

# Soil microbial communities in highland and lowland grasslands under different management intensity

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## Abstract:

In the BIOINVENT project, the soil microbial communities in permanent grassland systems are investigated along a pan-European gradient. In this particular study, we compare the soil microbial community of grasslands in two different agro-ecological areas (highlands and lowlands) in two different countries (Germany and Switzerland). A gradient of management intensity was sampled, from intensive grasslands with high nutrient inputs and utilization frequency, to grasslands with an intermediate and extensive management intensity. It was analysed 12 replicates per management intensity and area, which adds up to 144 samples. The PLFA and NLFA (phospholipid-neutral fatty acid) analysis was used to estimate the total and the specific biomass of the soil microbial groups as well as the microbial community structure. A marked impact of the agro-ecological gradient was detected, the microbial community structure varied depending on the altitude, while the management intensity had a smaller impact, in each country. We observed that in the lowlands, the microbial community structure of the extensive grasslands was different compared to the grasslands under other management intensities. The effect was, however, not clear in the highland samples. Despite these differences in the microbial community structure, the total and bacterial biomass was not significantly different under different management intensity or in different agro-ecological regions. However, the fungal biomass – both saprotrophic and mycorrhizal – is generally higher in the extensive grasslands than in the other management intensities. We therefore conclude that, the extensive grasslands provide a distinct habitat for fungal colonization; but this work will feed into the larger survey.