

DETECTION OF *ARMILLARIA* BASIDIOSPORE DISPERSAL USING MOLECULAR TECHNIQUES

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A project is underway to confirm directly the spread of *Armillaria* into pine plantations by means of basidiospores. Basidiospores of *Armillaria novae-zelandiae* were trapped from the air using a SporeWatch volumetric spore trap. Between May and August 2005 the spore trap was placed within an undisturbed podocarp-hardwood forest adjacent to a dense cluster of fruitbodies of *A. novae-zelandiae* on a fallen tree. Trapping was repeated the following year in an open area close to the margin of the same forest. A molecular identification technique was utilised to detect the presence of *A. novae-zelandiae* basidiospores caught by the spore trap. The technique successfully detected and recorded *A. novae-zelandiae* basidiospores for a period of 11 weeks during 2005. In 2006 basidiospores were detected for 5 weeks of the testing period at lower quantities, implying filtering of some spores by the tree canopy during dispersal from a more distant spore source. The project is continuing, and this season the spore trap has been placed in the open approximately 1 km from the forest boundary to further test the sensitivity of the technique. Trapping will ultimately be conducted in a pine forest to verify the dispersal of the disease agent by this means.

THE USE OF A PCR DIAGNOSTIC TEST TO PREDICT AND CONTROL *PERONOSPORA SPARSA*, DOWNY MILDEW OF BOYSENBERRY

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Downy mildew caused by the oomycete *Peronospora sparsa* is a major risk for boysenberry growers in New Zealand. In some seasons crop loss can be severe, with up to 100% fruit loss. Fruit infections cause the berry to lose its glossy sheen, taste bitter and quickly dry up, hence the disease is also known as dryberry. Pathways of fruit infections by this biotroph are unclear. This project is monitoring the presence and symptomless spread of the pathogen to symptom observations. DNA extraction and diagnostic polymerase chain reaction (PCR) were developed by modifying a method for detecting downy mildew in artichoke published by the University of Helsinki. The PCR diagnostic test was also suitable for New Zealand isolates of the boysenberry pathogen. Modification to a nested PCR test has increased the sensitivity significantly. Previous microscopic observations place the oomycete mainly in the cortex tissues of the plant, but PCR testing during the 2005-2006 growing season has revealed that the pathogen can be found throughout the plant, including root tips, root cortex, primocane cortex, primocane leaf, primocane tip, florican cortex, florican leaf, florican buds and green fruit.