

Impact of cover cropping with rotary- or no-tillage practice on the arbuscular mycorrhizal fungal communities colonizing maize roots

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Introduction: Community structure of arbuscular mycorrhizal fungi (AMF), may be a key component utilized in sustainable cover cropping systems. However, it still remains unclear whether introducing cover crops with or without tillage agricultural environments change the diversity of AMF communities in the subsequent maize roots. Thus, we investigated how combined agricultural practice with tillage and cover cropping affects the AMF community structure of subsequent maize roots.

Methods: A field trial was performed at Nihon University, in Kanagawa, Japan. Three cover crops treatments (hairy vetch, brown mustard and fallow) with rotary- or no-tillage practice were established to determine the diversity and structure of AMF communities in maize roots using amplicon sequencing.

Results: AMF colonization rate in no-tillage plot regardless of cover crop treatments was significantly higher than that in tillage plot. AMF communities in maize roots showed a significant difference between tillage and no-tillage. However, there were no significant differences in the diversity of AMF communities among the difference of cover crops regardless of tillage management.

Conclusions: In this study, the difference in the AMF communities of maize roots between tillage and no-tillage regardless of cover cropping was distinct. This suggests that the difference in tillage management may be more related to shaping the AMF community structure compared with cover cropping. However, we could not determine why cover cropping did not affect the AMF communities in the maize roots.

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