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Abstract Book

P32: Investigating the effect of intercropping on the rhizosphere microbiome of cultivated lettuce

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Microbial diversity has been shown to have an impact on plant growth and health by improving nutrient uptake as well as increasing tolerance to biotic and abiotic stressors. Considering this aspect in agricultural systems could lead to higher crop yields and resilience. Intercropping, as opposed to monoculture, consists of simultaneously growing more than one crop in the same field. The effect of this practice on soil, rhizosphere, and root microbiomes was investigated in various cropping combinations, often determining higher microbial diversity and enhanced plant growth. The aim of this study was to explore the effect of intercropping on the microbial rhizosphere composition of *Lactuca sativa* var. capitata L. Rhizosphere samples were collected from fields with different cultivation methods, namely monoculture with and without mulching and intercropping with narrow or wide rows, at three different time points during the growth season. High-throughput sequencing of the 16S rRNA gene fragment and ITS region was applied to unravel the taxonomic structure of bacterial and fungal communities, respectively. The relative abundance of the bacterial and fungal communities was mainly influenced by the sampling time point and to a lesser extent by the treatment. Additionally, the Shannon diversity index of both intercropping treatments showed a significantly higher diversity at the first time point compared to the mulched monoculture.

However, a significant increase in microbial diversity was also observable in mulched monoculture across sampling time points. PERMANOVA of Bray-Curtis dissimilarities revealed that both collection time and cultivation system explain a similar proportion of the observed variance. Visualization of non-metric multidimensional scaling (NMDS) plots by sampling time point highlighted a clustering behaviour of samples belonging to different cultivation systems, showing a shift in the bacterial and fungal communities due to different treatments. In conclusion, the most evident effect of intercropping on microbial diversity was observed during the early cultivation season, but it was also observed that mulching increased microbial diversity over time, although determining distinct communities compared to intercropping.