



Soil microbial community fragmentation reveals indirect effects of pesticide application mediated through biotic interactions between taxa

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Introduction

Background

Pesticides are major environmental pollutants and their use is expected to increase due to agricultural intensification. While pesticide risk assessment is well-defined for aquatic organisms and terrestrial macro-organisms, more research is needed to identify tests that assess the toxicity of pesticides on soil microorganisms. Furthermore, because microorganisms exist in complex and diverse communities where microbial taxa are interacting, pesticide application will not only directly affect certain microbial taxa, but will also have indirect effects throughout the community mediated through these interactions.

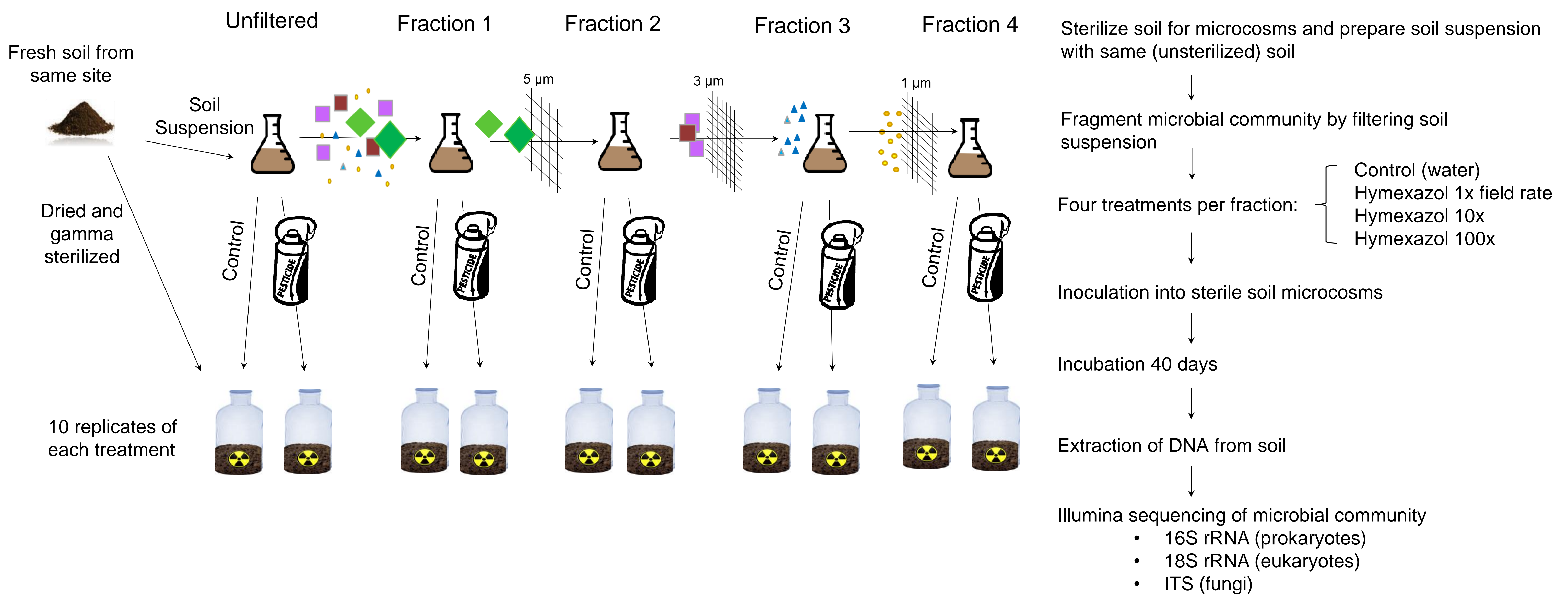
Objective

To quantify the indirect effects of application of the fungicide Hymexazol on a soil microbial community

Hypothesis

If there are indirect effects of pesticide application which are mediated through biotic interactions between microbial taxa, then some taxa will respond differently to pesticide application when the community is fragmented

Experimental setup



Results

Preliminary results

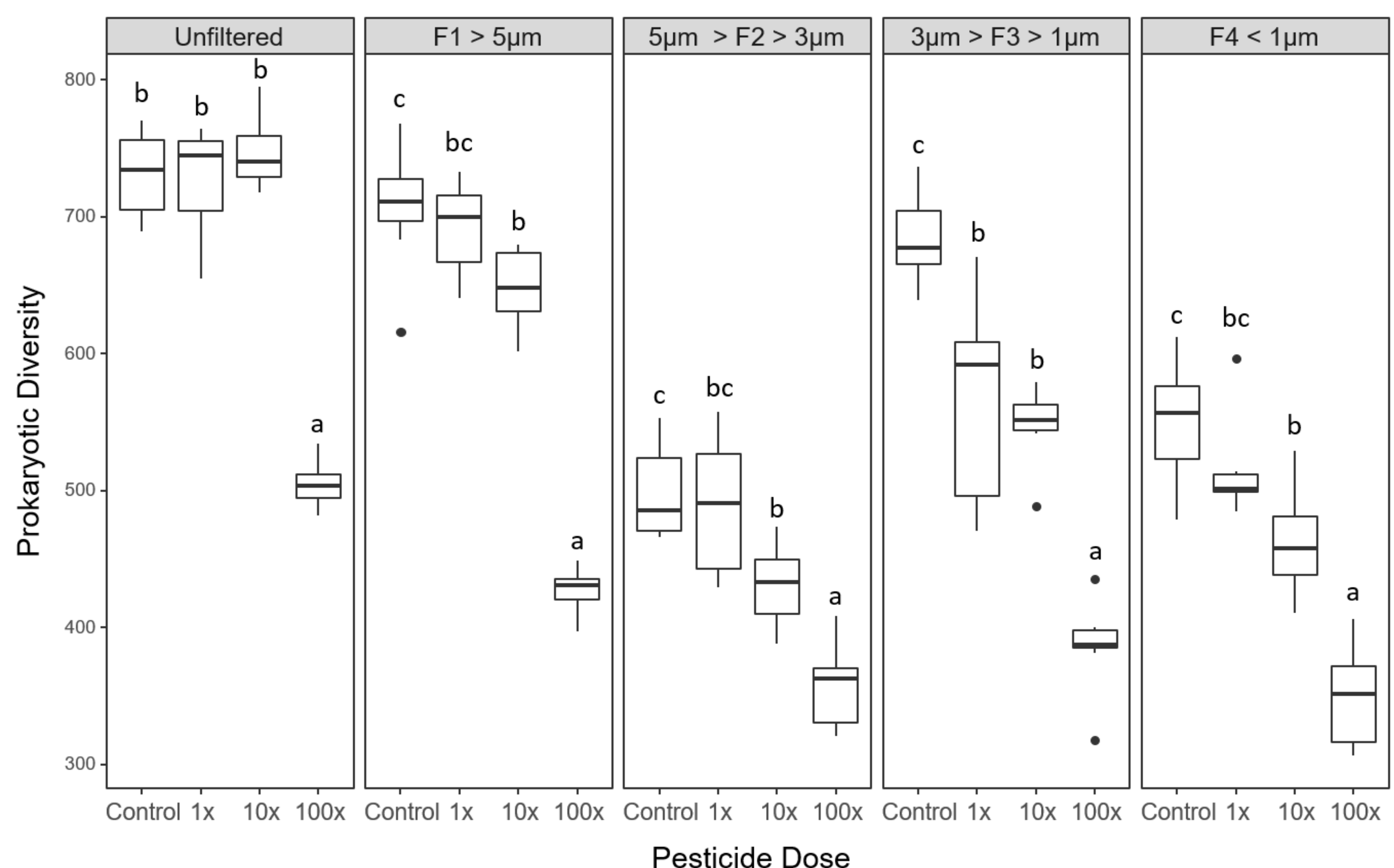
Fragmentation reveals pesticide effects that are not apparent in the unfiltered community. For example, the number of observed species does not differ significantly between the control and 10x dose in the unfiltered community, but does in all the other fractions (see figure).

Next steps

Identify taxa that are indirectly affected by pesticide application

Impact

This work could provide a novel approach for the development of procedures to assess pesticide toxicity on soil microorganisms



Prokaryotic diversity in each treatment

Letters above boxplot indicate statistically significant ($p < 0.05$) difference between doses within each fraction