Abstract

Plant-associated microorganisms are very important for plant growth. Microbiota influence, for example, nutrient uptake, flower and fruit production or biocontrol of pathogens. Microorganisms are found in various plant organs. Each plant part then creates different environments for the microorganisms to live in. This may influence their different functions depending on which plant part they are found in. One such function is to help plants cope with adverse conditions. Drought, as an adverse condition, has a major effect on both plants and micro-organisms. The aim of this thesis is to study effect of long-term drought on the composition of the microbiota in the rhizosphere and leaf and root endosphere.

Long-term drought affected the composition of microbial communities in different plant parts. According to the original hypothesis, the response to drought of prokaryotes differed from that of fungal communities. Fungal communities are more stable and their alpha diversity did not change much during the different durations. The opposite trend in diversity is seen in prokaryotes, where a relative increase in specialists can also be observed.

Regarding specific microbial taxa, the results confirm the previously reported trend of increasing *Actinobacteria* abundance during drought. For fungi, on the other hand, there was a surprising increase in saprophytic taxa. Last but not least, the results also show a difference in the sharing of microbial taxa among the different plant parts. In fungi, a clear division of taxa between the rhizosphere and endosphere of plants was observed. In prokaryotes, on the other hand, we see a partition between the underground parts of the plant and the leaf endosphere. This trend intensified during the drought.

The results therefore show that long-term drought has an impact on the composition, diversity and function of plant-associated microbial communities. This effect was not only evident after two years of drought, but it also intensified during the fourteenth year of drought.

Key words: Drought, plant microbiota, *Festuca rubra,* rhizosphere, plant endosphere