

RESEARCH DIRECTIONS

A new twist to an age-old partnership

Dr Jonathan Plett of the Hawkesbury Institute for the Environment has received a prestigious Discovery Early Career Researcher Award (DECRA) from the Australian Research Council to investigate the relationship between fungi and plants.

'The relationship between plants and fungi is mutualistic - it's one where the interaction between the plant roots and fungi underpins the vigour, productivity and stress tolerance of the plant host', explains Dr Plett. 'Previous research has shown that fungi secrete proteins called "effectors" which initiate the interaction between the two species. These effectors can interact with and alter the biology of plant proteins when the fungi colonises the plant. One of the ways the fungi affects the plant is that it can provide the plant with growth limiting nutrients and protection from stressors. To understand how this mutualistic lifestyle has evolved and how to best foster these relationships, we need to understand both the role of effectors and the plant proteins with which they interact. This work aims to identify the genetic traits that enable plants to benefit from relationships with mutualistic fungi in efforts to maximise plant health and productivity.'

The research will use a range of techniques aimed to increase our understanding of the relationship between a eucalyptus tree and the fungal species *Pisolithus microcarpus*. Yeast and plant based assays will be used to identify what plant proteins interact with the fungal effector proteins. Using this information, in-depth identification of the plant pathways controlled by 5 plant proteins targeted by effectors will be performed. This will enable researchers to better understand the specific genetic code necessary in plants to facilitate interactions with beneficial fungi.



This research aims to better understand beneficial tree-fungi relationships in economically important forest trees and crops. Exploiting these interactions has the potential to substantially increase the profitability and sustainability of agro-forest and agricultural systems.

Project Title: Understanding plant: fungal communication to increase plant productivity
Funding has been set at: \$393,416
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