Harnessing the microbes associated with soil water repellency to enhance plant survival and growth

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SYMPOSIUM: Applying microbial communities to improve restoration and conservation outcomes, Meeting Rooms 1-2, November 27, 2018, 1:30 PM - 3:30 PM

Biography:
Dr Anna Hopkins is a lecturer in conservation biology and fungal ecology at Edith Cowan University. She has more than ten years experience working with soil microbes, plant-fungal-fauna interactions and fungal plant pathogens in Australasia and Scandinavia.

Soil water repellency (SWR) is one of the fundamental challenges to plant establishment and growth in production and restoration landscapes worldwide. Despite considerable research, it remains a recalcitrant problem for which few persistent, cost-effective alleviation technologies or solutions have been developed. Previous work focused on SWR as a problem to overcome. However, SWR may yield to a new approach that focuses on its potential ecological benefits. This project seeks to understand SWR so that we may temporarily overcome it to establish plants, and then preserve it to act as a "drought-proofing" tool for agricultural and forestry systems. The overarching aim of the project is to develop a mechanistic understanding linking the microbial properties of soils to SWR, and to create products to improve plant establishment and yield. In a pilot study, soil samples were collected from paired repellent and non-repellent soils at three sites and subjected to high throughput sequencing to find common microbial influences involved with SWR. Both fungal-specific (for ITS) and bacteria-specific primers (for 16S) were used to examine a wide range of potentially significant microbes. The findings of this pilot study will inform a larger-scale study to look for microbial patterns in water repellent soils. In collaboration with our industry partners, recommendations will be made for a range of plant and broadacre–scale products that facilitate and exploit SWR.

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