

# Soil type affects rhizosphere microbial community and biocontrol of *Rhizoctonia solani*

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The soil borne pathogen *Rhizoctonia solani* is hard to control with fungicides. The use of antagonistically active bacteria could be an environmental friendly alternative. Two promising biocontrol strains could be identified under laboratory and greenhouse conditions. However, the biocontrol activity under field conditions is often inconsistent. The reason for this variability is until now unknown. An important factor influencing the crop yield, plant health and disease symptoms is the soil type. Soil types differ in chemical and physical conditions which may lead to different microbial communities. To understand the complex interactions between the soil type, plant and microbial community a field experiment with a unique plot system containing three soil types was performed. The dry weight and disease severity of lettuce was analyzed as well as the rhizosphere colonization of the two biocontrol strains. The dry weight in the three soil types is similar, but there are differences in the establishment of the pathogen. Surprisingly, the colonization density of the biocontrol strains was independent from the soil

type. PCR-DGGE analysis showed that the rhizosphere microbial communities of lettuce in the three soil types differed significantly. The biocontrol strains had a negligible effect on the indigenous microbial community. Amplicon pyrosequencing of 16S rRNA genes from bulk soil and rhizosphere samples revealed taxonomic groups which were enriched in the rhizosphere of lettuce, or which differed between soil types. The dominant phyla in bulk soil and rhizosphere of all three soil types were *Proteobacteria*, *Actinobacteria*, *Firmicutes*, *Acidobacteria* and *Bacteroidetes*. The fast growing *Proteobacteria* were enriched in the rhizosphere compared to the bulk soil whereas the relative abundance of the other dominant groups decreases. The *Firmicutes* were enriched in one of the loamy soils, but decreased in the other two soils. A detailed analysis of the OTU report showed that many OTUs are enriched in the rhizosphere but also a noticeable number of OTUs are not influenced by the rhizosphere environment. Also there are significant differences between the soil types; especially the two loamy soils seem to enrich other OTUs than the sandy soil.