

Legume-cereal intercropping as a strategy of regenerative agriculture supporting reverse of biodiversity loss - relevance of microbiome-based research

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Abstract

Adverse environmental impacts connected with high chemicals and fertilizers use is one of the causes of biodiversity loss. Therefore, there is a need to looking for more natural and non-hazardous alternative approaches to make agriculture more sustain. The legume-cereal intercropping is currently one of the „hot topics” in the area of sustainable and regenerative agriculture. These intercropping practices are increasingly gaining attention as a way for enhancing soil ecosystem services and reversal biodiversity loss, as well as as a strategy of harnessing plant yield quality and soil health.

Legume-cereal systems are the most common intercropping combinations used in sustainable agriculture models because of their noncompeting niche requirements and atmospheric nitrogen fixation which improve a balance of this nutrient in soil and plant and decrease the amount of mineral fertilizers use. However, conventional crop rotations in the EU are largely dominated by cereals while legume cultivation has declined in recent years.

The idea of the LEGUMINOSE project includes that multi-species assemblages of plants deliver rhizosphere functions that are greater than the sum of the functions delivered by the rhizospheres of individual plants growing alone as a monoculture. We hypothesises that the higher plant diversity in intercropping will increase plant health, improve soil biodiversity and reduce the use of pesticides in agroecosystems. However ther is a knowledge gap concerning plant-soil-microbe interactions under root exudation from single and diverse plant assemblage and role of soil microbiomes in soil ecosystem functionality and plant production. Therefore we will focus on understanding these interactions by the microbiome research of soil and plant niches, including bulk soil, rhisosphere, roots and shoots of cereal and legume plants in order to assess the percentage of microbiota transfered between them within monocropping and intercropping fields and understand relationships

of that microbiomes in plant health improvement. This project will design and implement sustainable environmental practices based on legume-cereal intercropping systems that account for the nature, impacting to global biogeosphere changes.

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Conflicts of interest

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