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**ÖKOLOGISCHES KOLLOQUIUM**  
des Instituts für Zoologie in person in room 0.024

**Wednesday, 28.06.2023, 01:15 pm**



Edith Hammer

Microbial Ecology, Lund University

Host: Prof. Dr. Bonkowski

**Windows to the underground - Direct investigation of microbial behavior, trophic interactions and ecosystem functions within soil pore space structures**

Soil organisms live and interact in the intricate soil pore space labyrinth, but interactions with their habitat and realistic biotic interactions are difficult to study because of the opaqueness of the soil. We recently developed microfluidic model systems that simulate the spatial microstructure of soil microbial habitats in a transparent material, which we call Soil Chips. They allow us to study the impact of soil physical microstructures on microbes, microbial behavior and realistic microbial interactions, live and at the scale of their cells.

Using microbial model strains, we could show the influence of the pore space geometry on bacterial and fungal growth and enzymatic activity. Different litter decomposer fungi showed opposing space exploring strategies. In synthetic communities of a fungus and a bacterial strain, sharper and repeated angles in channel-shaped pores consistently diminished microbial biomass and degradation activity, but reduced connectivity in maze like structures increased bacterial biomass and even more so their enzymatic activity.

Inoculating the chips with soil, we get a large proportion of the natural microbial community into our chips and can study natural communities of soil bacteria, fungi and smaller protists and nematodes in their food webs and in different spatial habitats. In chips that were containing initially dry pore spaces, colonization success of not only bacteria but also protists was strongly increased by the presence of fungal hyphae, which paved the way for protists by wetting pore spaces.

The soil chips enable us to study the influence of trophic interactions such as the presence of predators on bacterial and fungal nutrient cycling, and various predation strategies of protists otherwise difficult to culture. Beyond the scientific potential, the chips can also bring soils closer to people and hopefully increase engagement in soil health conservation.

**Gäste sind herzlich willkommen!**  
**Die Mitarbeiter/innen der Ökologie**

→ bei Rückfragen: 470-8242 (Niedeggen)