Evaluation of Tillage Systems Following Soybeans for Field Corn

Andy Kleinschmidt, Extension Agriculture and Natural Resources Agent
Gary Prill, Extension Associate, Farm Focus/ Research Coordinator

Objectives

To compare population and yield of field corn under four different tillage systems following soybeans.

Background

Cooperator:	Marsh Foundation/ Farm Focus	Herbicides:	
		PRE (May 25)	10 oz/A Epic
County:	Van Wert		2 qt/A Aatrex 4L
Nearest Town:	Van Wert		1 pt/A 2,4-D LVE
Soil Type:	Hoytville clay		0.5 pt/A Banvel
Drainage:	Systematic tile	Insecticide:	8 oz. per 1,000 row ft.
Previous Crop:	Soybeans		Lorsban 15G T-banded
Tillage:	See Methods	Hybrid:	Beck's Hybrids 5322
Soil Test (2002):	pH 6.1, P 43 ppm, K 124 ppm	Row Width:	30 inch
Fertilizer:	250 lb/A 7-26-26 in row at planting	Planting Rate:	30,500 seeds/A
		Planting Date:	May 24, 2002
	190 lb/A nitrogen sidedressed as NH3 on June 14, 2002	Harvest Date:	October 8, 2002

Methods

Four tillage systems were replicated four times in a randomized complete block design. The four tillage systems included no-till, fall strip-till, fall deep till followed by spring field cultivate, and a shallow fall disking. Strip-till was performed on November 15, 2001, by using a six-row 30-inch Trail Blazer strip-till machine 8 to 9 inches deep. The fall deep till/ spring cultivate treatment consisted of using an M&W Earthmaster disk/ ripper 16-inches deep on November 16, 2001, followed by a spring field cultivation three inches deep with two passes of a Wilrich C-shank field cultivator on May 24, 2002. The two-inch deep shallow disking treatment was performed on November 16, 2001, with an International #37 disk. The study was planted using a John Deere 7000 Maxemerge six-row planter. Each individual plot contained 12 rows and was 600 feet in length.

Percent residue was determined post-plant on May 30 by using a USDA-NRCS Crop Residue Management Kit. Early season populations (June 7, corn stage V2) and harvest populations (October 7) were estimated by counting the number of plants on each side of a 17.5 feet tape at three different locations in each individual plot. The average of the number of plants counted per 17.5 feet was converted to plants per acre. Yields were collected from one combine round (12 rows). Individual plot weight and moisture was determined using a calibrated AgLeader PF3000

yield monitor in a John Deere 6620 combine. Yields reported in this study have been adjusted to 15% moisture standard.

Results

Table 1. Crop Residue, Population, Moisture, and Yield Means.[a]

Tillage Treatment	Residue (%)	Population at V2 (plants/A)	Harvest Population (plants/A)	Grain Moisture (%)	Yield (bu/A)
Fall deep till/ spring cultivate	2.8 d	27,000 c	25,500	19.5 c	114.2 a
Strip-till	33.8 b	27,300 bc	25,500	20.0 b	101.7 b
Fall disk	24.5 c	28,500 a	26,000	19.8 bc	100.0 bc
No-till	42.0 a	28,100 ab	25,300	20.7 a	97.8 c
LSD (0.05)	4.5	1,000	NS	0.3	3.5
F-test	145.1	4.7	<1	24.5	45.6

[a] Means followed by the same letter in the same column are not significantly different.
NS = Not Significant

Summary

This is the second consecutive year for conducting this tillage trial at Farm Focus. Data from this year suggests that there were statistically significant yield differences among the tillage systems compared. Results from this study contradict similar work conducted in 2001 at Farm Focus that suggested no-till having a distinct yield advantage compared to the two conventional tillage applications. Possible reasons for lower yields in the reduced tillage and no-till plots in 2003 include heavier dandelion pressure in the plots with no spring tillage, and soil properties that may have been altered from intensive subsurface irrigation in past years. These soil properties may have had a greater effect in the plots where there was no deep tillage performed. Exact reasons for the lower yields are not known. Early population differences show weak significance among the tillage treatments; however, these population differences disappeared later in the season. This trial will be conducted at Farm Focus again in 2003 in order to obtain three years of data.

Acknowledgment

The authors express appreciation to Van Wert SWCD and NRCS for technical assistance with this study.

For additional information, contact:

Andy Kleinschmidt or Gary Prill
The Ohio State University
kleinschmidt.5@osu.edu or prill.1@osu.edu