

Does kauri dieback disease change soil bacterial community structure?



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INTRODUCTION

- Kauri (*Agathis australis*) are an ancient coniferous tree only found in the North Island of New Zealand¹.
- Root rot caused by the soil-borne oomycete *Phytophthora agathidicida*, has threatened this iconic species since 1972^{2,3,4}.
- Interactions between harmful microorganisms and other plant-associated microorganisms in soil are not well understood.

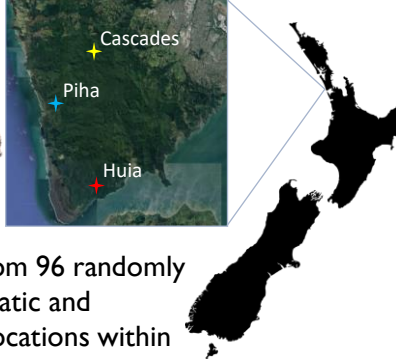




Figures 1-3: 1) The thinning canopy of a kauri tree. 2) Basal bleeding of a kauri tree. 3) A dead/rotting kauri tree.

OBJECTIVES


- To determine the bacterial community composition of soil surrounding kauri.
- To determine if there is any significant variation in bacterial community composition in symptomatic versus asymptomatic kauri.

METHODS


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 Environmental DNA extracted.
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3

 16S rRNA gene PCR.
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4

 Sequencing on Illumina MiSeq platform.
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5

 Analysis using DADA2⁵ (v.1.24.0) and Phyloseq⁶ (v.1.40.0) via RStudio⁷ (v.4.2.1).

Four soil samples collected from 96 randomly selected trees, from symptomatic and asymptomatic plots in three locations within the Waitākere Ranges (Cascades, Piha, Huia).

ACKNOWLEDGMENTS

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RESULTS

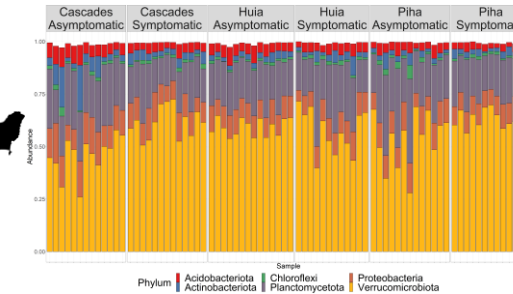


Figure 4: Relative abundance of the most abundant phyla surrounding kauri trees from the six different plots.

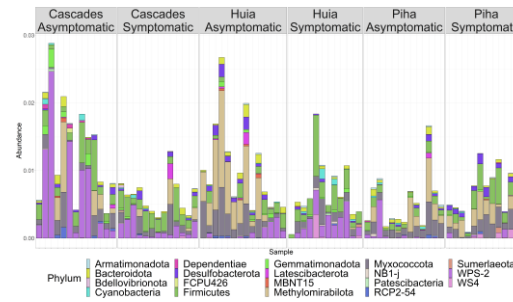


Figure 5: Relative abundance of the least abundant phyla surrounding kauri trees from the six different plots.

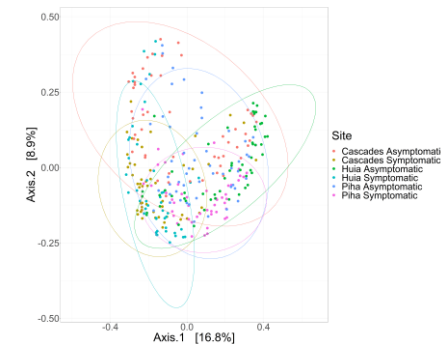


Figure 6: Principal Coordinates Analysis (PCoA) plots showing bacterial community composition between site location. Community dissimilarity scores calculated using Bray Curtis index.

- Relative abundance of the most abundant phyla showed minimal variation. Most variation was identified in the Cascades asymptomatic, Piha asymptomatic and Huia symptomatic sites (Figure 4).
- Relative abundance of the least abundant phyla highlights more variation, especially between the Cascades asymptomatic and Huia asymptomatic sites (Figure 5).
- No major groupings of bacterial community composition were identified based on site location (Figure 6).

FUTURE WORK

- Provide a baseline of soil health to help monitor the effects kauri dieback may have on the soil microbial communities in the Waitākere Ranges.