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GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN



Open Project for PhD, MSc and BSc –

Multidimensional trophic niches in belowground animal communities along a successional gradient

Food is fundamental for life continuation, not only for aboveground biota but also for belowground animals. The high local biodiversity in soil is presumably due to the ample food resources belowground and **trophic niche differentiation** between coexisting species living underground. However, the soil represents a black box where different organic entities such as litter, detritus, bacteria, fungi, algae, root exudates and various soil microfauna are mixed, making depiction of the food resources of soil animals difficult.

In this project we will for the first time use a combination of multiple advanced approaches, including **stable isotope analysis**, **fatty acid analysis**, **enzyme activity analysis** and **DNA gut content analysis** that are complementary to each other, to investigate the trophic niches of soil invertebrates. We focus on **springtails (Collembola)** and **oribatid mites (Oribatida)** – the two most diverse and abundant soil animal groups. The animals will be taken from a permanent study sites in South Bohemia (Czech Republic) that represent a secondary successional gradient from arable field to forest with a more than 30-years monitoring record. We aim at providing comprehensive data on multiple dimensions of trophic niches of springtails and oribatid mites. The data will be used to depict food resources and further applied to the niche concepts to explain species coexistence in soil.

Students involved in this project will benefit from working in, learning from, and exchanging between **two experienced research groups in Czechia and Germany**: 1) **Institute of Soil Biology (ISB)**, Biology Centre, Czech Academy of Sciences (Czechia) that is well-recognized by taxonomic expertise and long-term ecological studies on soil animal community, as well as lab works on digestive enzyme activities, and 2) **Department of Animal Ecology (AG Scheu)**, University of Göttingen (Germany) that has a great reputation in functional soil ecology and food-web ecology. See more information about the working groups at www.upb.cas.cz (ISB) and www.uni-goettingen.de/en/107728.html (AG Scheu).

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Picture from Soil Biodiversity Atlas