Ecophysiology of Plants at Professorship for Land Surface-Atmosphere Interactions (LSAI)
Department of Life Science Systems
TUM School of Life Sciences
Technische Universität München

Opportunities for Talents

2 PhD students (m/f/d) in Forest Ecophysiology / Microbial Ecology

to elucidate local site factors and interactions for forest regeneration concepts in climate change

The Technical University of Munich (TUM) is one of the best universities in Europe. It is characterised by excellence in research and teaching, interdisciplinarity and talent promotion. The Plant Ecophysiology Unit (LSAI) of the TUM School of Life Sciences is looking for two interdisciplinary PhD students to start on **15.10.2024 (or later)**. Our aim is to understand how small-scale site factors improve the survival of young plants under climate change. To this end, we are investigating their establishment success as a function of local site factors in a large-scale experiment that has already been set up with over 100,000 young trees of different species planted in a mixture. Factors such as deadwood, tree stumps, hydraulic redistribution and biological interactions are at the forefront of the ecophysiological and fungal/microbial investigations.

Your tasks

The survival of young trees depends primarily on their immediate environment. Biotic factors such as old trees, tree species mix, tree stumps, mycorrhiza, and the tree-soil microbiome have hardly been investigated in direct connection. Your task is to clarify the significance of such small-scale factors at the stand, tree and root zone level of an existing future-oriented large-scale trial with several locations in Bavaria, and to uncover mechanisms of the water supply of such young plants in forest manipulation experiments. To this end, you will develop measurement concepts and experiments, carry them out and communicate the results. Together you will use a wide range of methods, including drone-based thermal photography in the stand, physiological measurements on plants in the field, stable isotope analysis, and molecular biological analysis of microbial communities in the laboratory. The focus is divided into:

Position 1: Ecophysiology and stand processes

- Measurements and experiments, e.g. on xylem flow, hydraulic redistribution (including stable isotopes), anatomical wood analyses, photosynthesis rates, transpiration, water use efficiency
- stand-orientated: thermal photography (drone) for spatially resolved mapping of leaf temperatures, position determination and shoot length growth, ground penetrating radar in the root zone

Position 2: Microbioms, fungi, and roots

- Analysis of microbial root and soil communities (e.g. with Oxford nanopore and Illumina amplicons on, fungal, prokarya, and possibly protists)
- Development of a strategy for functional characterisation of root communities (DNA and RNA based, as well as consideration of individual root characteristics, e.g. vitality)

Your profile

We are looking for dynamic, reliable and motivated candidates with a master/diploma degree in biology, ecology, forestry or related disciplines who enjoy independent, interdisciplinary work, who actively participate in our group and exchange ideas within the project. Willingness to work in the field and laboratory work, experience with statistical data analysis (R), driving licence and willingness to drive (especially position 1), good German and English language skills, as well as communication skills with local partners (especially position 1). Additionally:

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Position 1

- Specialisation (MSc./Dipl.) in **ecology, forest science, biology, resource management, or similar**.
- Practical experience with ecophysiological methods and field work is an advantage
- Strong interest in process-orientated research in plant physiology/plant ecology
- Advantageous: GIS and other spatial software

Position 2

Opportunities for Talents

- Specialisation (MSc./Dipl.) in **biology, microbiology, ecology, bioinformatics, or similar**.
- Experience in fungal/microbial ecology, especially with NGS DNA sequencing and analysis in the lab and on the PC
- Strong interest in microbial communities and interactions in the root zone
- Willingness to work in the field

We offer

- Integration into a young, dynamic, international and multidisciplinary working environment with various national and international co-operations
- A constructive, lively working atmosphere
- Employment with appropriate remuneration for doctoral candidates, according to the collective agreement for the public service of the federal states (65% TV-L E13)
- Structured doctoral programme (TUM Graduate School)

How to apply

Please send your application with a letter of motivation, a brief description of your research experience, CV, and the contact details of two references as a single pdf file (KlimaSens_surname_firstname.pdf) to Prof. Dr Thorsten Grams and Dr Fabian Weikl (klimasens.weikl@tum.de). The application deadline is **15 September 2024**. If you have any questions, please do not hesitate to contact Prof. Dr Thorsten Grams or Dr Fabian Weikl.

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