

# Long-Term Tillage and Crop Rotation Trial

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## Objective

Evaluate the long-term effects of tillage systems and crop rotations on grain yields and soil health.

## Materials and Methods

### Crop Year–2021

Soil Type	Marshall, Exira
Previous Crop	Varied by crop rotation
Hybrid/Variety	Corn–P0592AM; soybeans–P29T37E
Planting Date	Corn–April 28; soybean–May 11
Row Spacing	30in.
Seeding Rate	Corn at 35,077 seeds/acre; soybean at 161,355 seeds/acre
Tillage	Fall ST, CP, DR and MP November 3, 2020; spring lightly disked and then field cultivated, CC and SC, April 8, 2021. CCS field cultivated April 1, 2021. All plots except NT and ST
Fertilizer	15 lbs. P <sub>2</sub> O <sub>5</sub> /acre and 28 lbs. K <sub>2</sub> O/acre on all plots March 4, 2020
Nitrogen	All corn plots received 200 lbs. N/acre as 32% UAN solution
Harvest Date	Soybean–October 9; Corn–October 18
Experimental Design	Randomized complete block design
Replications	Four
Treatments	No-tillage (NT), strip-tillage (ST), chisel plow (CP), deep rip (DR), moldboard plow (MP)

## Results

**Table 1. Summary of hybrid performance over the three testing sites: Boone, Crawfordsville, Greenfield.**

Tillage System	Continuous Corn Rotation	Corn-Corn-Soybean Rotation	Corn-Soybean
	corn yield (bushels/acre)		soybean yield (bushels/acre)
No-tillage	93.4	191.6	65.5
Strip-tillage	97.9	227.1	62.1
Chisel plow	119.7	248.6	66.0
Deep rip	117.1	225.8	66.7
Moldboard plow	137.6	228.0	70.5
	P = 0.0577	P = 0.1382	P = 0.4122

## Key Takeaways

- In 2022, tillage systems did not significantly affect corn or soybean yields in any of the crop rotations, however, there were some trends. For instance, continuous corn yields seemed to be higher with increased tillage intensity, and soybean yields followed the same trend in the corn-soybean rotation.
- A continuous corn yield drag of 111.1 bushels per acre (50%) was observed compared with the first-year corn yields from the corn-corn-soybean rotation.