Stefan Geisen

geisens@uni-koeln.de

Supervisor Michael Bonlowski, Zoological Institute, Dept. Terrestrial Ecology, University of Cologne, Germany

Molecular, taxonomic and functional characterization of protozoan taxa and communities from European soils

Protozoa are the major consumers of bacterial production in soil due to their small size, high abundance and fast turnover rates. They form the major base of the heterotrophic eukaryotic food web channeling the energy flow via bacteria to higher trophic levels in soil (i.e. the bacterial energy channel).
Despite their important functions for nutrient cycling in soil we only have a vague idea on the identity of the dominant taxa. Major reasons for the general ignorance of these small eukaryotes in environmental studies are methodological difficulties in cultivation and quantification in the opaque soil environment as well as a lack of taxonomic expertise. However, recent developments in molecular techniques now allow closing the methodological gap on this largely unknown trophic link in the soil food web.

In the EU-project EcoFINDERS we are aiming to increase the knowledge on protozoa in soils by combining morphological and molecular methods. We developed protozoan primers for high-throughput sequencing to investigate and compare protozoan communities of different soils in long-term observatories across Europe and identify indicator species across gradients of land-use intensity.

We are further aiming to develop and apply barcoding methods for protozoa resulting in easy-to-use molecular techniques for in-depths studies of this largely unknown group of microorganisms. Laboratory studies will evaluate effects of distinct protozoan taxa on changes of the composition within the bacterial community and feed-backs on soil nutrient cycling to shed light into the "black-box" of microbial interactions in soil.