To the Third Dimension: Challenges on the Way Towards Small-Scale Spatial Microbial Ecology. (S03-kandeler083126-Oral)

Authors:

- E.Kandeler* - *University of Hohenheim, Stuttgart, Germany*
- C.Kampichler* - *Soil Zoology and Ecology Lab., Berlin, Germany*

Abstract:
Investigations on soil organisms at different spatial scales and levels of complexity have improved our knowlegde about distribution and function of soil organisms. Whereas their heterogeneity at the plot-scale is well known, much less information is available on the micro-scale. This paper presents an overview of recent micro-scale studies using different techniques. Particle size fractionation allows for the separation of the smallest microbial habitats in soils. For example, Holophaga/Acidobacterium and Prosthecobacter are mainly located in the silt- and clay fractions, whereas Proteobacteria colonize all particles. Specific microbe-particle associations, the quality of organic matter and grazing resistance of soil microorganisms seem to be the driving factors for preferential colonization of these microhabitats. Two-dimensional studies clarify distribution and function of soil microorganisms at the soil-root interface as well as microbial-faunal interactions. Three dimensional studies of microbial communities are mostly restricted to aquatic systems; nevertheless non-invasive measurements in porous media allow for real-time studies of the spatial development of bacterial growth.

Corresponding Author Information:

Ellen Kandeler
University of Hohenheim
Emil-Wolff-Str.27
Stuttgart, D 70599
Germany

phone: +49 711 459 4220
fax: +49 711 459 3117
e-mail: kandeler@uni-hohenheim.de

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