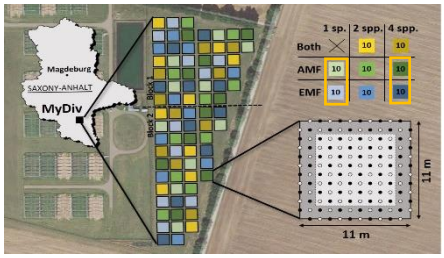
AGRARÖKOLOGIE
Universität Bayreuth

Master thesis in Agroecology

From grassland to forest: How is carbon stabilized in soil and does this depend on mycorrhizal type and tree diversity?

MyDiv is a tree diversity experiment located in Bad Lauchstädt, where 10 deciduous tree species with two different mycorrhizal types were planted across a gradient of species richness (ranging from monocultures to 4 tree species mixtures). The site was formerly used as agricultural land and grassland, trees were planted in 2015, and we are now interested in:



- How does the plantation of trees change carbon content in soil, and in which forms is carbon stabilized?
- Do arbuscular mycorrhizal trees stabilize carbon differently than ectomycorrhizal trees, due to their distinct strategies to acquire nutrients?
- Does tree diversity influence carbon stabilization?

We have already analyzed soil samples taken in 2023 and are interested in how the system changes over time as the trees grow. However, there is also room for your own ideas, we will discuss the sampling campaign and lab-work together.

Methods you will work with:

- Field work (soil sampling)
- Density fractionation: separation of soil organic matter into mineral-associated and particulate organic matter
- C (carbon) and N (nitrogen) elemental analysis
- Stable isotope analysis of ^{13}C and ^{15}N (natural abundance)
- Data analysis and statistics (preferably in R)
- Presentation of your plans and results in the group seminar

Is this project something for you?

- You are interested in understanding rhizosphere processes and nutrient cycles in soil
- You are interested in stable isotopes and mycorrhizal symbiosis
- You have experience working in the lab (don't worry, the specific methods you will learn)
- You like to work with high precision, and can handle small amounts of samples (for elemental and stable isotope analysis, you need to weigh in a few mg of your sample on a high precision scale)
- You like to work independently and plan and organize your work in the lab yourself (e.g. density fractionation requires several steps on different days). We will help you with planning your work.

If you are interested, **please contact:**

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Start of the thesis: October 2025 (or upon agreement)