Endophytic colonisation of perennial ryegrass by *Trichoderma atroviride*

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Trichoderma spp. are widely used as biocontrol agents and plant growth promoters. Endophytic colonisation of perennial ryegrass (*Lolium perenne*) by *T. atroviride* strains was studied in laboratory, greenhouse and field experiments. Four strains of *T. atroviride* were inoculated into *in vitro* agar cultures or potting mix with ryegrass seeds for colonisation studies. The strains were also produced as prill or granule formulations for application in the field experiment. Microscopy was used to observe fungal structures in plant tissue segments from pot- or field-grown plants. Segments were also surface sterilised and placed onto *Trichoderma* selective media. Fungal colonies recovered were verified as *T. atroviride* by sequencing the *tefl* gene. No endophytic colonisation occurred in any non-inoculated plants, and no *Trichoderma* endophytic colonisation was observed in field-grown plants. However, microscopy revealed fungal hyphae and reproductive structures characteristic of *Trichoderma* in root and stem sheath tissues of inoculated plants from *in vitro* cultures and pots. These results were verified by sequencing the *tefl* gene. This study has demonstrated endophytic colonisation of ryegrass by *T. atroviride* strains, which may be related to beneficial effects on plant growth and disease control.

Antimicrobial potential of bacterial endophytes that inhabit New Zealand's medicinal plant *Pseudowintera colorata*

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Medicinal plants are valued for the naturally bioactive compounds they produce. International research has demonstrated that these plants contain endophytic microorganisms that, through close interaction with the plant's physiology, contribute to the production of host metabolites either directly or via involvement in biochemical pathways. Some endophytes can produce bioactive compounds that are either the same or similar to those originating from their host plants. *Pseudowintera colorata* (horopito or NZ pepper tree), an endemic New Zealand plant used in traditional Maori medicine (rongoā), is recognised for its antimicrobial properties. The biologically active chemical constituent polygodial is used for treating candidiasis. A total of 340 endophytic bacteria were recovered from surface sterilised horopito leaves, stems and roots from nine sites across New Zealand; strains were assessed for their ability to inhibit the phytopathogens *Neofusicoccum parvum*, *N. luteum*, *Ilyonectria liriodendri*, *Nectria galligena*, *Pectobacterium atrosepticum* and *P. brasiliensis* using a dual culture assay. Inhibition zones ≥ 3 mm were considered a positive result. Out of the strains tested seven showed activity against all the phytopathogenic fungi tested and ten strains were active against at least three phytopathogens. Future work will determine if any of the endophytic bacteria produce polygodial.