

ABSTRACT

Root Endophytes from Kauri Companion Plant

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Keywords: Kauri, Kauri dieback, cutty grass, kauri grass, *Phytophthora agathidicida*, Soil born pathogen

Kauri (*Agathis australis*) is a culturally and ecologically important conifer native to Aotearoa New Zealand. It is currently threatened by a dieback disease caused by the soil-borne pathogen *Phytophthora agathidicida*. The relationship between the plant and its endophytes plays a crucial role in plant growth, host resilience, physiology, and defence mechanisms. This research investigates the potential role of endophytes in supporting systems, particularly concerning kauri dieback disease. The study focuses on identifying and characterizing the endophytic fungi and bacteria associated with the roots of cutty grass (*Carex geminata*) and kauri grass (*Astelia trinervia*), which are companion plants in kauri forests found at both diseased and healthy sites. These companion plants are closely associated with kauri and serve as promising models due to their abundance. A total of 61 endophytes were isolated from the roots of both plants using different media. The colony and cell morphology of these isolates were examined, and they were identified as putative *Fusarium*, *Penicillium*, *Trichoderma*, and *Aspergillus* species. The full 16S rRNA gene and internal transcribed spacer (ITS) region analyses confirmed the phylogenetic identities of the endophytes. Some isolates demonstrated antagonistic effects against *Phytophthora agathidicida* via dual culture assays. Bioactive metabolites from these endophyte isolates will be extracted for further analysis. This study aims to explore whether root endophytes of companion plants could contribute to biocontrol strategies for combating kauri dieback.

This research provides novel insight into mitigating plant pathogens in native forests and ecosystems using companion plants hence, preserving forest integrity.