one of three *Haastia* species, all endemic to New Zealand. The species is adapted to very exposed habitats in the mid to high alpine zone. It is often found near high rocky ridges, often just over the shaded side on stable scree, and on rock outcrops, growing out of cracks. It is found in the drier eastern areas of the northern South Island from the Richmond Ranges, near Nelson, to north Otago. Individuals form large dense clumps or cushions, totally covering the ground surface for up to a few square metres area. The leaves are very reduced in size and packed in uniform round rosettes that look like little cylinders, very similar in form to those of the vegetable sheep, *Raoulia* spp. Single yellow or whitish composite flowers emerge from the top of each rosette. These have very reduced ray florets and are in the form of small buttons. The species is split into two varieties, var. *pulvinaris* and var. *minor*, which differ in their rosette diameter and tomentum colour. *Haastia pulvinaris* var. *minor* has a whiter tomentum and smaller rosettes (<15 mm diameter).

The species is most similar in appearance to some *Raoulia* spp., such as *R. mammilaris* and *R. exmina*. It overlaps in distribution with these species, but differs in that the cylindrical rosettes are much larger (>5 mm) than those of the *Raoulia* spp. Its distribution also overlaps the other *Haastia* spp., but is easily differentiated from these by the extremely reduced leaves and rosettes.

This species is endemic to New Zealand. *Haastia pulvinaris* var. *pulvinaris* is currently listed as Not Threatened, because most of its habitat is fairly intact and resistant to weed invasion because of its high altitude and exposure. *Haastia pulvinaris* var. *minor* is listed as Data Deficient, because it appears to be quite sparse, and not enough is known about its population size and exact distribution extent. Plants are not prone to browse by most exotic animals. It would be hard to cultivate because of its very specific habitat requirements and should not be removed from the wild since almost all of its natural habitat is within conservation areas.

The genus *Haastia* consists of three species, all of which are endemic to New Zealand. It is most closely allied to the genus *Brachyglottis*, according to recent molecular studies. The genus name *Haastia* is named after Julius von Haast, a famous explorer of southern New Zealand. The species epithet is from the Latin *pulvinar* 'a cushion', as the plant resembles a cushion in its form.

You can view the NZPCN website factsheet for *Haastia pulvinaris* var. *pulvinaris* at: http://www.nzpcn.org.nz/flora_details.aspx?ID=1378

and *Haastia pulvinaris* var. *minor* at: http://www.nzpcn.org.nz/flora_details.aspx?ID=511

nature but because of its relationship with our seriously endangered short tailed bat! Both being in dire need of protection and conservation!”

Kerry wrote: “*I am voting for this plant due to its unique relationship with short-tailed bats; its once prized status—or the associated plant root anyway; because it’s relatively cryptic; and the characterisation that I once saw Avi Holzapfel give of a bat that had consumed some of its nectar—the “bat” was drunkenly crooning.*”

The 2017 runner up, the iconic nikau palm (*Rhopalostylis sapida*) garnered 8.1% of the vote; it was making its fourth appearance in the top 10 last featuring in 2007. This grand plant is one New Zealand’s two species of palm, the other being the arguably distinct Kermadec nikau. Nikau may grow as tall as 15 m and is usually found in lowland coastal areas, often where humidity is higher beside the plane of a river valley, or stream. This iconic species is known to most New Zealanders and has been immortalised as steel sculptures at the entry to Wellington’s civic square. The supporters of this species had lots and little to say:



Rhopalostylis sapida at Whareroa Farm, Paekakariki.
Photo: Jeremy Rolfe.

Richard wrote: “*The nikau is an emblematic species for us in the Buller. I love the pattern in how it grows, including the regularity of its leaves arising from the stem. I love the feeling of the exotic that it adds to our place. Just a very cool plant. I love the fact that you have to be patient with it but dislike the fact that when I’ve planted it around here it often gets pinched right out of the ground!*”

David wrote: “*Unique to NZ. Very attractive. Our only palm, high biodiversity value. Distinctive. Icon. Long-lived, represents stability, resilience and strength. Cultural Taonga. Links us with the other South Pacific Islands. Represents our Sub-Tropical nature and our tropical flora and people heritage. Needs our protection. Needs us to control introduced seed predators.*”

Matthew wrote: “*I like the look of nikau palms.*”

In third place was the iconic and endangered kakabeak (*Clianthus puniceus*). This species garnered 4.8% of the vote and has featured eight times in the top 10, the last appearance being 2017. Needing little explanation as it sits clearly in most New Zealander’s minds with its superb brightly coloured flower panicles. Thought to have only been found naturally in Northland and the Auckland portion of the Hauraki Gulf, it was once a feature in many garden centres until being replaced by its close relative *C. maximus*. In 2005 there was thought to be just one surviving natural specimen in the Kaipara Harbour area making this species “Threatened – Nationally Critical”, and realistically possible of going extinct in the wild. The passionate supporters of this species had this to say:



Clianthus puniceus in cultivation.
Photo: Jeremy Rolfe.

Robyn wrote: “I love these in flower and so do the tuis. It is a shame it is pretty much non-existent in the wild now so we should be planting these to keep them from becoming extinct altogether.”

Niki wrote: “This plant has the most amazing flowers in such a vibrant colour. It is also an endangered species so it needs awareness about its current state.”

This year’s top 10 Favourite Plants featured only one of the species from last year’s top 10, great to see an annual change about, showing the creativity of the voters’ polling. The only survivor from last year’s leader board was the threatened mauve fingers orchid, *Caladenia bartlettii*, this time finishing fourth down from third in 2016 (see the table below).

Worst Weed

The worst weed competition, now in its sixth year, saw the return of another historic winner and, by all accounts, it is the most disliked plant ever. For good reason this species has won four of the six competitions run so far. Once again taking out the top spot, earning almost 14% of the vote, following 2012, 2013, and 2015 wins, everybody’s least favourite ground cover...

The winner of the 2017 Worst Weed as voted by you is:

Wandering Jew—*Tradescantia fluminensis*

This species needs little introduction or explanation, every gardener or nature lover who has ever encountered it, will share the same view, it’s painful! It must be said the survival of *Tradescantia* is because of its incredible ability to form mats of fleshy stems. Interestingly, this species does not seed in the New Zealand environment, so spreads only vegetatively, which means it is usually only found where some bright spark has dumped garden waste. This pestilent menace of a plant is only where we have put it, so some consideration would go a long way in preventing its further spread. I will leave it to the voters to express their thoughts:



Tradescantia fluminensis Stokes Valley. Photo: Jeremy Rolfe.

Catriona wrote: “It just seems unstoppable! The first time I encountered it I was shocked by the whole hillsides covered in it, preventing everything else except large trees from growing. The only positive I have found in its favour is that skinks love to hide under it—hidden, damp safe home full of slugs to eat!”

James wrote: “*Tradescantia* smothers the forest regeneration niche preventing seedlings from establishing—this will significantly influence the structure and composition of forests wherever it invades... wretched thing..”

Robert wrote: “Just the hardest to kill and most persisting weed around—a true nightmare.”

The New Zealand Plant Conservation Network thanks the hundreds of you motivated to vote in our annual Favourite Plant / Worst Weed poll. The winner of the Favourite Plant being a newcomer is fantastic and somewhat sad, as it again highlights the plight of our native flora. The Worst Weed a stalwart appearing every year inside the Top 10 suggests it still is as disliked and still as common now as it was in 2012 when this part of the poll began.

The 2017 poll was a little quiet compared with past years, so let's not forget to vote this year. The predicament of our native flora will only improve with recognition and publicity, so it's our responsibility to vote each year and add some amount of sway to saving our unique flora from extinction. This year get your friends, family and colleagues to vote too, the more the merrier have your say!

New Zealand's Top 10 Favourite Plants 2017		% of vote	New Zealand's Top 10 Worst Weeds 2017		% of vote
1.	Pua o te reinga, wood rose, flower of Hades, <i>Dactylanthus taylorii</i>	32.5	1.	Wandering Jew, <i>Tradescantia fluminensis</i>	13.8
2.	Nikau palm, <i>Rhopalostylis sapida</i>	8.1	2.	Gorse, <i>Ulex europaeus</i>	9.3
3.	Kakabeak, <i>Clianthus puniceus</i>	4.8	3.	Holly, <i>Ilex aquifolium</i>	9.2
4.	Konehu, kopakopa, rurenga kidney fern, <i>Hymenophyllum nephrophyllum</i>	4.7	4.	Darwin's barberry <i>Berberis darwinii</i>	7.6
5.	Puawananga, white clematis, <i>Clematis paniculata</i>	3.5	5.	Japanese honeysuckle, <i>Lonicera japonica</i>	6.4
6.	Korokio, wire-netting bush, <i>Corokia cotoneaster</i>	3.4	6.	Blackberry, <i>Rubus ulmifolius</i>	6.3
7.	Kirk's kohuhu, thick-leaved kohuhu, <i>Pittosporum kirkii</i>	3.3	7.	Agapanthus, <i>Agapanthus praecox</i> subsp. <i>orientalis</i>	6.2
8.	<i>Gunnera hamiltonii</i>	2.4	8.	Moth plant, moth vine, <i>Araujia sericifera</i>	6.1
9.	Mauve fingers orchid, <i>Caladenia bartlettii</i>	2.3	9.	Bind weed <i>Convolvulus arvensis</i>	6.0
10.	Hector's tree daisy, deciduous tree daisy, <i>Olearia hectorii</i>	2.2	10.	Old man's beard, <i>Clematis vitalba</i>	4.6

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Obituary: William Russell Sykes ONZM, FMLS

David Glenn, Landcare Research (glennyd@landcareresearch.co.nz)

Bill Sykes, 1927 to 2018

Born in south east England in 1927, Bill Sykes came to New Zealand in 1961 to be a botanist specialising in cultivated and adventive plants at DSIR Lincoln, a position he held until his retirement in 1992, but this was followed by 25 productive years as a research associate at the Allan Herbarium at Lincoln. Bill's expertise was very wide: the cultivated and wild floras of Europe, the Himalayas, and the tropical South Pacific, and New Zealand's native, adventive, and cultivated floras. He was one of three main authors of our Flora of New Zealand volume 4, *Naturalised Pteridophytes, Gymnosperms, Dicotyledons*. Bill continued to publish up to 2016, culminating in the publication of the Cook Islands flora that year. Bill was much loved by the botanical community in New Zealand for his botanical enthusiasm, his encyclopaedic knowledge, his gentle manner and a warm sense of humour that made him friends everywhere.



Bill on his 89th birthday in colourful dress, including a mauve scarf, his favorite colour.

Life summary

Bill's interest in botany started at primary school with collecting the chalk flora. He worked for the seed nursery of Thompson and Morgan in Ipswich in 1946 and 1947, which gave him his first grounding in horticulture. After a break in 1947–49 as a medical attendant for the Royal Navy, he became a diploma student at the Royal Horticultural Society, Wisley Gardens 1949–51. He was one of four botanists (the others were Oleg Polunin, Adam Stainton and John Williams) on two major plant collecting expeditions to Nepal for the Royal Horticultural Society and British Museum, collecting over 5000 specimens over an 8 month period in 1952 and 9500 plant specimens over a similar period in 1954 (Hunter & Sykes, 2015; 2016). Following these two trips, he studied for a BSc in botany at London University, 1957–60.

Bill was invited by Eric Godley to take a scientist position with the DSIR, Lincoln, and he arrived in 1961. A good proportion of the Allan Herbarium's cultivated plant collections were made by Bill, starting only weeks after he arrived in Christchurch. Bill's main work was on the New Zealand dicot cultivated and adventive flora (Arthur Healy specialised in the adventive monocot flora). This work culminated in the 1988 adventive flora volume (Webb, Sykes & Garnock-Jones, 1988). Bill, throughout his life, was a prolific collector of plants (at the Allan Herbarium there are probably 20,000 collections made by Bill, including 5000 Cook Island specimens). Bill's son, Julian, describes how on family holidays, Bill never missed an opportunity to collect plants seen from the road, often involving perilous climbs on bluffs. Bill retired in 1992 but continued to work at the Allan Herbarium nearly every day up to about 2015, and his services in making plant identifications were much appreciated by the herbarium.

During the 1960s, Bill started work on the flora of Niue, leading to a publication in 1970, followed by two trips to the Kermadec Islands (the first trip curtailed by a volcanic eruption of the Raoul Island volcano) leading to an annotated checklist in 1977. He made nine collecting trips to the Cook Islands between 1974 and 2002 and was persuaded to embark on a full flora of that country in 1982, but work on the flora started in earnest only after his retirement. A book launch for the Cook Islands flora was held at Lincoln in 2016, a festive event and the last big celebration of Bill's work that he was able to attend. A second launch was held in Rarotonga in 2017 that Bill was unable to attend.

After retirement

Bill had a particularly rich and productive life in retirement, both in the botanical sense and in his participation in community life. He was botanist on trips to Nepal organised by Diane McKinnon. He and his wife Peggy were active in the Packer Street Community and community garden. In recent years, he worked one day a week in the garden at Orton Bradley Park. Bill supported the Free Tibet movement (but nevertheless had a strong interest in the Chinese flora and made a work trip to China in 1990). He was a thoughtful letter writer to the Christchurch Press, and took part in street protests, most recently the TPPA Christchurch street marches in 2016.



Bill at the Cook Islands Flora Launch in 2016 with the Cook Islands' Queen on his right and the Cook Islands' High Commissioner on his left.

Bill stayed well and active until early 2017 and then slowly declined in health but managed to live at his home in St Albans, this made possible by Peggy, the rest of his family, and support from community care workers. Bill's funeral was held in Christchurch on 9 Jan 2018, attended by his extended family and hundreds of friends, with many standing at the back of the chapel. It was a great celebration of an extraordinary life, with many stories from his family showing the many aspects of Bill, and a eulogy by Anthony Wright on 'Botany Bill' as he was often called.

Awards and memberships

Bill was made a Foreign Member of the Linnaean Society of London, 2017, an award with only 50 members at any one time. He was awarded the New Zealand Order of Merit in 2005 for services to botany.

Bill was a member of the Royal Society of New Zealand, the Royal New Zealand Institute of Horticulture (made an Associate of Honour, 1992), the New Zealand Botanical Society, and the Institute of Noxious Plants Officers. Bill helped found the Friends of the Botanic Garden Christchurch and for this and for his services to the botanic garden as a volunteer he was made a life member in 2017.



Bill and Peggy at the award ceremony for Bill's NZ Order of Merit in 2005.

Eponymy

Bill had the following plant species named after him: *Eulaliopsis sykesii* Bor. 1958, *Epilobium sykesii* P.H.Raven 1962, *Erythrina sykesii* Barneby & Krukoff 1974, *Corydalis sykesii* Ludlow & Stearn 1975, *Geniostoma sykesii* Fosberg & Sachet 1981, *Haroldiella sykesii* J.Florence 1997, *Urtica sykesii* Grosse-Veldm. & Weigend 2016, and *Pandanus sykesii* H.St.John 1989 (gleefully made a synonym of *Pandanus tectorius* by Bill in the Cook Islands flora).

Taxa Bill Sykes named or co-authored

× *Carpophyma mutabile* Heenan & Sykes

× *Carpophyma pallidum* Sykes & Heenan

Blechnum glabrescens T.C.Chambers & Sykes

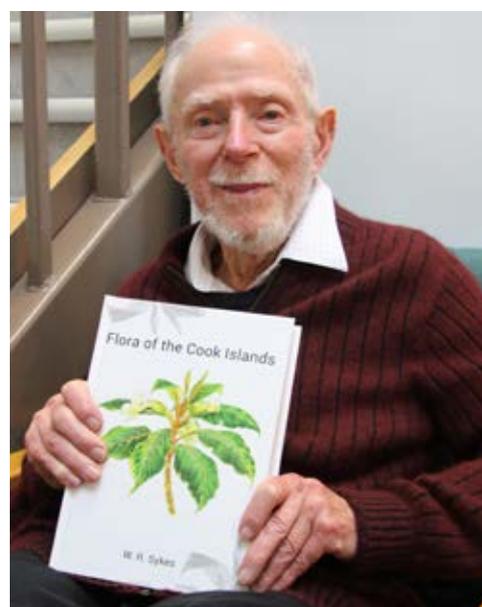
Convolvulus verecundus Allan subsp. *waitaha* Sykes

Crassula manaia A.P.Druce & Sykes
Lepidium makateanum Sykes
Macropiper melchior Sykes
Myoporum kermadecense Sykes
Pittosporum rangitahua E.K.Cameron & Sykes
Plantago obconica Sykes
Santalum insulare Bert. ex A.DC. var. *mitiario* Sykes
Senecio hauwai Sykes
Senecio lautus Willd. var. *esperensis* Sykes
Tetramolopium mitiarioense Lowrey, Whitkus & Sykes

Publications

Bill published on New Zealand botany, as a co-author of the New Zealand flora volumes 4 (contributing sections on gymnosperms and dicotyledons), and 5 (contributing the section on bamboos). He wrote 15 articles for the *New Zealand Journal of Botany* as well as a number of checklists as precursors to the New Zealand floras. He co-authored a further eight articles in the *New Zealand Journal of Botany*.

Bill's largest work was his 970 page *Cook Islands Flora*, published in 2016, representing 20 years of research and field work in the Cook Islands. In addition, he wrote a number of unpublished reports for the Cook Islands government describing the vegetation of the various islands. He wrote a DSIR bulletin on the flora of Niue (1970) and an annotated checklist of the Kermadec Islands flora as a DSIR bulletin (1977). In 2000, an update to this publication was produced. With Ian Atkinson, he wrote a report on rare and endangered plants of Norfolk Island for the Australian government, and several publications on the flora and vegetation of Tonga.



Bill proudly holding the first copy of the Cook Islands flora to arrive at the Allan Herbarium, 2016.

An incomplete list of publications

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Kauri Dieback Frequently Asked Questions

Dr Mels Barton, Secretary, The Tree Council (melsbarton@gmail.com), Dr Nick Waipara, Former Principal Biosecurity Advisor, Auckland Council, Jack Craw, Former Biosecurity Manager, Auckland Council

Q1. What is kauri dieback caused by?

A. A microscopic water mould called *Phytophthora agathidicida*. It is new to science and lives in the soil and has two forms. The soil form is in tough spores called oospores that can survive in dried soil on boots and equipment for up to 8 years (and counting). It also has water borne spores called zoospores with a tail so can swim. However, this stage is short lived and is killed by seawater, but can move up to 3 m per year through the water film in the soil.

Q2. How does kauri dieback spread?

A. Almost exclusively by soil disturbance; the greater amount of disturbance the greater risk of spread. Large animals like humans and pigs move kilos of soil around the forest on feet and equipment (and in pig guts) and are the primary vectors. Small animals like birds, rats, possums, move only miniscule amounts of soil and are a negligible risk. Dogs are a moderate risk and should be on a lead at all times in forest areas. The water borne zoospore can swim downhill in water films in the soil and in watercourses. The “natural” spread of the disease via water is estimated at 3 m per year.

Q3. Aren't pigs and possums spreading this disease?

A. There is no evidence that possums and other small animals spread the disease. Pigs have been confirmed as a vector, but not anywhere near as significant as humans. Humans have been shown by monitoring to be at least 70% of the problem in the Waitakere Ranges because 70% of the infection is along the track network; 48% of the infection is within 50 m of a bait line, so again humans are the vector; and 59% of the infection is within 50 m of a watercourse. In some cases, watercourses run down tracks and so do bait lines, so poorly maintained tracks with water in them are a serious risk. Pigs cause a large amount of soil disturbance when rooting for food on the forest floor; they do this when there is nothing else to eat. Evidence has shown that when pig numbers in the Waitakere Ranges were significantly reduced by intensive hunting (pre 2014, Jack Craw, pers. obs.), the vegetation began to regenerate and the pigs then fed on that rather than rooting and this reduced the soil disturbance impact of pigs by 90–95%. Possums are small animals that spend most of their lives in trees and eat vegetation not roots, so they are a negligible risk for soil disturbance. Effective pest control can easily eliminate or reduce the risk of vertebrate pests spreading kauri dieback.

Q4. Do all trees that get kauri dieback die?

A. Yes all trees of all ages die. There is an experimental treatment using injections into the tree of a chemical called phosphite that has been shown by research over the last 5 years to keep trees alive. It is not a cure and does not remove the infection, immunise the tree or treat the disease in the soil. You can find out more and join the treatment programme at www.kaurirescue.org.nz if you have kauri dieback on your property.

Q5. What about natural resistance? Won't kauri recover like the cabbage tree did?

A. No resistant trees have yet been found but there is a research programme at Scion to investigate this (<https://www.scionresearch.com/>). The disease that killed cabbage trees was a bacterium spread by an insect. There is no similarity to kauri dieback. It is unlikely that kauri will be resistant to this disease because the species comprises such a small gene pool now. Since logging cleared 99.9% of kauri from its natural range, we now only have 0.1% of the gene pool for kauri remaining. Kauri live for 800-5000 years, so it is impossible for a species with that lifecycle to evolve resistance to a pathogen which is killing them within a few years. Also, when

existing trees die, all other species relying upon kauri die with them. So, in the unlikely event of resistant kauri being found, we would need to replant them everywhere and wait 200 years or more for a forest to be created. We simply cannot rely on any of this.

Q6. Can we get a kauri seed bank so we can replant kauri if we find a cure?

A. Kauri seeds don't survive long and must germinate within about 4 months. In the forest, kauri seedlings germinate quickly and then remain small for decades waiting for a gap in the canopy to appear and then they all shoot up towards the light. This is why you find groves of kauri rickers that are all the same age; they are brothers and sisters. Where *Phytophthora agathidicida* is in the soil, the seedlings don't survive so we may be seeing the last generation of kauri if we don't stop the spread of this disease around our forests. If you replant kauri into infected soil they will die so we cannot replant infected areas.

Q7. Why do we need to worry about an area or close tracks if the trees are already dead?

A. *Phytophthora agathidicida* remains in the soil after kauri die and can still be moved to other areas to infect new trees. It may also infect other species so containing and preventing spread from infected areas is a priority.

Q8. Does kauri dieback kill other trees?

A. We know that *Phytophthora agathidicida* can infect other native plant species such as tanekaha and rewarewa, which was discovered through a recent MSc project completed in 2016 (Jessica Ryder, University of Auckland / Auckland Council). No other research work has been done on the host range for this disease in 9 years. Evidence from other similar *Phytophthora* in Australia (Professor Giles Hardy) shows that a single host is highly unlikely and that when levels of the pathogen reach higher levels in the soil they will start to show symptoms and kill other species.

Q9. How widespread is kauri dieback in New Zealand?

A. Many other forests are already known to be infected but the extent of that infection within those forests is not known because insufficient surveillance and monitoring has been done. Only forests in the Auckland region have been systematically monitored using air surveillance and ground truthing in both 2011 and 2016. This is how we know how much the spread has increased in the Waitakere Ranges (more than doubled in 5 years from 8% to 19%). Over 22,400 individual trees have been surveyed in the Waitakere Ranges (see Auckland Council's Monitoring Report: <http://ourauckland.aucklandcouncil.govt.nz/media/14014/kauri-dieback-waitakere-ranges-report.pdf>). The only forests in the country known to be free of kauri dieback are the Hunua Ranges, most of the Coromandel and most offshore islands. Keeping the infection out of these forests has to be the top priority.

Q10. What about glyphosate, 1080 or other toxins, are they causing kauri dieback?

A. No. The water mould *Phytophthora agathidicida* is causing this disease, nothing else. Anything that compromises tree health and stresses trees such as climate change, drought, excess water, pests, driveways and buildings on their roots, soil compaction and herbicides sprayed on their roots will make individual trees more susceptible to a pathogen, but these factors are not the **cause** of the disease. They may be contributing to why kauri are succumbing so quickly to this pathogen, but for each individual tree it is a complex picture of a combination of factors. The majority (70%) of infected trees in the Waitakere Ranges are within 50 m of a walking track, which clearly indicates that humans are the main vectors for spreading this disease.

Q11. Why does it matter if we lose kauri, it's just one species?

A. Kauri is a keystone species and an ecosystem engineer. Kauri create their own soil type called a podsol in which only certain other species can survive. At least 17 other plant species depend entirely on kauri, so if we lose kauri we will lose them too. The assemblage of plants

in New Zealand kauri forest is unique; there is nothing else like it on earth. If kauri become extinct, we will lose these forests forever. Kauri is a taonga to Māori, a scenic treasure and an historic resource (e.g., waka, yachts, houses, furniture).

Q12. What about the other forests that don't have kauri, won't they be ok?

A. We don't know because little research has been done on the host range for *Phytophthora agathidicida* so we don't know what other species it affects. It is highly likely that it will affect other species and kill them, so if we continue to spread it around all our forests we may find in the future that it threatens the survival of other species and other forests all over the country.

Q13. How can we stop the spread?

A. By removing the main vector, humans, from risk areas where there are infected and healthy kauri; in other words keep people out of kauri forests. This will remove at least 70% of the problem in the Waitakere Ranges. At the same time pigs, the other main vector, need to be eradicated. Fencing off areas of healthy kauri ecosystem to prevent pigs and humans from bringing the disease into them is necessary and a priority. Upgrading the track infrastructure to make the tracks dry and get them off kauri roots will minimise the risk of moving soil around and spreading the disease. Boardwalks and engineered tracks that are convex and allow water to run off them instead of pooling and creating a mud slurry is what is urgently required. Tracks should be rerouted away from kauri if possible.

Q14. How effective is the sterigene spray and is it the right thing to use?

A. We don't know because the research to investigate what kills *Phytophthora agathidicida* has not been completed, despite being a priority for almost 10 years. However, we do know that the oospores can survive in just a pinhead of soil, so if you don't clean your boots and equipment (bikes, walking sticks, etc.) first to completely remove all soil particles then spraying the top of soil will not kill the disease. Proper cleaning is far more effective than spraying. A quick spray without cleaning achieves nothing. You should scrub and clean your shoes and equipment thoroughly under an inside tap (not in the garden) before and after visiting any forest.

Q15. How effective are the cleaning stations?

A. The basic ones (crate / brush / spray bottle) are not at all effective because they are difficult to use and the diseased soil is being brushed on to the track surface for others to stand in. It is recognised that these need to be upgraded urgently.

Q16. How long must we stay out of the forest?

A. Until the required track upgrades have been completed to make them dry and improved cleaning stations are put in place. The amount of money invested in these upgrades will dictate how long that will take. You can lobby your councillors and MPs to provide the money for this work.

Q17. How do we deal with dead kauri trees, can we chop them up and remove them?

A. No. Dead trees with kauri dieback must remain on your property and not be chopped up. They will still be infectious (as will your soil) and cutting them up will release millions of spores of the pathogen that can easily be spread to other sites. There are Standard Operating Practices (SOP) from Auckland Council and the Kauri Dieback Programme that define how you should work around kauri. All kauri should be assumed to be infected and the relevant SOP followed. You can find SOPs for all sorts of situations at: <https://www.kauridieback.co.nz/more/documents-and-resources/>

Q18. What about predator or weed control work, can this continue?

A. Yes. Under the rāhui, a warrant can be issued to a group undertaking essential work to look

WAITĀKERE RĀHUI

Rationale and Background

Kauri dieback disease within the Waitākere forest (Te Wao Nui a Tiriwa) has spread at an alarming rate over the past decade. Current estimates show that the rate of infection has more than doubled over the past few years with at least 19% of all kauri within the forest showing signs of infection. In addition, approximately 58% of kauri forest larger than 5 ha is now symptomatic. The evidence has established that the main vector of the disease is human movement through tracking contaminated soil. The current management methods have not worked. The forest is dying and could face ecological collapse and localised extinctions within a generation unless drastic action is undertaken.

For Te Kawerau ā Maki who are the mana whenua of Waitākere, the death of our forest is an existential threat. It would also see the loss of a nationally significant taonga (treasure) for the people of New Zealand. The Waitākere Ranges Heritage Area Act (2008) directs the Government and Auckland Council to ensure the protection and enhancement of the Waitākere Ranges Heritage Area. Te Tiriti o Waitangi requires the Government to protect tangata whenua and our taonga.

Although the Government and Auckland Council will not assist us with the closure now, it is hoped they will assist in the future. The health of the forest is reaching an ecological tipping point, and Te Kawerau ā Maki will act to protect the forest for future generations. Te Kawerau ā Maki subsequently have decided to place a rāhui (customary prohibition) over the Waitākere forest to prevent and control human access until effective and appropriate research, planning and remedial work is completed to ensure the risks are neutralised or controlled.

Rāhui area

The rāhui has been laid over the Waitākere forest itself (the 'ecological catchment') to quarantine or prevent human access. As a matter of tikanga (customs), the purpose of the rāhui is to enable the environment to recuperate and regenerate without the presence and impacts of humans. Its purpose is both physical and spiritual protection. The placement of a rāhui in this situation is focused on the forest (kauri ecology), and is not limited or constrained by infrastructure or property boundaries. As the forest is more than simply the Waitākere Ranges Regional Park, the rāhui will extend beyond the park boundaries. The Waitākere Ranges Heritage Area is the approximate boundary of the rāhui for two reasons: (1) the Waitākere forest can largely be captured within this boundary, and (2) the WRHAA provides legislative support for the protection objectives of the rāhui.

TE KAWERAU A MAKI



"Kawerau Iwi, Kawerau Mana, Kawerau Tangata"

after the forest. The warrant requires the group to be trained in both cultural understanding of the rāhui and compliance with the strict phyto-sanitary requirements for working among kauri. Compliance can then be monitored and audited. If you want to help look after the forest, please join one of the many groups undertaking this work that have been warranted to do so by Te Kawerau a Maki or apply for your group to get a warrant via the website at: <http://tekawerau.iwi.nz/contact>

Q19. The Auckland Council has closed some tracks, may I still use the ones that are open?

A. No. The rāhui has closed all the tracks in the forest, not just the ones the Council has closed. It is very important to keep humans out of all the tracks because by continuing to use them they will continue to spread the disease and thereby increase the scale of the problem. The Council closures are sending mixed messages and causing confusion. All tracks are closed by the rāhui. Please respect the rāhui and stay out of the Waitakere Ranges and any other forests that have kauri. It is not safe for people to walk near kauri on inadequate track infrastructure. It will just result in the death of more trees. Thank you for your understanding and support.

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: the Centre for Australian National Biodiversity Research (CANBR) at CSIRO, and held at CSIRO Discovery at the Black Mountain Science and Innovation Park, Canberra, 12–16 November 2018. ANPC conferences and forums provide:

- 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: will be provided in the near future, so stay tuned at www.anpc.asn.au/conferences/2018.

Auckland Botanical Society

Field trip: Saturday 17 February to Hunua.

Leader: Jenni Shanks. **Contact:** youngmaureen@xtra.co.nz

Rotorua Botanical Society

Field trip: Sunday 11 February to Puaiti Scenic Reserve, Atiamuri.
Meet: the carpark Rotorua, at 8.00 a.m. or corner of Te Kopia and Puaiti Rds, Atiamuri at 8.45 a.m. **Grade:** medium.

Leader: Paul Cashmore,
ph: 07 349 7432 (wk) /
027 650 7264; email:
pcashmore@doc.govt.nz.

Wellington Botanical Society

Field trip: Saturday 3 February to Te Kopahou Reserve. **Meet:** 9.30 a.m. at west end, Owhiro Bay Pde, near toilet block and WCC interpretation panels. **BOOKING ESSENTIAL;** when you book, give your email address so that you can be sent a plant list.

Co-leaders: Chris Horne, ph: 04 475 7025; Sunita Singh, ph: 04 387 9955 or 027 4052 987; and Barry Insull.

Meeting: Monday 19 February at 7.30 p.m. for a talk by Dr Matt Ryan titled 'Unearthing the secrets of the stone rows'

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 18 February to Mt Robert ridge. **Meet:** 8.00 a.m. Cathedral Steps.

Leader: Penny Palmer, ph: 03 539 1329 or 027 535 6441; please contact Penny by Friday 16 February if intending to come.

Canterbury Botanical Society

Field trip: Saturday 10 February to Lake Lyndon to botanise the shore plants. **Meet:** at the Yaldhurst Pub at 8.30 a.m. or the Springston toilets at 9.20 a.m. to carpool. **Bring:** sunhat, water, warm jacket, lunch, gumboots or footwear that can get wet, magnifying lens. **Cost:** suggested petrol reimbursement to driver \$15 per passenger. **Fitness:** 6 hours slow botanising along the gravel and muddy lake edge and through short tussock grassland.

Contact: Alice Shanks, ph: 027-366-1246 or Paula Greer, email: paulagreer@rocketmail.com.

Botanical Society of Otago

Meeting: Wednesday 28 February at 5.20 p.m. for a talk by Kath Graham titled 'Spring Flowers of El Camino'. **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: Robyn Bridges, ph: 03 472 7330.

Field trip: Saturday 24 to Sunday 25 February to Northern Southland; more information available closer to the time.

Contact: John Barkla, ph: 03 476 3686.
