

# Long-Term Tillage and Crop Rotation Trial

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## Objective

Evaluate the effects of interseeded cover crop species a mix across corn population and row spacing on corn productivity.

## Materials and Methods

### Site-Year 1 | Crop Year–2021

Soil type	Mahaska, Nira
Previous crop	Varied by crop rotation
Hybrid/variety	Corn–Pioneer 1108Q; Soybean–Mershman Osage 2025E
Planting date	Corn–May 6, 2021; soybean–May 3, 2021
Row spacing	30 in.
Seeding rate	Corn at 36,000 seeds/acre; soybean at 150,000 seeds/acre
Tillage	Fall ST, CP, DR, and MP–October 15, 2020; Spring soil finisher (except NT and ST)–April 28, 2021
Fertilizer	No fertilizer applied in the fall of 2020; 22–104–120 applied April 3, 2021, and 0–0–220 applied on November 19, 2019, to all plots
Nitrogen	UAN at 240 lbs. N/acre for corn following corn and second year corn–April 20, 2021; an additional 50 lbs. N/acre as UAN applied June 2, 2021, due to excess rainfall
Harvest date	Corn–October 21, 2021; soybean–October 5, 2021
Experimental design	Randomized complete block design
Replications	4
Treatments	No-tillage (NT), strip-tillage (ST), chisel plow (CP), deep rip (DR), moldboard plow (MP)

### Site-Year 2 | Crop Year–2022

Soil type	Mahaska, Kalona
Previous crop	Varied by crop rotation
Hybrid/variety	Corn–P1185Q; Soybean–Merschman Osage 2025E
Planting date	Corn–May 16, 2022; soybean–May 16, 2022
Row spacing	30 in.
Seeding rate	Corn at 36,000 seeds/acre; soybean at 140,000 seeds/acre
Tillage	Fall ST, CP, DR, and MP–November 03, 2021; Spring soil finisher (except NT and ST)–May 11, 2022
Fertilizer	(27–127–138–10S) using MAP, potash, and CAL-SUL–November 22, 2021
Nitrogen	28% UAN injected at 130 lbs. N/ac at the C-S and C-C-S rotations. 180 lbs. N/ac at the C-C rotation–April 19, 2022
Harvest date	Corn–October 10, 2022; soybean–October 10, 2022
Experimental design	Randomized complete block design
Replications	4
Treatments	No-tillage (NT), strip-tillage (ST), chisel plow (CP), deep rip (DR), moldboard plow (MP)



## Results and Discussion

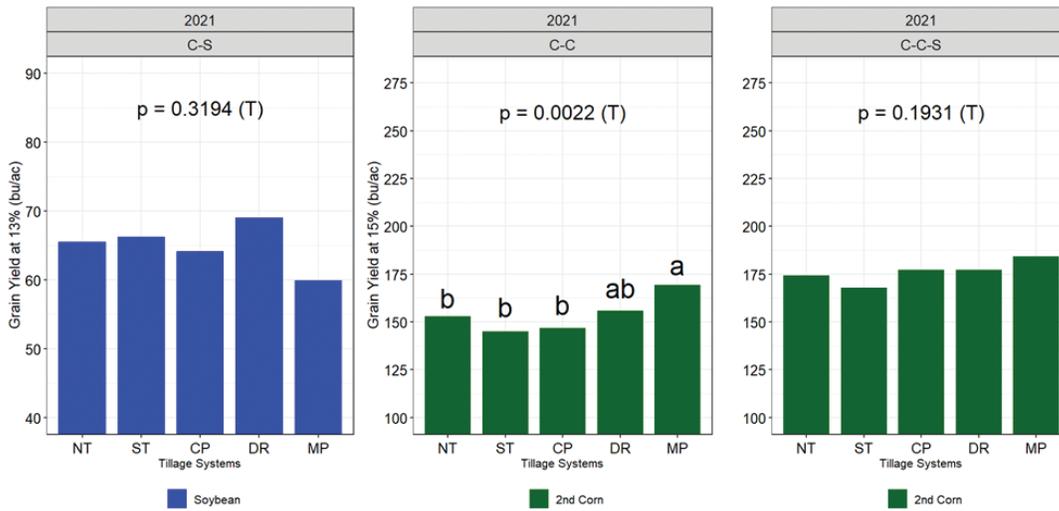


Figure 1. Grain yield in 2021 from the tillage systems within each crop rotation. Yields that are significantly different at  $P < 0.05$  have different letters.

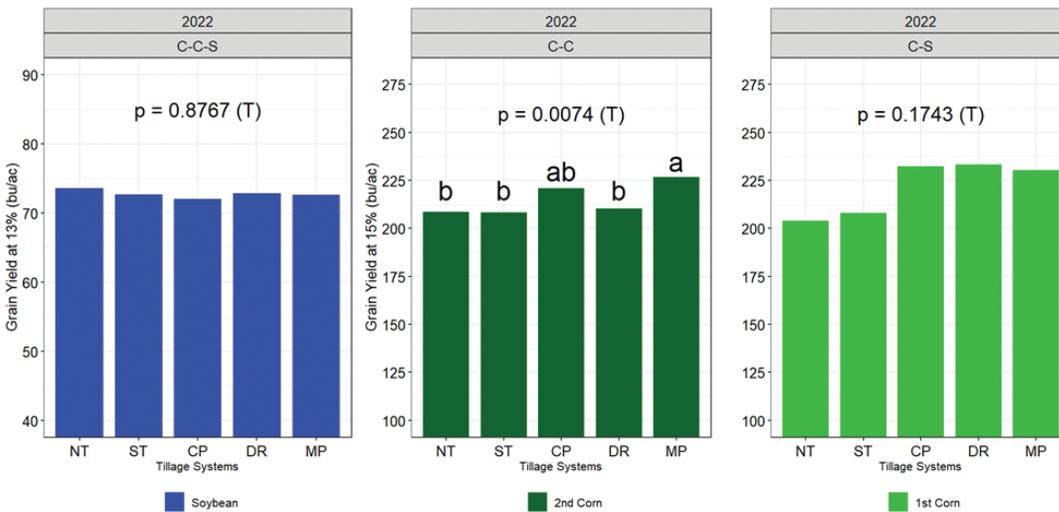


Figure 2. Grain yield in 2022 from the tillage systems within each crop rotation. Yields that are significantly different at  $P < 0.05$  have different letters.

### Key Takeaways

- There were no statistical differences between tillage systems on soybean grain yield in both years.
- The only statistical differences between tillage systems were in the C-C rotation where in both years MP was higher yielding than NT and ST.

### Acknowledgements

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