



## Master project: Drought intensity effects on the ectomycorrhizal communities of mountain forest trees

Climate change will lead to more frequent and intense droughts in the immediate future. The majority of experiments that observe drought effects on plants and soil have a replicate design with one control and one drought treatment. However, most functional responses to environmental drivers, such as drought, are non-linear. To assess the responses of trees and associated soil microbiota to different drought intensities, a common garden experiment was set up in the botanical garden in Innsbruck.

The aim of this Master thesis is to investigate the effect of a drought gradient on the ectomycorrhizal communities associated to mountain forest trees. This will be done in close collaboration with a PhD student on this interdisciplinary project. Ectomycorrhiza (ECM) are crucial for the ability of their mutualist tree partners to tolerate drought stress. The ECM diversity will be monitored based on ECM morphotyping and subsequent molecular analysis, at the end of the drought treatment, and compared to the control trees. The productivity of ECM will be monitored using in-growth mesh bags. Hyphal growth will be quantified by measuring ergosterol content.

In addition, a labelling experiment will be carried out on drought affected trees, by gassing them with  $^{13}\text{C}$  labelled  $\text{CO}_2$ . In this way it will be assessed, how newly assimilated carbon is partitioned between different tree compartments and how much carbon is shared with mycorrhiza symbionts, depending on the drought level the tree is subjected to.

Used methods:

- ECM morphotyping using microscopy
- PCR of fungal DNA barcodes and subsequent sequencing
- Ergosterol extraction and quantification from mesh bags (involving HPLC)
- Determination of  $^{13}\text{C}$  allocation to ECM

If you are interested in this collaborative project involving botanists, ecologists, atmospheric science researchers and microbiologists please contact

[Ursula.peintner@uibk.ac.at](mailto:Ursula.peintner@uibk.ac.at) and/or [M.Neurauter@uibk.ac.at](mailto:M.Neurauter@uibk.ac.at)

Start of Master project: May 2024 or summer 2024

