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.

Materials and Methods

Site-Year 1: Chariton | Crop Year–2021

Soil type	Haig, Grundy
Previous crop	Corn and soybean
Hybrid/variety	Pioneer 1366AM
Planting date	April 23, 2021
Row spacing	30-in.
Seeding rate	32,000
Tillage	NT, ST, DR, CP, MP–early November 2020; spring cultivator in April 2021
Fertilizer	22-104-124
Nitrogen	200 lb. N as 32%
Harvest date	September 23, 2021
Experimental design	Randomized complete block design
Replications	Four
Treatments	No-tillage (NT), strip-tillage (ST), chisel plow (CP), deep rip (DR), moldboard plow (MP)

Site-Year 2: Chariton | Crop Year–2022

Soil type	Haig, Grundy
Previous crop	Corn
Hybrid/variety	Corn–Pioneer 1366AM, soybean–QP35T15E
Planting date	May 17, 2022
Row spacing	30-in.
Seeding rate	Corn–32,000, Soybean–140,000
Tillage	NT, ST, DR, CP, MP–early November 2020; spring cultivator in April 2021
Fertilizer	22-104-0 25S
Nitrogen	200 lb. N as 32%
Harvest date	October 18, 2022
Experimental design	Randomized complete block design
Replications	Four
Treatments	No-tillage (NT), strip-tillage (ST), chisel plow (CP), deep rip (DR), moldboard plow (MP)

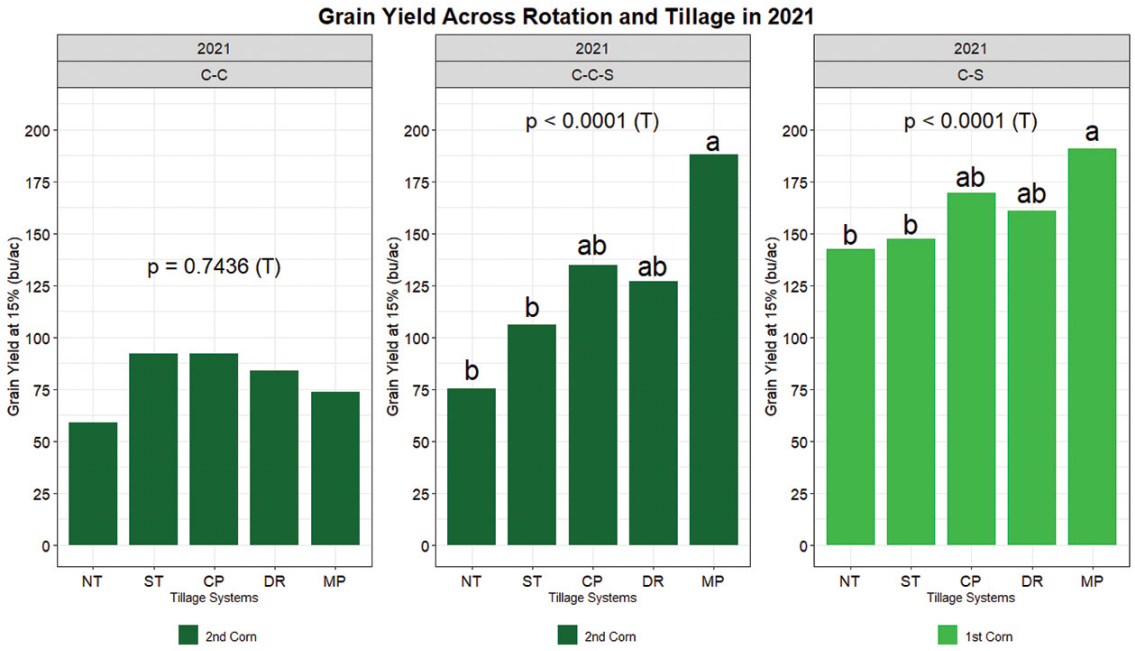

Figure 1. Grain yield in 2021 from the tillage systems within each crop rotation. Yields that are significantly different at P < 0.05 have different letters.

Figure 2. Grain yield in 2022 from the tillage systems within each crop rotation.

Key Takeaways

- In 2021, the second year corn in the corn-corn-soybean rotation and the corn in the corn-soybean rotation had similar yield patterns across tillage practices ($p < 0.0001$). However, on average, the second year corn yields were lower than the first year corn. Moldboard plow was the only treatment that yielded almost the same in both rotations.
- In both years, the continuous corn rotation did not have statistical difference between tillage practices.
- In 2022, soybean yields in both the corn-corn-soybean rotation and the corn-soybean rotation did not have any statistical differences between tillage practices.