Photo by David Kirkland

Does kauri dieback disease change soil microbial community structure?

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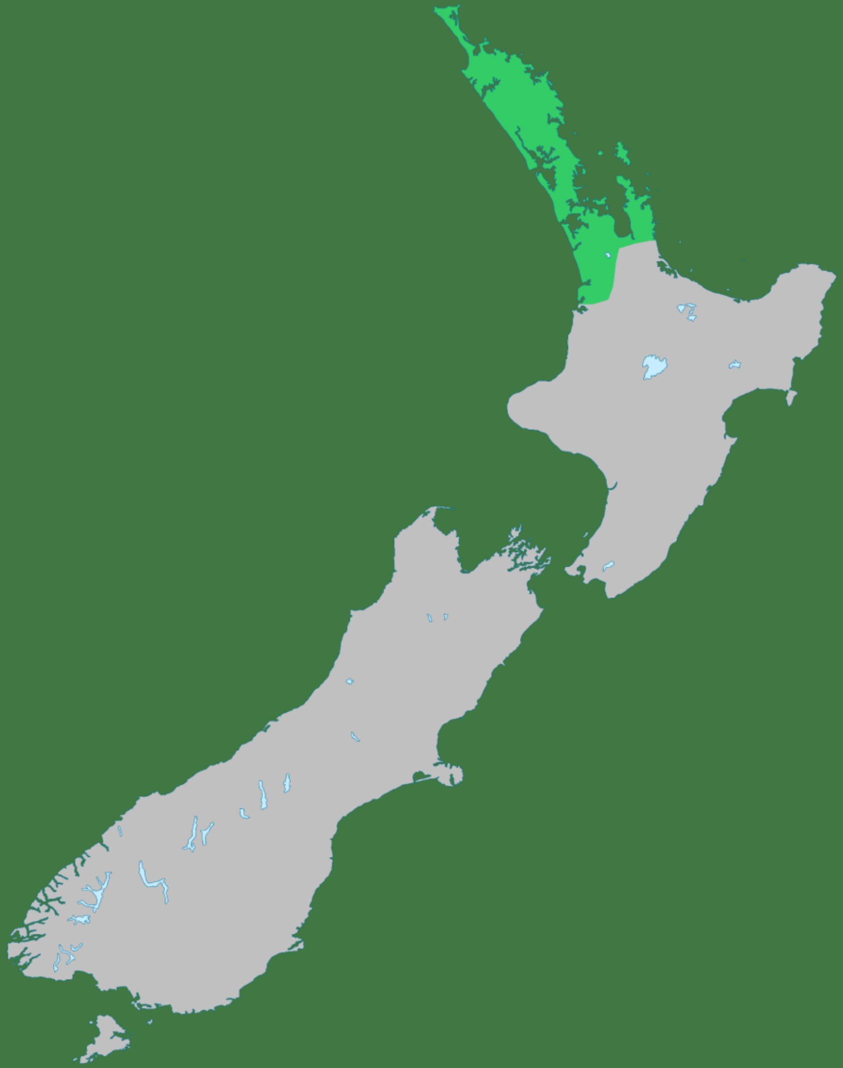
Kauri (*Agathis australis*)



Significance of kauri

- Cultural
    - Taonga species
    - Creation beliefs
- Economic
    - Kauri timber and gum
    - Tourism
- Ecological
    - Foundation species
    - Carbon storage

Image 1 is “Triumph” by Jane Crisp. Image 3 retrieved from http://www.nz-native-riverwood.com/nzhistory.

Kauri dieback

Phytophthora agathidicida

Distribution of kauri dieback

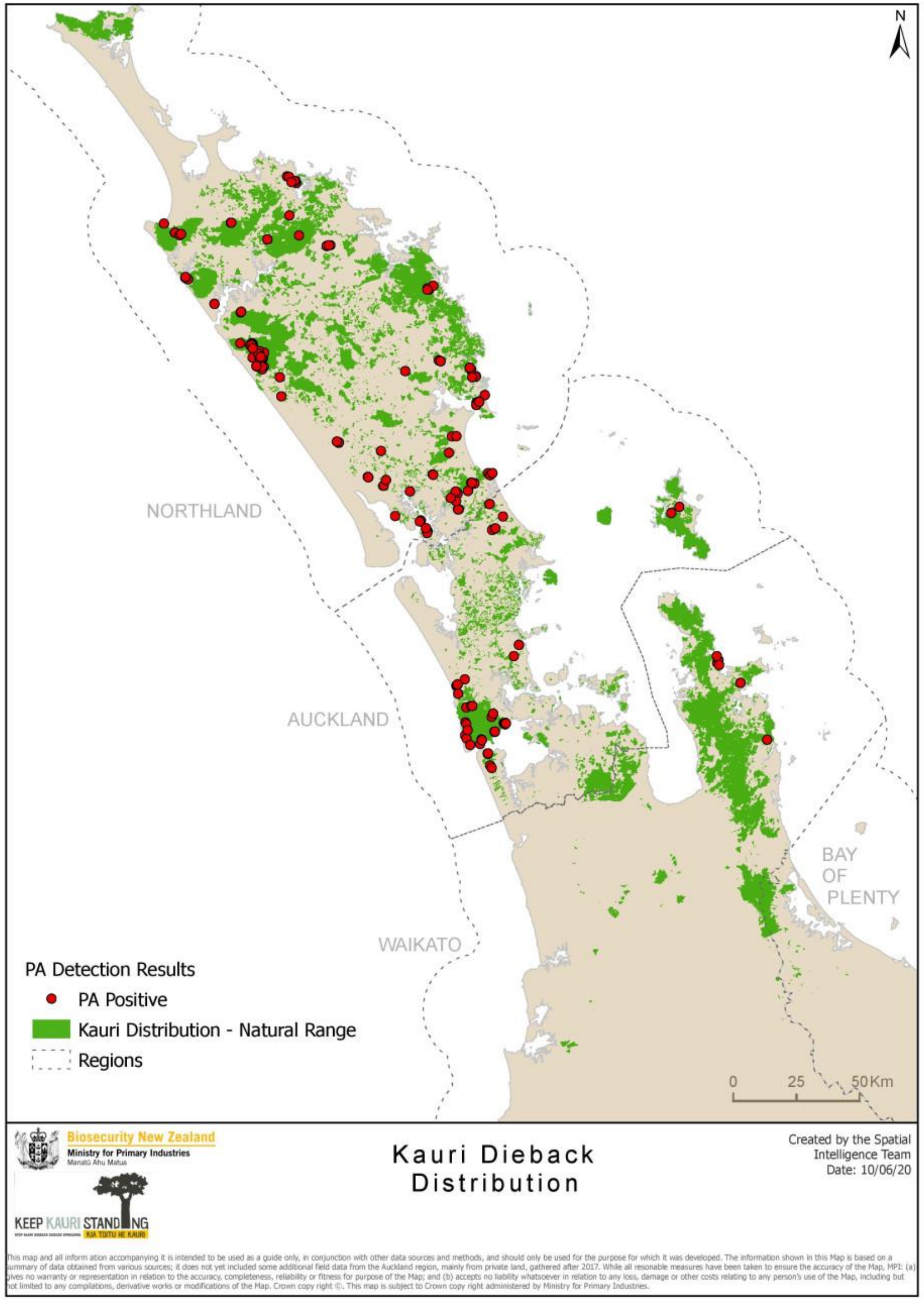
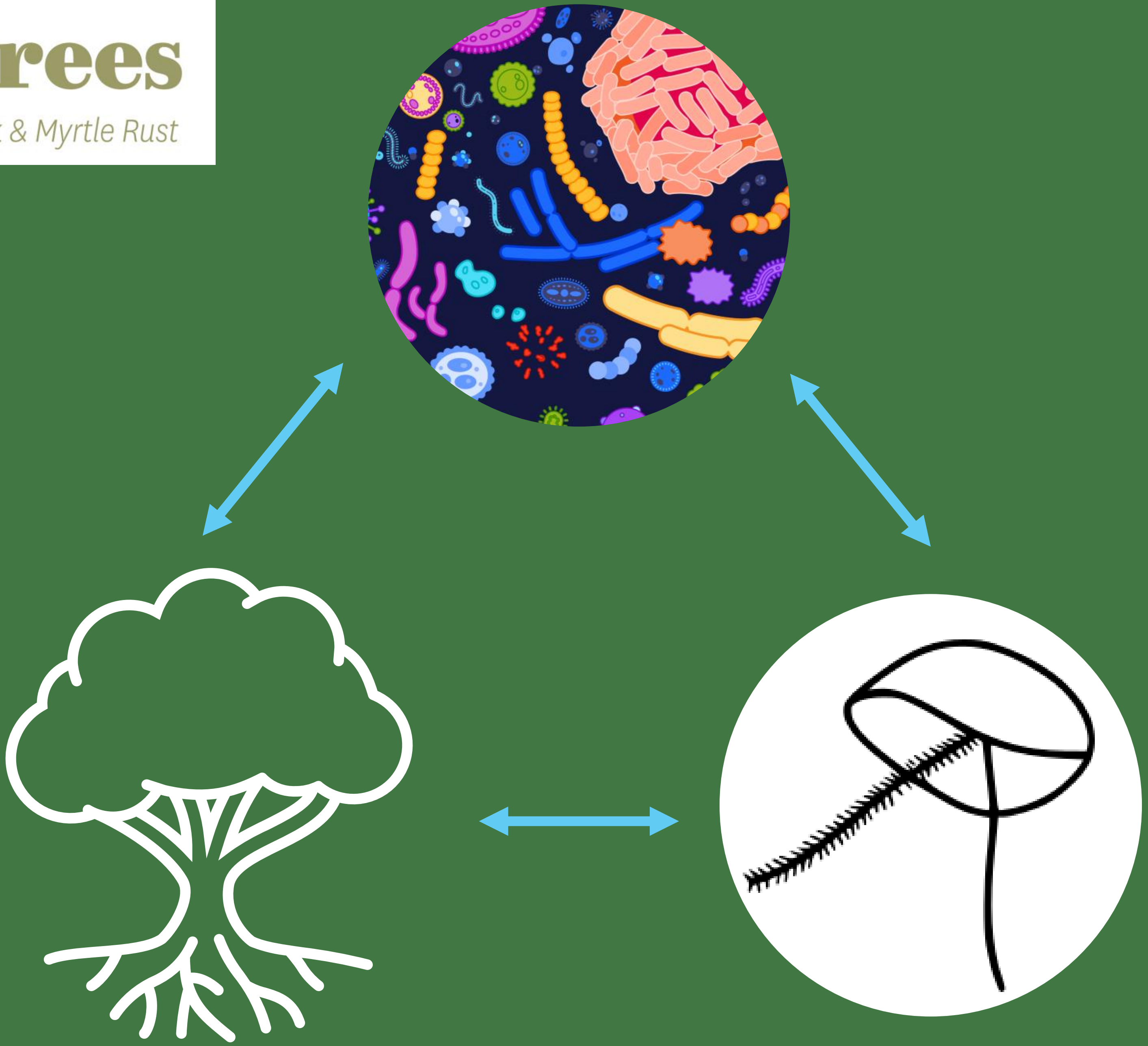
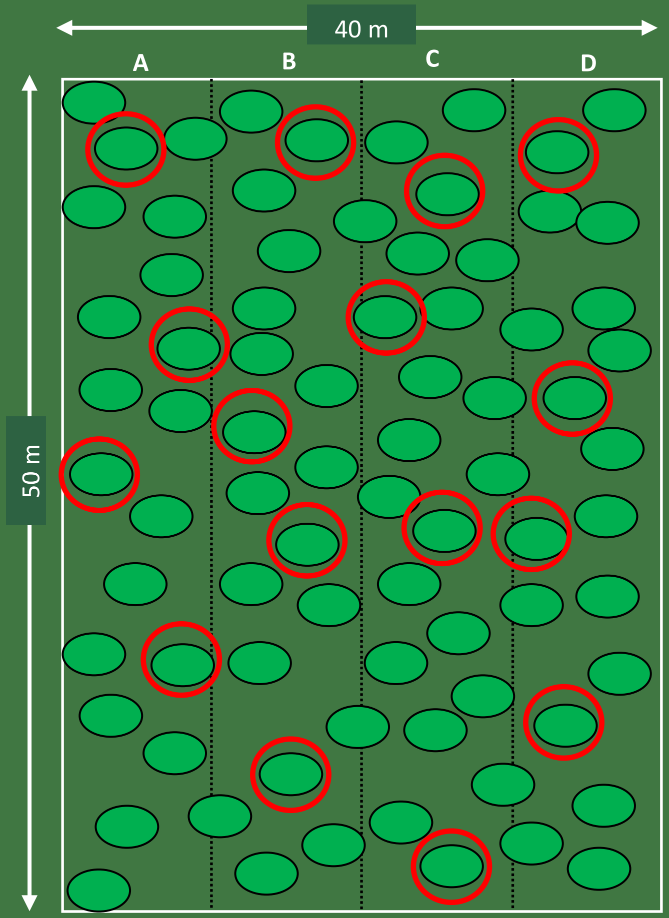


Image created by Biosecurity NZ (MPI), retrieved from Bradshaw et al. (2020)

- Kauri soil microbial community



Sites and plots

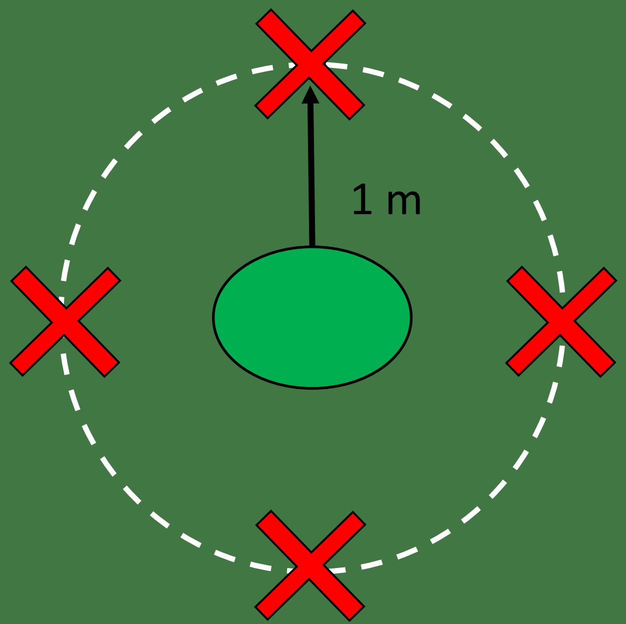


Canopy health classifications

Tree health status	Canopy health score	Trees sampled
Healthy	1 – 2	21
Defoliated	2.5 – 4.5	70
Dead	5	5

Image retrieved from Meiforth et al. (2020)

Soil sample collection



- 96 kauri trees (16 trees per plot)
- 4 samples per tree
- 384 soil samples total

Amplicon sequencing

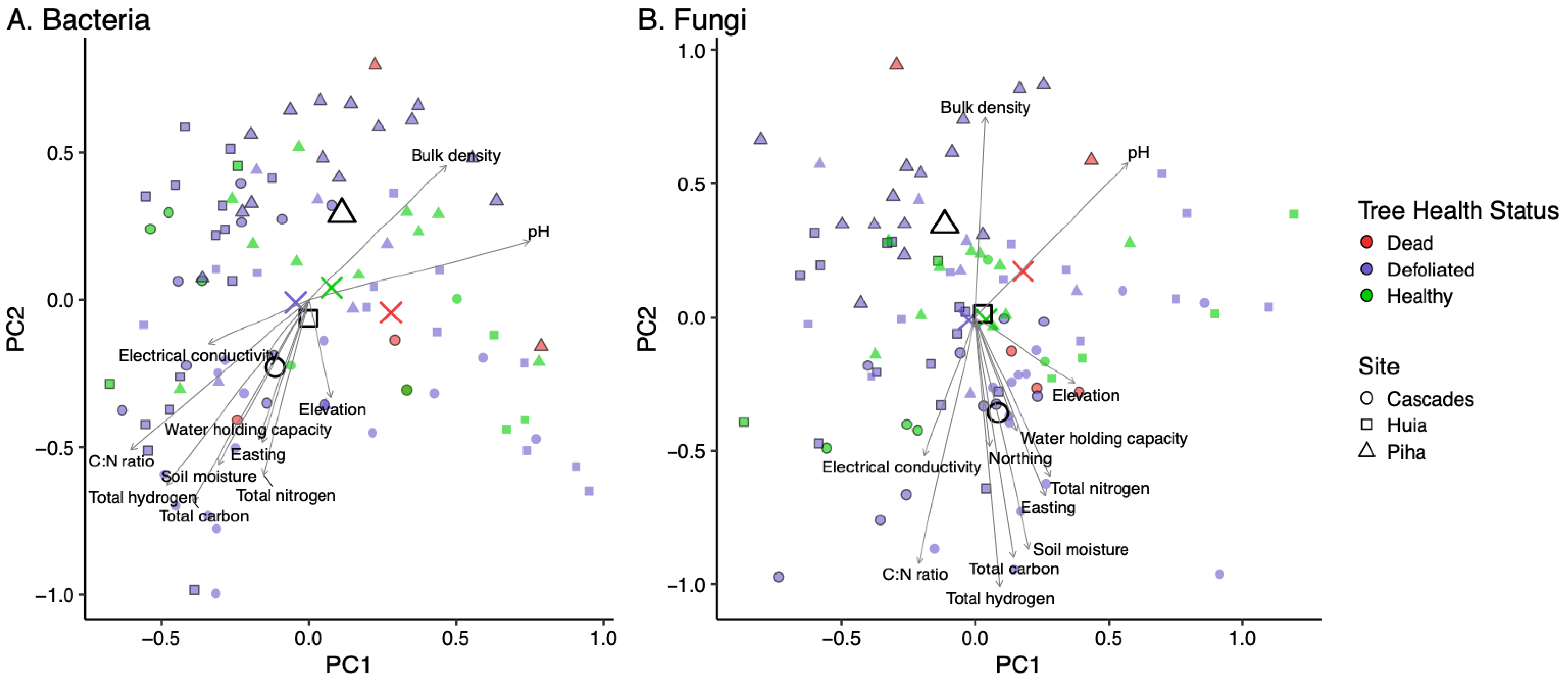
(16S rRNA gene and ITS gene region)

MiSeq Reagent Kit v3
(600-cycle)

Metagenome shotgun sequencing

NovaSeq 6000
S4 flowcell

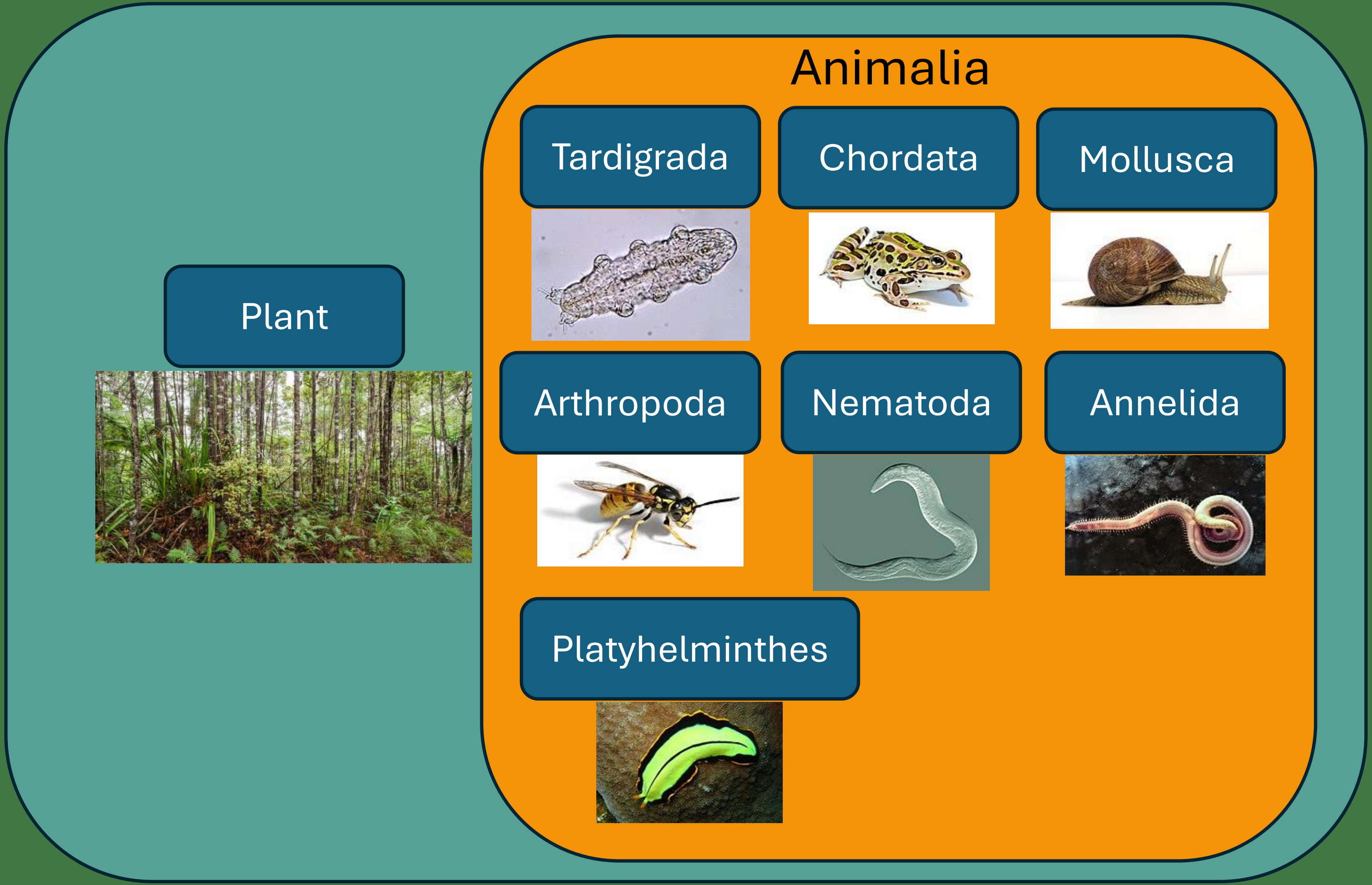
Images from illumina.com



Robust Aitchison principal component analysis of bacterial (A) and fungal (B) community composition

Environmental variables overlaid as vectors using *envfit* R function

Metagenome data processing



Plant

Animalia

Tardigrada

Chordata

Mollusca

Arthropoda

Nematoda

Annelida

Platyhelminthes

Bacteria

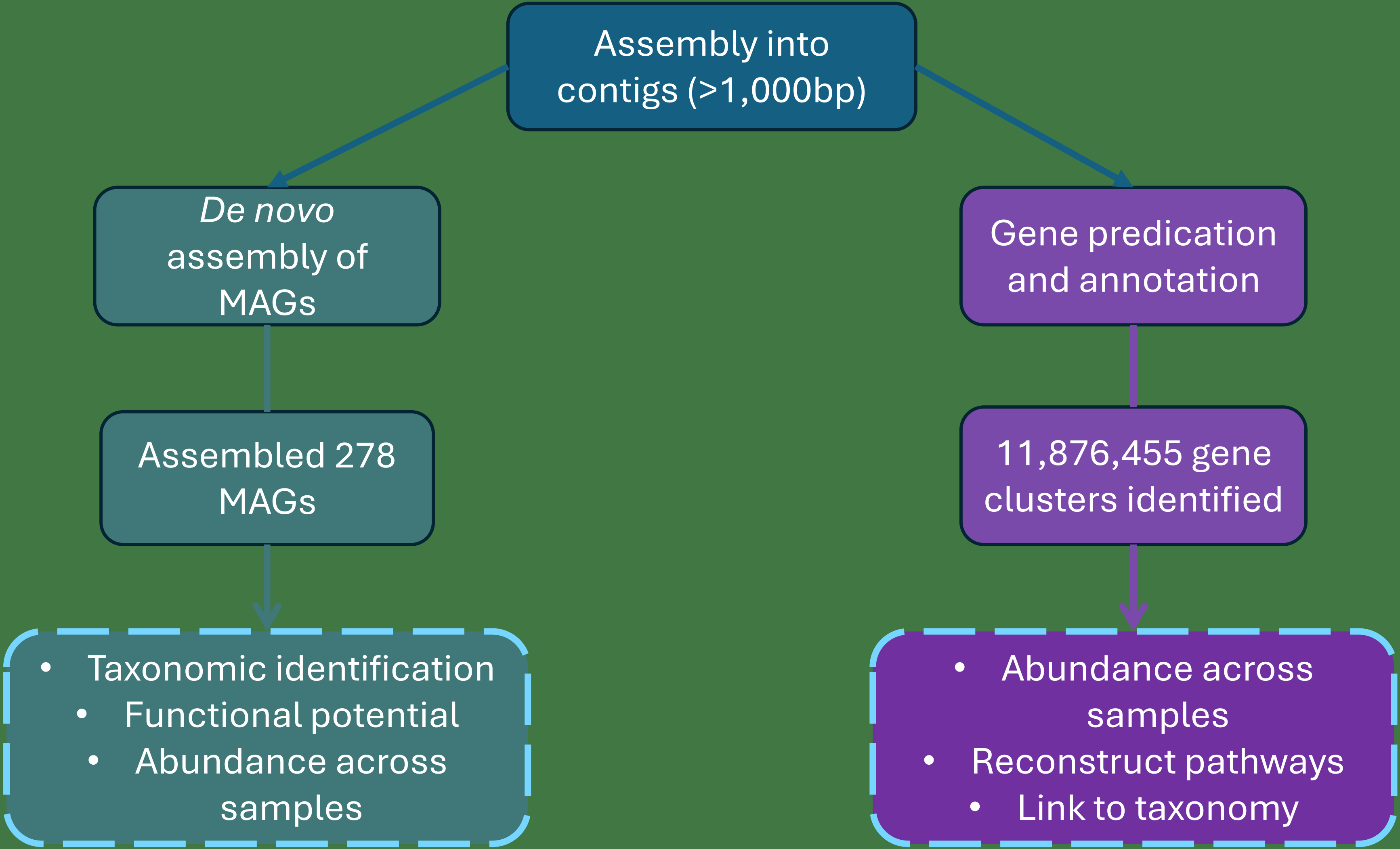
Fungi

Archaea

Oomycota

Viral

Metagenome data progress



Assembly into contigs (>1,000bp)

De novo assembly of MAGs

Assembled 278 MAGs

- Taxonomic identification
- Functional potential
- Abundance across samples

Gene predication and annotation

11,876,455 gene clusters identified

- Abundance across samples
- Reconstruct pathways
- Link to taxonomy

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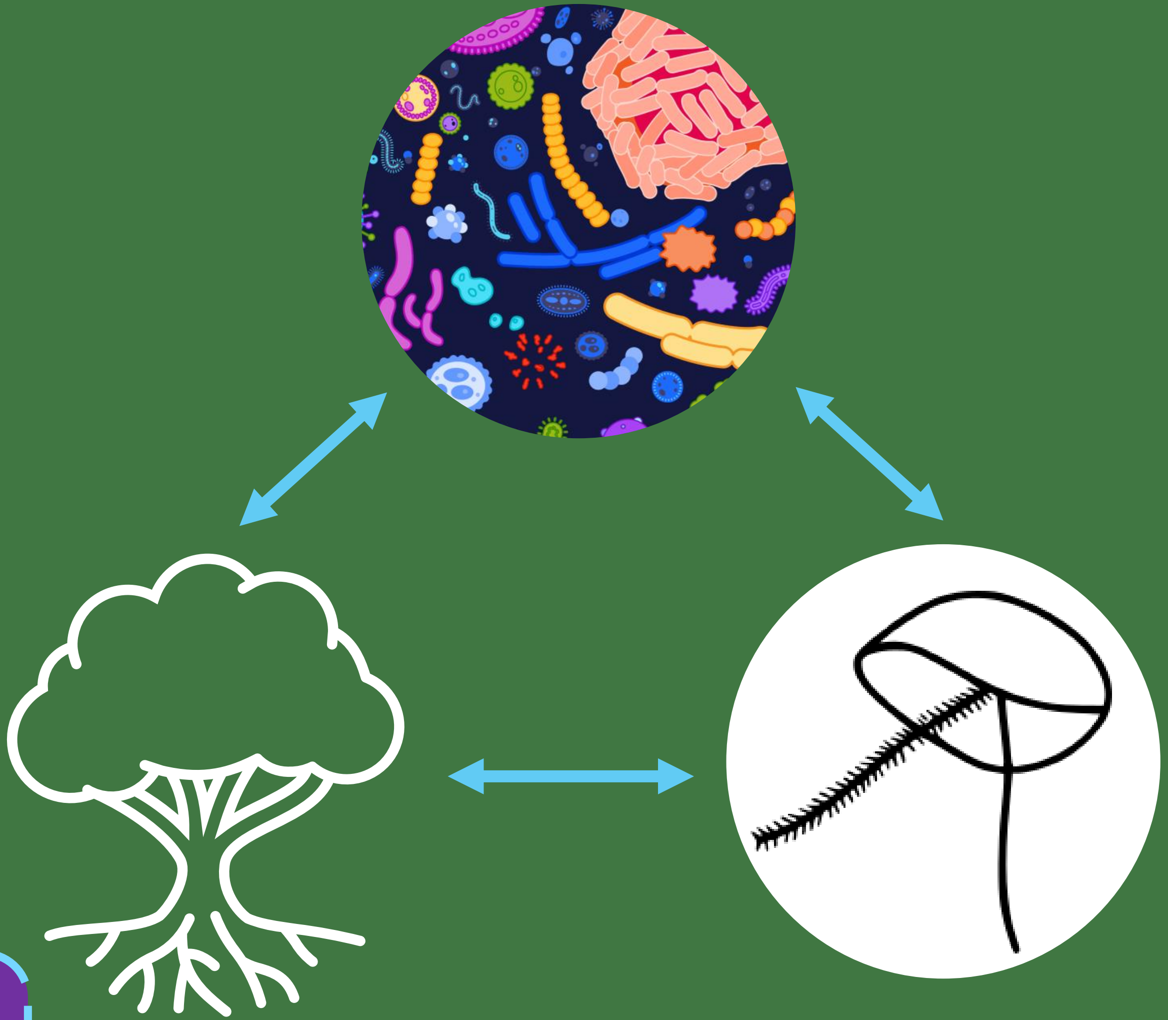

Acknowledgements

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AUT
UNIVERSITY
NEW ZEALAND

TE KAWERAU Ā MAKI

NGĀ RĀKAU TAKETAKE
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from Kauri Dieback & Myrtle Rust

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Professor Hannah Buckley

Professor Gavin Lear

Dr Kevin Lee

Associate Professor Brent Seale