STABLE ISOTOPES AS A TOOL TO TRACK C AND N PATHWAYS IN THE ROOT SYSTEMS

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Mycorrhizas (fungal roots) play vital roles in plant nutrient acquisition, performance and productivity in terrestrial ecosystems as soil nutrients, including NH^{+4}, NO_3 and phosphorus, are translocated from mycorrhizal fungi to plants. A stable isotope technique will be used to study mycorrhizal symbiosis as the mutually beneficial association between the roots of cereal plants and specific soil fungi.

The main aim of our project "The influence of mycorrhizal abundance on N transfer and C sequestration in the cereal/legume intercropping system by the ^{13}C and ^{15}N isotope method" will be to investigate the impact of mycorrhizal abundance on N_2 fixation, N transfer and C sequestration in cereal/legume intercropping system by the labelling ^{13}C and ^{15}N stable isotope method. To evaluate the role of mycorrhizal abundance on N transfer and C sequestration, it is important to investigate how its response to different cereal/legume intercropping system. The objectives of this project: (i) quantify the root mycorrhizal abundance of cereal/legume intercropping system; (ii) to study and compare the effect root mycorrhizal abundance on nutrient uptake, N_2 fixation and N transfer in cereal/legume intercropping system; (iii) to study the effect of mycorrhizal abundance on C sequestration in the soil in cereal/legume intercropping system; (iiii) to relate the physical cereal root parameters to plant productivity, yield quality and plant adaptation to climate change using intercropping systems.

The results obtained using the labeled stable isotope method to determine the C and N pathways in root systems with different mycorrhizal intensities will provide new insights into the importance of mycorrhizae and their impact on N cycling and C sequestration in soil under adverse environmental conditions. The established regularities would consider the assessment from the viewpoint of specific cropping systems i.e., cereals/legumes intercropping impact in terms of food quality, crop productivity, soil nutrient cycling and greenhouse gas emissions.