Comparison of Strip-Tillage and Conventional Tillage in Corn Production

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Objective

To evaluate the effect on corn of yield, test weight, and moisture of fall strip-tillage compared to fall conventional tillage.

Background

	Crawford	Hancock	Fayette	Morrow	Sandusky	Van Wert
Soil Types	Blount/Pewamo	Hoytville	Crosby/ Brookston	Centerburg	Kibbie Sand/Spinks	Hoytville
Drainage	Randomly tiled	Randomly tiled	Systematic	Randomly tiled	Systematic	Systematic
Location	Chuck Smith farm	Duane Stateler farm	Fayette Co. farm	Morrow Co. farm	Steve Lindsay farm	Marsh farm
Plot Size (acre)	0.5	0.57	0.17	0.75	0.5	1.65
Date of Strip Tillage	11/9/2001	11/15/2001	m/d	11/5/2001	10/31/2001	11/14/2001
Strip Tillage Implement	Remlinger	Yetter	Yetter	Yetter	Yetter	R and G Trailblazer
Date of Conventional Tillage	11/17/2001	11/15/2001	m/d	11/14/2001	11/1/2001	11/16/2001
Conventional Tillage Equipment	Disk chisled	m/d	DMI chisel plow/harrow	Fall chisel/field cultivate	Chisel plow/field cultivate	M&W Earthmaster
Depth of Strip Tillage (11/19/01)	7"	m/d	7"	7"	8"	8.2"
Width of Strip Tillage (11/19/01)	13"	m/d	m/d	11"	9.5"	9.7"
Height of Strip Tilled Berm (fall)	3.6"	m/d	3.1"	4"	3.25"	3.2"
Height of Strip Tilled Berm (after planting)	0"	0"	0"	0"	0"	0"
Planting Date	5/27/2002	5/22/2002	5/5/2002	6/1/2002	4/19/2002	5/23/2002
Planting Rate (seeds/A)	30,500	m/d	30,100	26,000	33,000	29,120
Harvest Date	10/19/2002	10/18/2002	10/3/2002	11/18/2002	10/22/2002	10/9/2002
Planter	International Cyclone	Kinze	John Deere 7000	John Deere 7000	John Deere 7000	John Deere 7000
Corn Hybrid	DKC 60-08	DKC 60-08	SC 1140	DKC 60-08	DKC 60-08	DKC 60-08
Herbicide	3 qt/A Degree Extra 0.25 pt/A Banvel (post)	3 qt/A Degree Extra	3 qt/A Degree Extra 2 oz/A Distinct (post)	3 qt/A Degree Extra	3 qt/A Degree Extra	3 qt/A Degree Extra 1 pt/A Atrazine 3 oz/A Hornet 1 pt/A 2,4-D

Previous Crop	Soybeans	Soybeans	Soybeans	Soybeans	Soybeans	Soybeans
Soil Test (ppm)	pH 7.0, P 17, K 204	m/d	pH 6.5, P 18, K 148	pH 7.0, P 44, K 90	pH 6.4, P 45, K 225	pH 6.7, P 25, K 135
Fertilizer	160-44-60	m/d	118-65-57	120-0-0	206-39-132	187-56-14
Residue After Planting	25%	m/d	m/d	m/d	54%	37%
Plot Design	Completely randomized (4 replications)	Completely randomized (4 replications)	Completely randomized (3 replications)	Alternating Strips (6)	Completely randomized (4 replications)	Completely randomized (3 replications)

m/ d = missing data

Methods

Six county locations were sites for a comparison of fall strip tillage to conventional tillage in corn production. Strip tillage was the use of a strip-till machine in the fall to build a berm upon which to plant corn the following spring. Conventional tillage was the use of a chisel plow in the fall, followed by a finishing tillage in the spring prior to planting the field. A completely randomized design was used at five of the six locations. Plot size varied by site. Sites were used as replications in the analysis of the data. All sites used a similar herbicide program. Previous crop was soybeans at all locations. In addition to yield, test weight, and moisture, attributes of the strip-tilled area (height of ridge, width of tilled area, and depth of the strip-tilled area) were also measured.

Results

Table 1. Corn Yield, Harvest Moisture, and Test Weight at Six Locations.

	Crawford	Hancock	Fayette	Morrow	Sandusky	Van Wert
Yield (bu/A)						
Conventional	80.4	85.4	141.8	58.1	185.9	99.5
Strip	77.3	81.2	149.1	45.9	182.5	97.9
F-test: <1, LSD (0.05): NS						
Moisture (%)						
Conventional	19.5	15.2	18.1	21.3	18.6	15
Strip	19.3	15.6	18.7	21.1	18.5	15
F-test: <1, LSD (0.05): NS						
Test Weight (lb.)						
Conventional	56.5	57	m/d	m/d	58.9	m/d
Strip	56.8	56.4	m/d	m/d	59.2	m/d
F-test: <1, LSD (0.05): NS						

m/ d = missing data

Summary

1. Because of the wet spring in Ohio, followed by widespread drought and high temperatures during the summer, there was a wide range of planting dates and yields across the six locations.

2. Yields, moisture, and test weight were not statistically different for strip-tillage and conventionally tilled ground across all the sites.
3. Measurements taken in the fall (five sites) found an average strip tillage depth of 7.4 inches.
4. Width of strip-tilled zone at the surface averaged 11 inches (four sites).
5. Average height of strip-tilled berm in the fall was 3.4 inches. By planting time the strips had flattened and were very difficult to see and follow accurately with the planter. This indicates a need for deeper tillage to form higher berms.
6. Residue measurements were taken at three sites with the average in excess of 37% for strip tillage.
7. Strip-tillage may compete with harvest operations because it should be completed as soon as possible after soybean harvest.
8. There are differences in strip-till equipment.
9. Strip-till provides the environmental benefit of reduced erosion.

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