Effects of Various Soil Microbiomes on Native and Invasive Plants

Wang, Eric (School: Millburn High School)

Many nature reserves use exclosures to preserve pockets of native plant biodiversity. These exclosures typically have a higher proportion of native plants with fewer invasive species to harm them, resulting in different plant-soil feedbacks within and outside of exclosures that alter the soil microbiome and have lasting effects on plant community composition. My research seeks to analyze how the different plant-soil feedbacks within and outside of exclosures affect various native and invasive plant species. Three native and two invasive plant species were grown in soil inoculated with microbiomes collected from within and outside of ten exclosures. After seven weeks, the plants were harvested and their dry biomass was measured. The data were then analyzed with R using linear mixed-effects models. Native plants performed significantly better in the soil microbiome from within exclosures, and mean biomass was 6.826% lower in the soil microbiome from outside the exclosures ($p = 0.03177$). On the other hand, invasive species' growth was not as influenced by the different soil microbiomes. Exclosure size also significantly affected how the soil microbiomes affected plant growth, and all of these effects were species-specific. This research provides new insights into plants and the soil microbiome in the context of conservation and has important implications for the preservation of native ecosystems and native plant biodiversity. It highlights a disparity between how native and invasive species respond to plant-soil feedbacks and provides new insights into the efficacy of exclosures for native plant conservation.

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