



Monique Smith

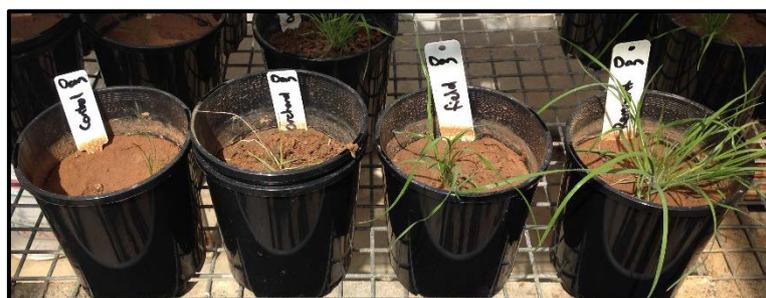
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Monique Smith is in the second year of her PhD under the supervision of Associate Professor José M. Facelli and Associate Professor Tim Cavagnaro from the University of Adelaide and Leanne Rosser from the Department of Environment, Water and Natural Resources. Her project is looking at ways to overcome barriers to restoring previously cultivated landscapes (old-fields), which are over-run by weeds, as well as ways of altering soil conditions to favour native grasses over weeds. It is known that weed invasions and previous land use can alter soil microbial communities so one key component of her PhD focuses on how these changes may inhibit restoration of old-fields. To this end, part of Monique's research involves investigating the differences in microbial communities between old-field and remnant soils, the effects these differences may have on growth of native and weed grass species, and the implications for improving old-field restoration success.

Results from a greenhouse experiment suggest that native grasses benefit from the remnant microbial community as demonstrated by increased growth (picture below) and lower mortality. Weed species, on the other hand, appeared to not discriminate between microbial communities, growing just as well in soil containing old-field microbes compared to those grown with remnant microbes. Both native and weed species had reduced growth in sterile soil, demonstrating the importance of soil microbes to plant health. The implications of this are that, to improve restoration success in old-fields and to reduce invasion by weed species, consideration and management of below ground biota may be critical to native plant growth and establishment. Monique will be investigating these hypotheses further and aims to carry out DNA metabarcoding of the soil microbial communities in order to measure differences in these communities among soil types.

Monique will use the CAWS Student Travel Award to learn valuable skills for future research and initiate future collaborations in Europe by visiting research groups at the **James Hutton Institute**, Dundee, Scotland and the **University of Tartu**, Estonia. Additionally, Monique will present at the **British Ecological Society Annual Meeting** in Liverpool, UK, allowing her to share her research findings with an international scientific audience, gain new insights and ideas from other delegates and to aid her professional development.



The picture above demonstrates the difference in growth of the native grass *Rytidospera auriculatum* when grown in a sterile control, or with microbes from a monoculture of a native grass, an old-field or a remnant site (pots left to right respectively and labelled control, orchard, field and remnant).