Title: Examining the influence of climate change on soil fungal and bacterial communities and their interactions: a macrocosm and a microcosm approach

Abstract

Climate change is expected to modify the structure and function of microbial communities in terrestrial ecosystems which would have an effect on nutrient cycles and ecosystem functioning [1,2].

We combined the results of a macrocosm and microcosm experiment.

In the first experiment, soil samples were taken from an Ecotron facility and exposed to six climate scenarios for three years. The objective was to **determine whether climate change conditions altered the microbial community structure and the complexity of microbial networks**. The results indicated that three years of exposure to climate change scenarios shifted bacterial and fungal community structure. However, the complexity of bacterial and fungal networks remained unaffected. Climate altered species with low relative abundance, being bacteria more affected. Next, we better evaluated specific interactions with a short-term microcosm experiment in which two fungal and two bacterial strains were used to **know whether heatwave temperatures would influence interactions**. Our results showed that bacteria were more sensitive to the presence of fungus than the opposite, at both reference and heatwave temperatures.

While prolonged climate change significantly alters microbial community structure in soil, fungal-bacterial interactions are complex and species dependent.

Delegates will learn that predicting fungal bacterial interactions is challenging and that more research is necessary for improving soil management practices.

References

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2. Osburn ED, Yang G, Rillig MC, Strickland MS. Evaluating the role of bacterial diversity in supporting soil ecosystem functions under anthropogenic stress. *ISME Communications*. 2023;3(1):66. doi:10.1038/s43705-023-00273-1