Soil Microbial Community Structure and Enzyme Activities

Tillage

• Canonical discriminant analysis separated the impact of NT and MP on soil microbial communities.

• Separation of tillage systems CP and DT were less pronounced.

CROP ROTATION

• Canonical discriminant analysis separated the impact of CC and SS on soil microbial communities.

• Separation of the crop rotations (SC and CS) were less distinct.

Results

Discussion

• Bacterial biomass, as measured by FAMEs, was reduced under tillage compared to no-till suggesting loss of microbial habitat (e.g. stable aggregates) or less favorable environmental conditions.

• Although saprophytic fungi was only marginally affected by tillage, AMF sharply declined with any form of tillage indicating differential sensitivity to tillage among hyphal organisms.

• A fairly consistent effect of crop rotation was higher microbial biomass and C-cycling enzyme activities in continuous corn (CC) compared to continuous soybean (SS). This effect is likely due to the high inputs of plant biomass in continuous corn supporting a larger microbial biomass and greater potential for enzyme production.

Conclusion

• Tillage had a consistent and negative impact on soil microbial biomass and enzyme activities, especially in the 0-15 cm depth.

• High plant inputs resulted in increased soil microbial biomass and activities and vice-versa.

• Soil microbial biomass and function decreased with increasing depth irrespective of tillage systems or crop rotations.

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