Exploring the effect of tree species richness on the soil microbial community in European forests

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Introduction
The conservation of biodiversity is important because there is a relation between biodiversity and ecosystem functioning. Mixed forests have a higher productivity and stability compared to monoculture forests. In grass ecosystems a positive effect of species diversity on the diversity of microorganisms is observed but in forest ecosystems this research is still in the initial phase. This research focusses on the effect of tree species diversity on the microbial diversity and the importance of this to the function of the forest ecosystem.

Hypothesis
1. Tree species mixture -- microbial community
A higher tree species diversity results in a higher microbial biomass and/or higher functional diversity of the microbial community.

2. Microbial community -- humus form
Different humus forms have a different microbial community. The microbial community differs in microbial biomass and functional diversity.

3. Tree species mixture -- humus form
Different tree species mixtures result in different humus forms. In this relation the microbial community plays a role.

Sampling scheme
6 Study sites
1. Finland
2. Poland
3. Germany
4. Romania
5. Italy
6. Spain

Available data
- Tree species mixture
  - Identity
  - Diversity
- Microbial community
  - C and N microbial biomass (Chloroform fumigation extraction method)
  - Metabolic diversity (% coloration wells Biolog EcoPlate)
- Humus form
  - Description according European Reference Base
  - Mass ectorganic layer
- Soil organic and mineral layer
  - pH
  - Water content
  - L.O.I.

Statistical analysis
- Mixed modelling
  - Linear mixed model
    - Response variable: Metabolic diversity [%]
    - Fixed effects: C/N ratio, Cmic/Ctot, pH and water content
    - Random effects: country

- Comparative analysis
  - Analysis of variance
    - Difference between plots
    - Effect of tree species identity (presence/absence tree species)

- Exploratory analysis
  - Indirect ordination technique: PCA

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