

DEEP TILLAGE IN A CORN-SOYBEAN PRODUCTION SYSTEM

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Abstract

Many crop producers in the Midwestern United States are currently using deep tillage, accomplished with equipment designed to run at depths of 30 to 40 cm, even though the effects of this practice are not well characterized. We assessed the effects of deep tillage, no tillage, and chisel plowing in the fall, with and without secondary tillage in the spring, on penetrometer resistance, plant stand, and yield of corn and soybean grown in rotation. In the spring, averaged across two years and six locations in Illinois with different soil types, deep tillage decreased penetrometer resistance by 11% in the 22 to 36 cm layer (below chisel depth), compared to no tillage and chisel. In 2000, corn yield responded to deep tillage at two locations. At the Perry location deep tillage and chisel increased corn yield by 0.69 Mg/ha and 0.65 Mg/ha over no tillage, perhaps in part as a result of corn following corn at that location. At DeKalb, deep tillage increased corn yield by 0.70 Mg/ha over chisel. Averaged across six locations in 2000, deep tillage increased soybean yields significantly, by 0.11 Mg/ha over chisel. In 2001, there was no significant effect of primary tillage on corn yield when results were averaged over five locations. Mature plant height, taken as a way to estimate cumulative effects of water shortage during vegetative development, showed no distinctive trends. Secondary tillage in 2000 produced no consistent differences in any parameters measured, but averaged over five locations in 2001, secondary tillage resulted in a 0.44 Mg/ha corn yield increase over no tillage. While deep tillage has so far produced few consistent agronomic or economic benefits, longer-term effects will need to be measured before final conclusions can be drawn.

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