

Submitted Abstract

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Abstract

The soils of Alpine pastures provide diverse habitats for animals, plants and microorganisms and are known as hotspots for biodiversity. In particular, soil microbes have a significant role in soil function. The international project MICROVALU is evaluating the microbial diversity in Alpine pastures by analyzing different components of the soil food web including soil, rhizosphere soil, invertebrate fauna and fecal samples of dominant above-ground mammals and tries to provide a more complete understanding of the relationship between soil organisms and their effect on soil processes.

The association of plants with plant growth-promoting microbes (PGPM) is substantial for plants to cope environmental stress, e.g. caused by climate change, and is essential for fruitful and sustainable agriculture in Alpine regions. Therefore, in addition to assessing overall microbial diversity patterns, we are focusing on possible driving factors for the abundance and composition of PGPM that live in close association with the roots of plants. These organisms provide the plant with beneficial services ranging from nitrogen fixation and phosphate solubilization, to phytopathogen suppression via antibiotic production, resulting in better plant growth, faster germination, enhanced root growth, and higher resistance against abiotic and biotic stress. Since the impact of factors like elevation, temperature, drought and interactions and/or transmissions via the soil fauna on PGPM is limited, this particular study is also ground-breaking.

For this study, samples from bulk soil, rhizosphere soil of two common plant genera in Alpine pastures (*Carex* spp. and *Festuca* spp.), belowground fauna (micro-, meso- and macrofauna) and fecal pellets of above ground fauna (wild animals and domestic livestock), were collected along an elevational gradient of an inner-Alpine valley from below to above the treeline (1000-2500 m a.s.l.). Microbial abundance, community composition, and diversity were determined in all sample types, and special focus is now being paid on the abundance and diversity of PGPM.

Our results will identify the associations of PGPM in the rhizosphere and the associations and possible transmission of PGPM between soil and soil animals in Alpine pastures under changing environmental conditions.