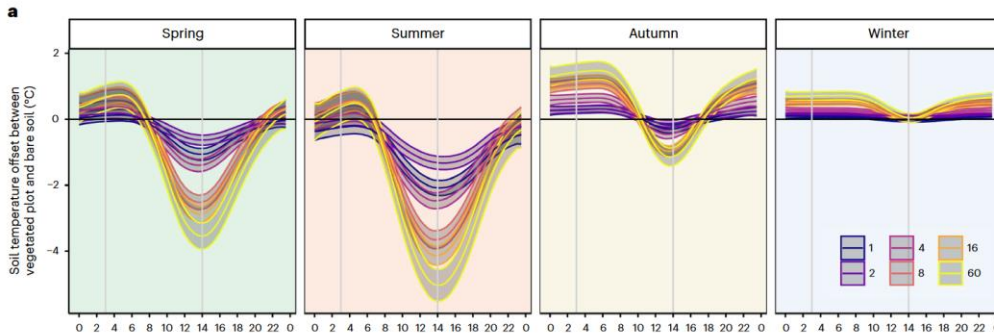


## Microclimate effects on ecosystem functions in the MyDiv tree diversity experiment

Bachelor or master thesis at the [Experimental Interaction Ecology](#) group at [iDiv](#).

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From: Huang Y, et al (2023) Enhanced stability of grassland soil temperature by plant diversity. Nature Geoscience. <https://doi.org/10.1038/s41561-023-01338-5>

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### Rationale:

Plant diversity has a positive effect on soil ecosystem functions (e.g., Chen et al 2019). A lot of research deals with exploring the underlying mechanisms. Recent studies show that plant diversity influences microclimatic conditions (Huang et al 2023, Schnabel et al 2023). Specifically, it buffers extremes, i.e., less extreme cold values during winter and less warm temperatures during summer. Further, fewer extremes also lead to more stable conditions. What is less clear and not yet empirically shown is how microclimatic conditions affect soil ecosystem functioning, for instance, soil microbial respiration and decomposition.

### Hypothesis:

Tree diversity reduces temperature extremes and leads to a more stable microclimate, thereby increasing soil-ecosystem functioning

### Project idea:

We want to use the [MyDiv](#) tree diversity experiment to investigate how tree diversity affects the microclimatic conditions for two economically relevant tree species, e.g., beech and lime.

We will follow these two tree species across the diversity gradient of 1, 2, and 4 tree species and measure microclimatic conditions using the [TMS-4 loggers](#). They measure soil moisture at ~ - 6cm soil depth and temperatures and three different heights: -2 cm (in soil), +2 cm and +15 cm (both aboveground). In addition, we can measure light per target tree species using simple [HOBO loggers](#). To investigate soil functions, we want to measure soil microbial respiration and biomass using the substrate-induced respiration method.

In addition, we measure microclimate conditions at a high spatial (4 loggers per target tree) and temporal (every 15 minutes) resolution.

If there is interest, [LI-8150](#) CO<sub>2</sub> chambers are available to measure CO<sub>2</sub> evolution, but only for a very reduced number of locations.

The thesis can be written in German or English.

#### Your main tasks:

- Deploy loggers in the field in (started for TMS-4 loggers)
- Read out loggers
- Take regular soil samples and measure microbial biomass and respiration
- Analyze the data
- (optional: use the LI-8150 system to measure CO<sub>2</sub> evolution at high spatial resolution)

#### Requirements for the position:

- Being not afraid of large data sets and statistics
- Ideally, you already have experience in working with R
- Willingness to combine field and lab work (we drive regularly from iDiv to the field site)
- You like to try things out / play around with equipment and data
- Able to work independently after being instructed
- Lab experience is of advantage

#### What we offer:

The Experimental Interaction Ecology group is a large international research group involved in many scientific platforms (e.g., [Jena Experiment](#), [iDiv Ecotron](#), [GCEF](#), [NutNet](#)) that can be further explored during the time of the thesis. You are welcome to make full use of all offers that are provided to all lab group members, scientifically (e.g. courses on scientific basics such as statistics, reference managers, how to write) and socially. We value friendly cooperation and are always ready to develop further. During our lab seminars you will learn about scientific work and how to apply it, and our paper club brings you in contact with critically evaluating scientific papers.

#### Next steps:

If you are interested in the position, please write us a short letter of motivation. Please refer to the requirements listed above and how you fulfill them. Further questions can also be clarified in advance. Please send your application with the subject "Thesis MyDiv Microclaimte 2024" to [simone.cesarz@idiv.de](mailto:simone.cesarz@idiv.de) who is supervising the project and will answer all questions.