

RESEARCH DIRECTIONS

How Climate Change Affects Forest Soil

Professor John Cairney and Associate Professor Ian Anderson from the Centre for Plant and Food Science, and Dr Zhihong Xu from Griffith University are collaborating with Dr Colin Campbell from The Macaulay Institute, Scotland, to explore the influence of climate change on forest soils through a three year Australian Research Council Linkage International project.

'The concentration of atmospheric carbon dioxide (CO_2) is predicted to double by 2075. More than 75% of the earth's carbon stock is stored in forests, and much of this is in soil' says Professor Cairney. 'Global warming and increased atmospheric CO_2 may decrease global diversity and alter soil biology, chemistry and nutrient availability. Since soil microbes, particularly fungi, drive nutrient and carbon cycling processes in forest soils, it is important to understand the likely effects of increased CO_2 concentrations on these processes. This is dependent upon understanding how fungal communities in soil will respond to global climate change. This project aims to do this, and also to look at the possibility of using fungi as the means of storing excess atmospheric carbon (sequestration).'

The multi-disciplinary and international research team will conduct a combination of laboratory based experiments and field testing in Australian eucalypt tree environments and a conifer forest in the United Kingdom. These tests will determine how different atmospheric CO_2 concentrations and temperature impact on fungal diversity and community structure. How differing conditions affect decomposition of fungi and subsequent release of chemicals, carbon compounds and nutrients into the soil will also be examined.



This project will provide novel insights into the likely consequences of global climate change on decomposition and how carbon 'flows' through forest soils. It will help refine science's predictions of future climate change and its impacts on the sustainability of Australia's and the earth's forests. The knowledge gained will help land managers to adapt their current practices to meet the demands of future climate change, thus maximising opportunities for sequestering carbon in forests and contributing to Australia's global climate-change action targets.

Project Title: Future climate change: consequences for decomposition and pathways of carbon flow through rhizosphere fungal communities

Funding has been set at: \$69,700

Contact Details: j.cairney@uws.edu.au,
<http://www.uws.edu.au/pafs>

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