

MEASURING SOIL QUALITY CHANGES IN CORN AND SOYBEAN ROTATIONS

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ABSTRACT

Soil quality is described as the ability of the soil to sustain crop growth and development along with nutrient cycling and water infiltration and retention. One possible strategy to maintain or increase soil quality is crop rotation. Crop rotations have the potential to increase crop yields, disrupt disease and pest cycles, and when a legume is added to the rotation, reduce nitrogen fertilizer requirements. Although the long-term productivity and sustainability of agriculture are dependent on maintaining soil quality, a complete assessment of soil quality attributes associated with crop rotation and subsequent effects on yield is missing. The objective of this study was to assess soil physical, chemical, and biological properties after 12 years of crop rotation. Continuous corn (*Zea mays* L.) (CCC), corn-soybean (*Glycine max* [L.] Merr.) (CS), and corn-corn-soybean (CCS) rotations at six sites throughout Illinois were sampled approximately 12 years after establishment. There were no significant differences in bulk density (BD), water aggregate stability (WAS), or soil organic matter (SOM) between the rotations. Corn yield was higher where corn followed soybean than where corn followed corn, and second-year corn in the CCS rotation yielded more than continuous corn at some sites. It thus appears that most soil properties are either unaffected by prior crop sequence, or that more than a decade is required before rotation effects show up as differences in soil. Yield effects of crop sequence appear to be more closely tied to previous crop than to changes in soil under different cropping systems.

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