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**Effects of biofuel cropping systems in soil depth and crop determinants of bacterial communities**

Biofuel-cropping systems can change their soil microbiome and the ecosystem services they catalyze.

**The Science**

In this study we characterized the impacts of biofuel cropping systems on soil microbial communities, finding that these communities were strikingly different depending on soil depth.

**The Impact**

Biofuel crops are projected to cover large areas of landscape, including marginal lands, and to effect changes in the soil microbiome. This study characterizes the impacts of these systems on microbial communities to better understand the long-term sustainability of these systems and their environmental impact.

**Summary**

GLBRC scientists studied soil microbial community compositions after six crop years at four soil depths (from 0-100 cm) that covered the rooting zone and beyond of four biofuel crops: corn, switchgrass, *Miscanthus*, and restored prairie, as well as the surface soils from six biofuel crops in replicate side-by-side plots. Deep sequencing established that communities differed significantly by depth. The cropping system significantly impacted composition, with corn and switchgrass communities the most different within the middle depths, probably due to the deeper roots of switchgrass. Soil depth, a proxy for changes in soil properties, was a strong factor in shaping bacterial community structure under a wide range of cropping systems. Crop type was a secondary with deeper effects on switchgrass. Individual phyla demonstrated varying patterns with depth. Poplar, followed by soils with perennial crops, contained the most carbon (C) in the surface soils, with data indicating that these differences will become more pronounced with time. Overall, sustainable agriculture requires that we increase C sequestration within soils, or at the very least, conserve the C already present.

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**Publications**

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