



Plant & Food  
**RESEARCH**  
RANGAHAU AHUMĀRA KAI



# Susceptibility of mānuka and other Myrtaceae associated with honey production to myrtle rust

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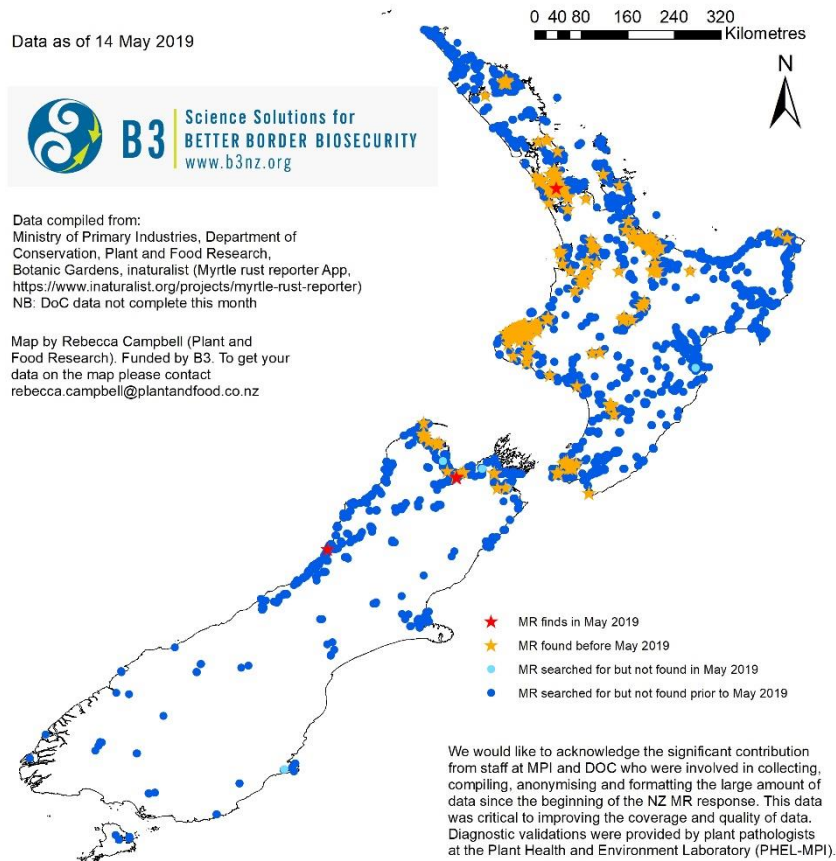
The New Zealand Institute for Plant & Food Research Limited

# What is myrtle rust?

Plant disease caused by a biotrophic fungal pathogen

- *Austropuccinia psidii*
- Multiple strains (12+) worldwide
- Australia & New Zealand have the 'Pandemic biotype'
- Very wide host range, over 400 species in the Myrtaceae family
- New Zealand Myrtaceae species include pōhutukawa, mānuka, kānuka, swamp maire, ramarama, rātā
- First detected in mainland NZ in May 2017

## NZ national Myrtle Rust (MR) surveillance



# *Austropuccinia psidii* is causing species extinction in Australia



- 2015 - initial reports of localised species extinction (in a valley)
- 2018 - substantial concern that two dominant Myrtaceae species would be soon be extinct across their natural host ranges (~1,500km)
  - *Rhodomyrtus psidioides*, native guava
  - *Rhodamnia rubescens*, malletwood
- Non-myrtaceae plants now colonising these habitats eg Lantana, wild tobacco, disturbed site pioneer species
  - Concerns for the diversity of other species (insects, birds, bats etc)



*Rhodomyrtus psidioides*

# Myrtle rust surveillance

## MPI surveillance findings

29 August 2018

Host	Total	Confirmed
Ramarama: <i>Lophomyrtus</i> spp.	13,664	657
Pōhutukawa, Northern rata, Southern rata: <i>Metrosideros</i> spp.	43,517	412
Monkey apple: <i>Syzygium</i> spp.	9,940	159
Bottle brush: <i>Callistemon</i> spp.	11,334	21
Willow myrtle: <i>Agonis flexuosa</i>	479	7
Feijoa: <i>Acca</i> spp.	17,724	5
Mānuka: <i>Leptospermum scoparium</i>	19,163	3
Chilean Guava: <i>Ugni molinae</i>	1,225	2
Gum: <i>Eucalyptus</i> spp.	6,760	1
Australian Tea Tree: <i>Thryptomene</i> spp.	80	1
Australian Water Gum: <i>Tristaniaopsis</i> spp.	322	1
Other	15,873	0
Total:	140,081	1,260

- Low numbers of infected mānuka
- Perception that mānuka could be resistant or tolerant.
- Other reasons for low level of detection
  - plants had not been exposed to the pathogen
  - the small leaves and branch tips of mānuka make detection of the pathogen more difficult.



Infected mānuka

# Is there resistance to *A. psidii* in New Zealand Myrtaceae?

- » Species vary in their susceptibility to *A. psidii*
  - » Also variation in susceptibility within a species

Tested how susceptible NZ Myrtaceae are to the pandemic biotype:

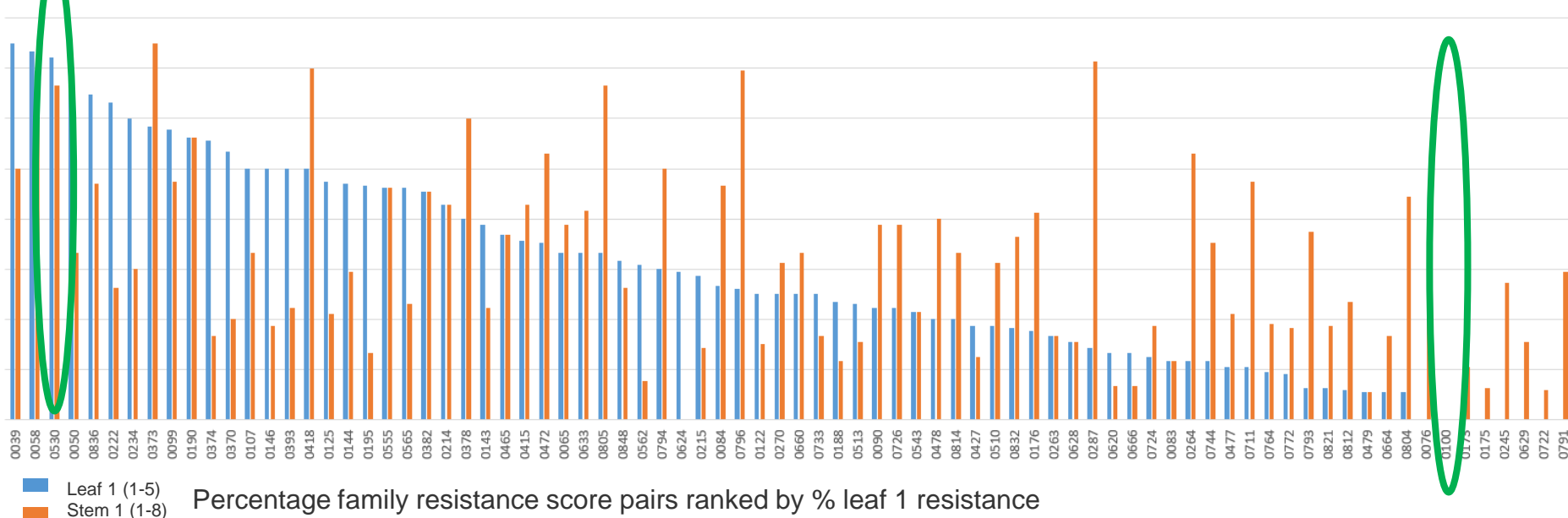
- Collected mānuka seed from almost 1,300 families (mother plants)
  - As well as from other species
- Exported seed to Brisbane (with compliance certification)
- Inoculated seedlings against the pandemic biotype and assessed symptoms



Inoculating NZ mānuka seedlings at QDAF, Brisbane

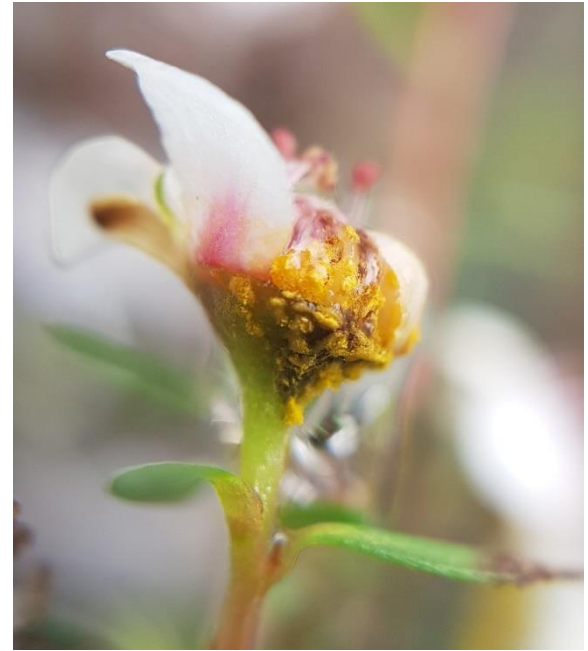
# Mānuka families initial results

Percentage of seedlings per family showing score 1 resistance to leaf and stem infection by *A. psidii*



# Findings

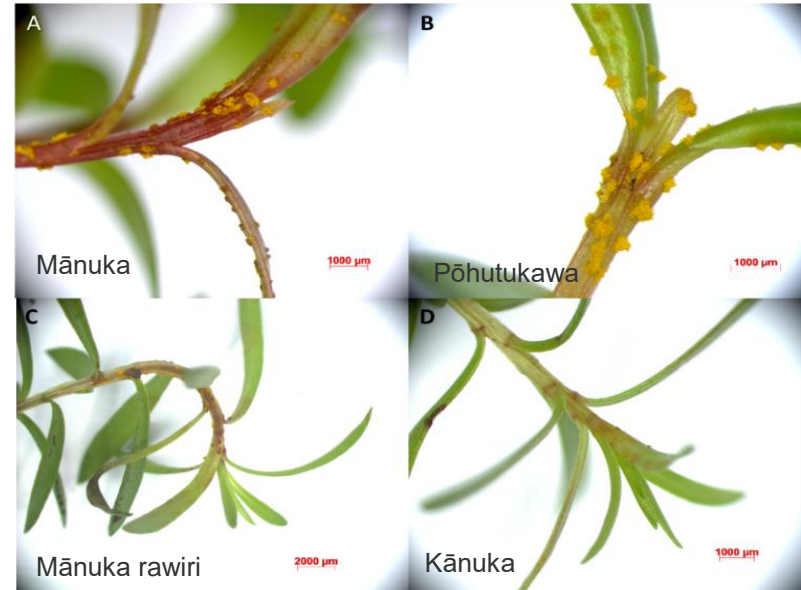
- There is resistance to *A. psidii* in New Zealand mānuka
  - Multiple stem and leaf resistance mechanisms?
- Also susceptibility to *A. psidii* in New Zealand mānuka
  - Infection of flowers is concerning
- Varying levels of resistance and susceptibility found in mānuka and the other species tested
- Need to monitor impacts of disease under NZ environment conditions
- Number of infected plants may increase as levels of inoculum increase.



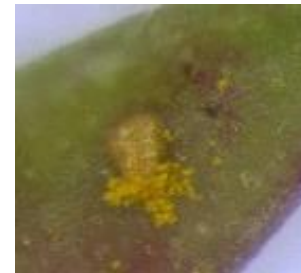
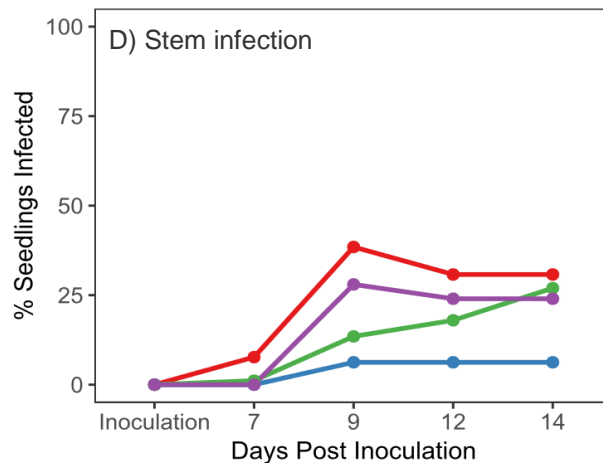
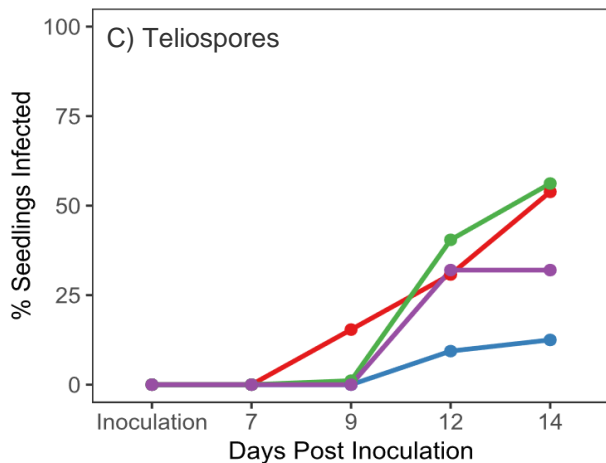
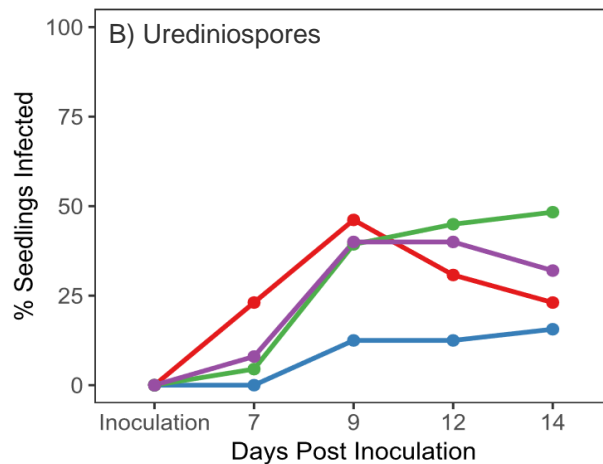
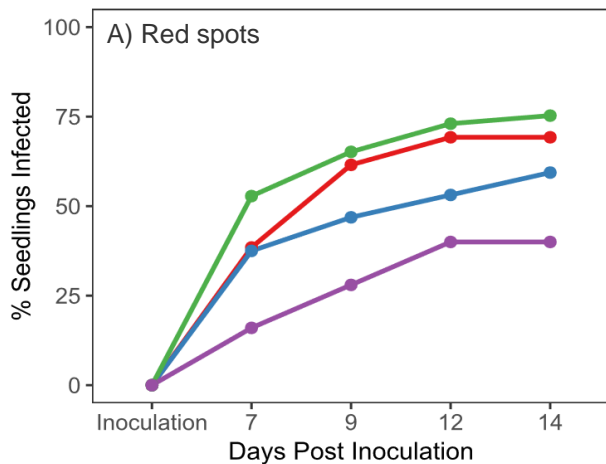
Infected mānuka

# Threat of other *A. psidii* strains

- Tested NZ native plants against the South African *A. psidii* strain:
  - Different from the pandemic biotype in New Zealand
  - Mānuka (*Leptospermum scoparium*), kānuka (*Kunzea robusta*), pōhutukawa (*Metrosideros excelsa*) and mānuka rawiri (*Kunzea linearis*)
- All the species are susceptible
  - Kānuka = the less susceptible
  - Mānuka and pōhutukawa = the most susceptible
  - Mānuka rawiri = small sample size tested



# Time series showing symptom appearance



## Species

- *Kunzea linearis*
- *Kunzea robusta*
- *Leptospermum scoparium*
- *Metrosideros excelsa*

# Summary

- Spectrum of resistance and susceptibility of mānuka to 'pandemic biotype' of *A. psidii*
  - Resistance mechanism(s) means breeding for resistance is an option
  - Infection of flowers is a major concern
  - Important to check plants, remove infected material if possible, prevent further spread
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- Currently frequency of detection in mānuka is low – will this change as the disease spreads and levels of inoculum increase?
  - Impacts on insects unknown – will honey bees forage rust spores over pollen?
  - Conservation of germplasm is critical

# Summary

- Spectrum of resistance and susceptibility of mānuka, kānuka, pōhutukawa and mānuka rawiri to South African strain of *A. psidii*
- Infection of flowers is a major concern
- Border biosecurity fight against myrtle rust is not over – need to prevent further spread of different rust strains
  - Increase host range
  - Could be more virulent or produce more virulent strains with pandemic biotype

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# Ngā mihi

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