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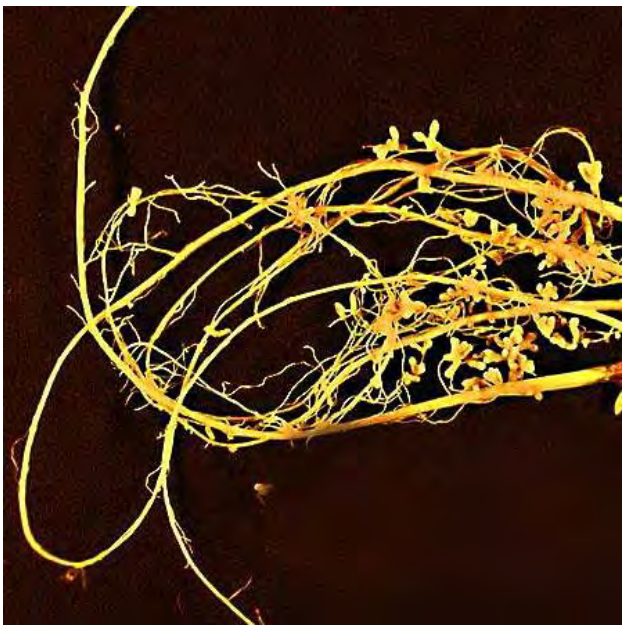
RESEARCH DIRECTIONS

Soil security with nodulation of pulse crops

Dr Jeff Powell from the Hawkesbury Institute for the Environment will seek to understand the interactions between different nitrogen-fixing bacteria strains in pulse crops to improve yields. This project is funded by the Department of Agriculture, Fisheries and Forestry and the Grains Research and Development Corporation through the 2012 Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry.

'Excellent soil quality is critical to being able to grow our food but the economic and environmental costs of fertilizers are increasing', says Dr Powell. 'In response, farmers are including plants such as chickpea, broad bean, field pea, lentils and other pulses in crop rotations. These plants contribute to soil quality because they partner with nitrogen-fixing bacteria, accounting for as much as 97% of total plant nitrogen, which can then be returned to the soil. There is a substantial body of research that demonstrates the benefits of helping this process through bacterial inoculation and several strains have been commercialized. One of the major challenges with regard to the establishment of effective plant-bacterial "partnerships" is maintaining population sizes. Surveying bacterial strains for the effects of environmental stressors on effective nodulation is an important component of identifying potential inoculants, but the diversity of soil types in pulse-growing regions across Australia is a major challenge.'

The project will take advantage of state-of-the-art molecular biology facilities and climate-controlled growth chambers at the Hawkesbury Institute for the Environment. The research team will employ a trait-based approach, designed to quantify the contribution of trait diversity to ecosystem services, to understand these interactions during nodulation and the resulting effects on nitrogen fixation.



The outcomes of this research program will provide an understanding of the functional consequences of microbial diversity. This knowledge will assist sustainable biomass production in agriculture and forestry, address conservation needs, and benefit environmental remediation contributing to soil and food security for Australians and beyond.

Project Title: A trait-based approach for understanding the processes limiting effective nodulation of pulse crops
Funding has been set at: $18,255
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http://www.uws.edu.au/hie
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