Wheat domestication impacts on rhizosphere bacterial community assembly (Back to the Roots Initiative)

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Studies have shown that domestication may have caused reduction in genetic diversity of modern cultivars when compared to their ancestors. As the rhizosphere microbiome can profoundly impact plant growth, nutrition and health, we hypothesized that plant domestication can affect interactions with beneficial microbes. A greenhouse experiment was conducted to assess the composition of rhizosphere bacterial community in six modern cultivars and three wheat ancestors. Plants were grown in forest and agricultural soils collected from a wheat field in São Paulo, Brazil. At flowering stage, plants were harvested, the rhizosphere soil was collected and DNA was extracted. To assess the bacterial taxonomic diversity, V3-V4 region of the 16S rRNA was sequenced using MiSeq technology. Principal coordinates analysis (PCoA) indicated that soil type had a highly significant effect on community structure and the rhizosphere effect was more evident in the agricultural soil. PCoA also pointed to a gradient in the bacterial community structure ranging from ancestral materials to modern cultivars. Principal components analysis (PCA) showed that Acidobacteria, Chloroflexi, Bacteroidetes and Nitrospirae were more abundant in agricultural soil while forest soil was mainly dominated by Actinobacteria and Firmicutes phyla. Differential recruitment between wild materials and modern cultivars was more pronounced in agricultural soil when compared to forest soil. In agricultural soil wild plants showed strong correlation with Proteobacteria and modern plants recruited mainly Chloroflexi, Acidobacteria, Nitrospirae and Bacteroidetes phyla. The preliminary results suggest that wheat domestication might have impacts on bacterial community assembly in rhizosphere.

Investigating the role of ethylene in the sanctioning response of leguminous hosts to ineffective rhizobial partners

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Nitrogen is essential for plant growth, but much of the nitrogen on earth is in a form that is unavailable to plants. In order to access this nitrogen, leguminous plants form a