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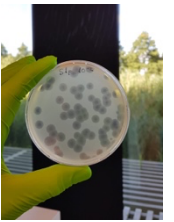
Mathematisch-Naturwissen-schaftliche Fakultät

Fachbereich Geowissenschaften

MSc thesis project:

Soil synthetic communities as models of virus biogeochemistry

Soil viruses are among the least explored components of terrestrial ecosystems. Viruses that infect bacteria (phages) are abundant in soil, with potentially strong influence on carbon cycling, plant nutrition, and greenhouse gas production.



Synthetic communities ("syncoms") are constructed by adding known organisms to a sterile habitat, creating relatively controlled communities. Syncoms are very useful for testing cause-effect relationships in microbial ecology, and offer great potential to test emerging theories of phage biogeochemistry. The "viral shuttle" hypothesis, for example, states that phage-induced mortality stabilizes carbon in soil, but manipulating phage abundance to test this in a natural soil community is technically very difficult.

This project will establish synthetic soil communities using existing microbial isolates (bacteria, phage, fungi) as a platform to investigate phage effects on the growth and activities of bacterial hosts and other community members (abundance, microbial biomass), as well as carbon and plant nutrient cycles (CO_2, soil carbon and nitrogen).

The project will provide space to develop original hypotheses and experiments within the broader research direction. Students will master skills in microbiology (sterile culture technique), biogeochemistry (soil and gas analysis) and molecular sciences (qPCR), while contributing to one of the most exciting frontiers of soil biogeochemistry.

Candidates should have knowledge of biology, biogeochemistry and environmental sciences, with some laboratory experience in soil science or microbiology. Self-motivation and the ability to work independently is needed. The working language will be English. Students will be hosted in the Soil Microbial Interactions group in the Department of Geosciences (GUZ). For enquiries, please contact Jun.-Prof. Kyle Mason-Jones at k.mason-jones@uni-tuebingen.de.