

# Strip Tillage and Fertilizer Timing Effects on Corn in Loam Soil

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## Objective

To evaluate corn response in two strip-tillage systems and one no-till system on a loam soil.

## Background

Cooperator:	Ron & Todd Hesterman	Soil Test:	P 23 ppm, K 103 ppm, OM 3.1%
County:	Henry	Fertilizer:	Variable
Soil type:	Loam, CEC 9.2	Planting Date:	April 25, 1999
Tillage:	Strip-till or no-till	Planting Rate:	31,000 seeds/A
Previous Crop:	Soybeans	Harvest Date:	October 3, 1999

## Methods

The experimental design was a complete randomized block of field-length, 12-row-wide strips with three replications. Fall strip tillage was done on November 30, 1998.

Tillage	Fall Fertilizer (actual lb/A N-P-K)	Fertilizer Placement	Planting Fertilizer (actual lb/A N-P-K)	Sidedress N (lbs/A)	Total Fertilizer (actual lb/A N-P-K)
Fall strip	179-50-64	5" deep in strip	none	none	179-50-64
Fall strip	none	2 x 2	114-19-3	114	228-19-3
No-till	none	2 x 2	114-19-3	114	228-19-3

On April 7, 1999, the no-till areas had 90% residue coverage compared to 40% residue in the strip-tilled zone. At corn stage V2 (7-in. height), 12-inch-deep soil nitrate samples were taken. At corn stage V5 (14-in. height), top leaf tissue samples were taken. At corn silking stage, ear leaf tissue samples were taken. At corn maturity (black layer), corn stalk nitrate samples were taken. Also at this time, ear and stalk population counts were made.

Continuous recording soil thermometers were placed in the no-till area and in the fall strip-till zone. Soil temperature was recorded at the 2 in. seed zone and mean (average of high and low) temperature calculated.

	Mean Temperature (°F)	
	April 14 -29	May 5 - 25
No-till	49.8	61.6
Strip till	50.3	63.3

## Results

**Table 1. Soil Nitrate and Plant Tissue Samples (average of 3 replications).**

Tillage/ Fertilizer Timing	Soil Nitrate (ppm)	V5 tissue			Ear leaf tissue			Stalk Nitrate (ppm)
		N (%)	P (%)	K (%)	N (%)	P (%)	K (%)	
No-till Spring Fertilizer	15.0 B	5.14	0.30 B	3.61	3.28	0.20 B	1.74 B	3503
Fall Strip Till Spring Fertilizer	16.5 B	5.07	0.27 C	4.09	3.19	0.18 C	1.79 AB	3240
Fall Strip Till Fall Fertilizer	8.7 A	5.06	0.33 A	4.05	3.21	0.23 A	1.90 A	2563
LSD (0.05)	4.0	NS	0.01	NS	NS	0.017	0.14	NS

Treatment means followed by the same letter are not significantly different from each other

**Table 2. Corn Populations and Yields (average of 3 replications).**

Tillage/ Fertilizer Timing	Ear Population (ears/A)	Harvest Population (plants/A)	Yield (bu/A)
No-till Spring Fertilizer	32,033	32,700	163.0 A
Fall Strip Till Spring Fertilizer	30,100	31,000	161.5 A
Fall Strip Till Fall Fertilizer	30,000	30,633	182.7 B
LSD (0.05)	NS	NS	10.4

Treatment means followed by the same letter are not significantly different from each other

## Summary and Notes

The spring-applied total nitrogen was higher (228 lb/ac) vs. fall-applied actual nitrogen (177 lb/ac) which may account for soil and stalk nitrate differences. Fall applied P and K resulted in higher tissue test results. Yield was significantly higher with fall strip tillage combined with fall fertilizer. The effect appears to be from better availability of P and K since stalk nitrate levels were not significantly different and adequate in all treatments.

Weather may have minimized nitrogen losses. Soil was dry from fall throughout the following growing season. This may have kept fall-applied N from leaching. Also soils were warm, which may have allowed more natural release of organic nitrogen.

For additional information, contact:

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