

# Effects of seed treatments on the rhizosphere microbial diversity

## Introduction

Conventional farmers use pesticide-coated seeds.  
Pesticides are known to be harmful for the ecosystem and human health.  
What is the effect of seed treatments on the soil microbial diversity?

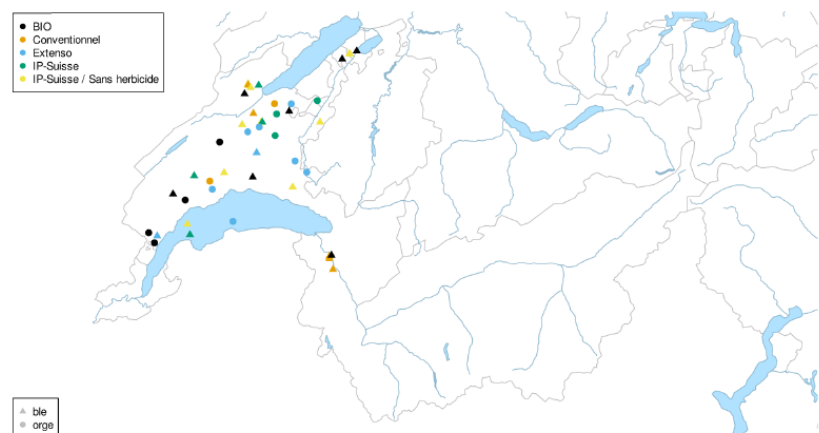


Fig. 1: Map showing the distribution of the different fields of the study.

## Methods

- Field experiments with a network of 20 farmers (Fig. 1).
- Comparison of untreated seeds to pesticides and ThermoSeed.
- Organic farmers used “alternative” seed treatments.
- Rhizosphere and bulk soil sampled a few weeks after germination.
- DNA extraction and PCR (ITS region and 16S rRNA gene).
- Amplicon sequencing with Pacbio (Fig. 2)

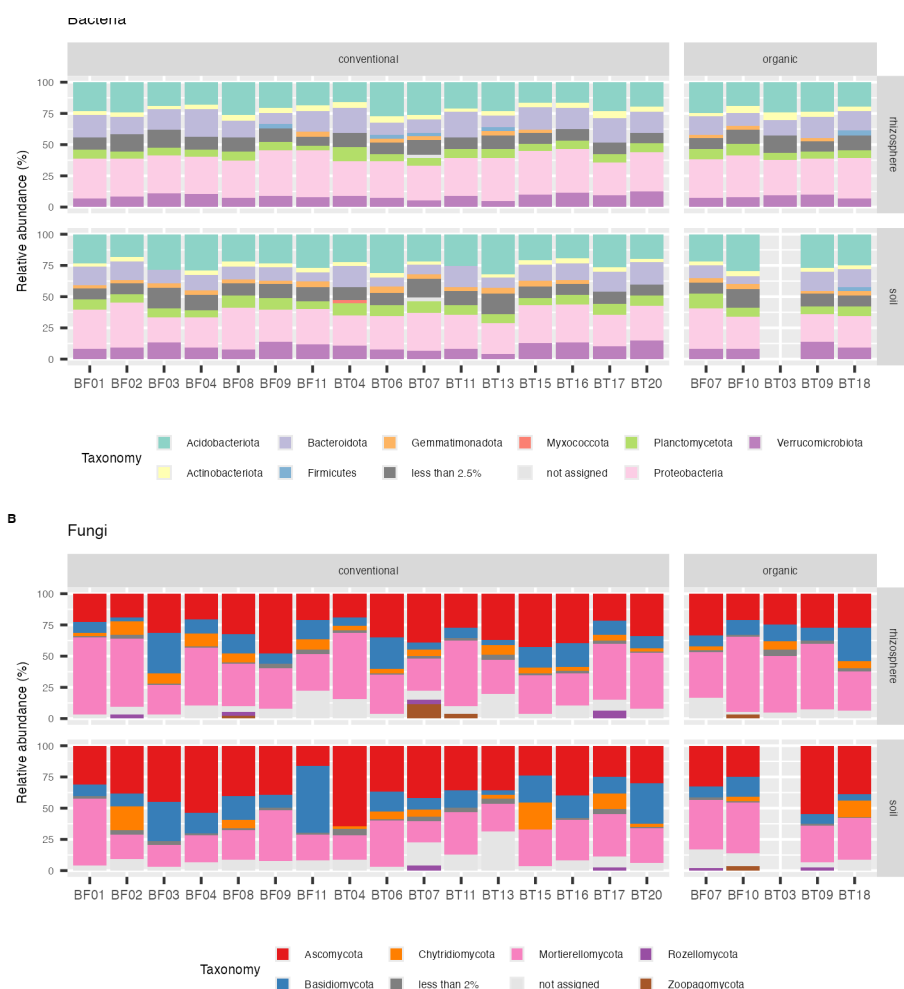


Fig. 2: Taxonomic profiles of microbial communities at the phylum level.

## Results

- All tested treatments led to a significant decrease in bacterial diversity, but no effect on fungal diversity (Fig. 3).
- No effect of seed treatments on community composition, but effect of field (Fig. 4).
- Bacterial community is shaped by pH, sand and silt; in addition, fungal community is also influenced by Corg (Fig. 5).

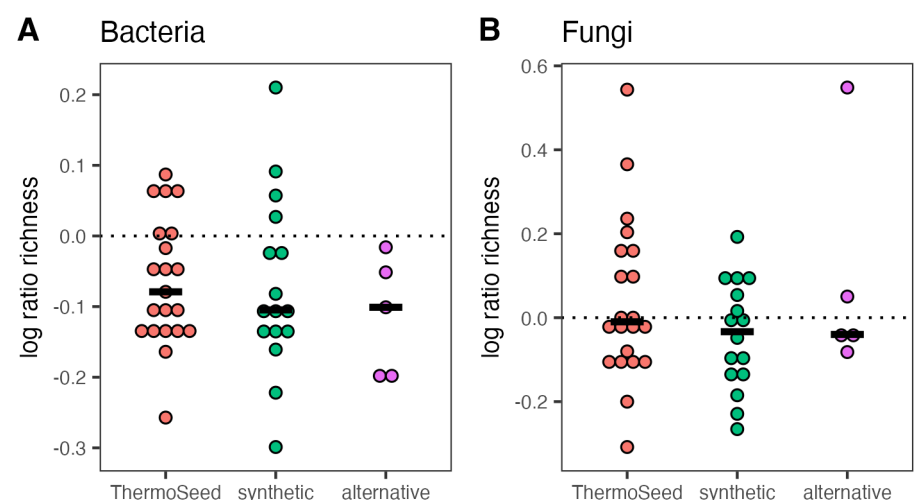


Fig. 3: Effect of seed treatment on the microbial diversity of the wheat rhizosphere.

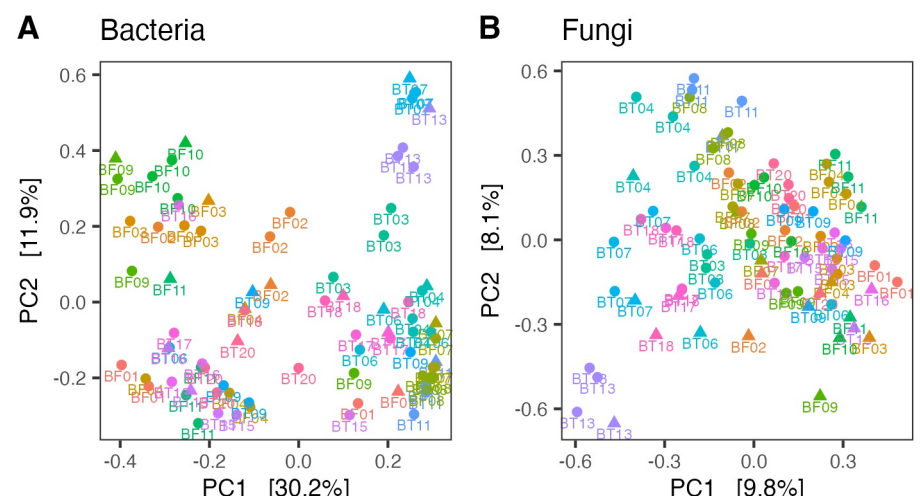


Fig. 4: Effect of field location on community composition of the wheat rhizosphere.

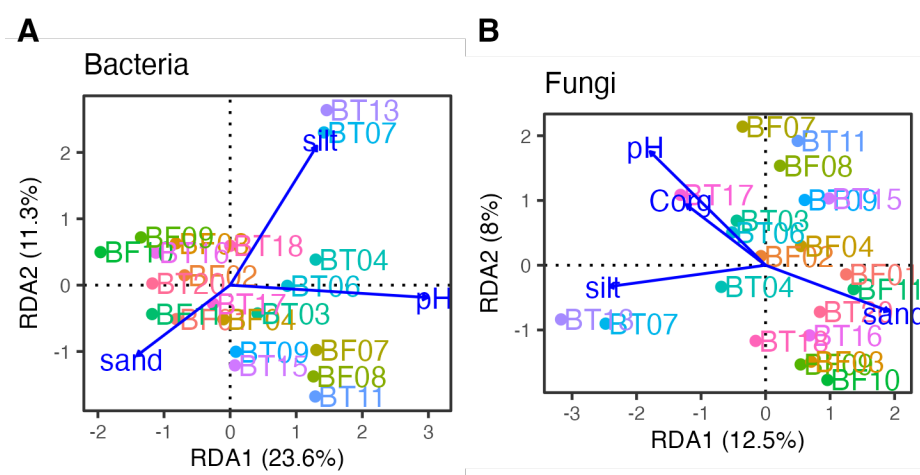


Fig. 5: Redundancy analysis showing effect of soil properties on the microbial communities.

## Conclusion

- Bacterial richness is decreased by all seed treatments.
- Community composition is strongly influenced by soil chemistry.
- Field experiment with randomized block design ongoing.