

Evaluation of Tillage Systems for Field Corn

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Objective

The objective of this study was to evaluate the yield response of corn to different tillage systems.

Background

Crop Year:	2008	Herbicide:	
Cooperator:	Farm Focus/Marsh Foundation	PRE (May 25)	Stalwart Xtra at 1.6 qt/A + Roundup PowerMax at 22 oz/A + + 2,4-D LVE6 at 10 oz/A + AMS at 17 lb/100 gal
County/Town:	Van Wert/Van Wert	POST(June 20)	Impact at 0.75 oz/A + UAN at 2.5% v/v + MSO at 1% v/v
Soil Type:	Hoytville Silty Clay Loam, Haskins Loam	Variety:	Seed Consultants SC 1107
Drainage:	Non-systematic tile	Insecticide:	Lorsban 15G at 8.0 oz/ 1000 row ft T-banded at planting
Previous Crop:	Soybeans	Row Width:	30 inches
Tillage:	variable-See Methods	Planting Rate:	32,000 seeds/A
Soil Test (2005):	pH 6.5, P 40 ppm, K 149 ppm	Planting Date:	May 24, 2008
Fertilizer:	225 lb/A 7-26-26 2x2 banded at planting 150 lb/A nitrogen sidedressed as 28% UAN	Harvest Date:	October 15-16, 2008

Methods

Five tillage systems for seedbed preparation were replicated four times in a randomized complete block design. The tillage systems consisted of:

- 1) Fall disked (2-3 inches deep)
- 2) Fall shallow strip-till (6-8" deep)
- 3) Fall deep strip-till (10-12" deep)
- 4) Fall disk/ripper (10 inches deep), spring field cultivated (2-3 inches deep)
- 5) Spring vertical tillage (1.5-2 inches deep)

Fall tillage on the first four treatments was completed during the first week of November. Disked plots were done with an International Harvester #37 standard disk. The shallow strip-till was done with a Remlinger PST 12 row unit, and the deep strip-till plots were done with a Brillion zone builder 8 row unit. Fall disk/ripper tillage was done with a M&W Earthmaster #1150 5 shank unit. Secondary tillage of the fall disk/ripper plots was completed on May 6 using a Wilrich c-shank field cultivator. The spring vertical tillage was performed using a Salford RTS implement on May 1 three weeks prior to planting. The strip-till and fall disked plots had no further tillage performed in the spring.

Planting of the plots was delayed until May 24 due to numerous rainfall events after spring tillage was completed. The study was planted using a John Deere 7000 Maxemerge six row planter equipped with no-till coulters on the fertilizer and seeding units plus one steel toothed closing wheel paired with one rubber closing wheel on each row. Adjustments for seed unit and

closing wheel down pressure were made to assure proper planter performance under the different field conditions for the different tillage treatments. Each individual plot was 60 feet wide by 600 feet in length.

Harvest populations (October 14) were estimated by counting the number of plants on each side of a 17 feet 5 inch measured distance at three different locations within each plot. The average number of plants counted per 17 feet 5 inches was converted to plants per acre. Plot yields were determined by harvesting each plot with a John Deere 6620 combine equipped with a calibrated AgLeader PF3000 yield monitor. Plot moistures were taken from the yield monitor. Plot weights were measured with a calibrated weigh wagon. Yields are adjusted to 15% moisture.

Results

Table 1. Corn harvest population, moisture, and yield means for each treatment.

Treatment	Harvest Population (plants/A)	Moisture (%)	Yield (bu/A)
Fall disk	29,900	19.4	165.8
Fall shallow strip-till (6-8")	29,600	19.8	160.6
Fall deep strip-till (10-12")	30,000	18.6	165.3
Fall disk/ripper, spring field cultivate	29,400	19.4	166.3
Spring vertical tillage (Salford RTS)	31,000	18.7	163.7
LSD (P=0.05)	NS	NS	NS
F-test	1.2	< 1	< 1
CV (%)	3.9	6.7	4.0

NS= not significant

Summary

Data from this one year trial suggests that there were no statistically significant differences among the tillage systems with regard to harvest populations, moisture, or yield. The test field had a significant amount of stalk lodging caused by high winds late in the season, but there wasn't a noticeable difference of lodging being better or worse in any particular tillage treatment in the study. The differences in tillage treatments may have been undetected because of the late planting date.

The vertical tillage in this study did not get completed in the fall due to a delay in getting the implement and the onset of wet weather. The manufacturer of the Salford RTS tool has indicated it can be run in the fall or the spring as needed with similar results, so it was included in this trial as a spring tillage treatment.

Fall primary deep tillage of some kind followed by secondary tillage in the spring has been the more conventional tillage practice for the heavier soils of northwest Ohio until recent years. The results of this study would indicate these other tillage alternatives produced similar yields, while reducing the cost of seedbed preparation through less manpower, fuel, and trips across the field.

Acknowledgement

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