



Optimising post-mining soil conditions to maximise restoration success in a biodiverse semiarid environment

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The original topsoil of mine degraded areas is frequently lost or damaged, which together with the absence of soil forming materials is a major constraint for seed germination and establishment in post-mining restoration. Thus, management of the available topsoil and the use of alternative growth media are critical to improve restoration areas disturbed through mining. Here we are developing laboratory and field trials to define the optimal range for physical and chemical properties of potentially suitable natural and 're-made' soil substrates and growth medium for 20 selected native plant species from the mining intensive Pilbara region of Western Australia. In this semiarid area, water is a limiting factor for seedling establishment, which is compounded by the lack of organic matter of post-disturbance soils. Therefore, particular attention is given to indicators of soil biological activity such as soil respiration, and hydrological soil properties such as water holding capacity, infiltration, hydraulic conductivity and soil water repellence. This research is part of a broader multi-study approach, the Restoration Seedbank Initiative project, a partnership between The University of Western Australia, BHP Billiton Iron Ore, and Kings Park and Botanic Garden to develop the science and underpinning knowledge to achieve biodiverse restoration in the Pilbara region, where land areas disturbed by mining exceed 40,000 ha. Achieving restoration success is critical as the Pilbara region is an ancient landscape with diverse geology and high levels of regional and local endemism in plants and animals.