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No-tillage, Strip Tillage, Chisel Plow Tillage Trial

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No-tillage, Strip Tillage, Chisel Plow Tillage Trial

Abstract

Farmers in central and north central Iowa are often criticized for low adoption of no-tillage. No-tillage is often faulted with cooler, wetter soils and subsequently reduced yields. An alternative to conventional tillage and no-tillage systems is strip tillage where the benefits of both may be combined.

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Introduction

Farmers in central and north central Iowa are often criticized for low adoption of no-tillage. No-tillage is often faulted with cooler, wetter soils and subsequently reduced yields. An alternative to conventional tillage and no-tillage systems is strip tillage where the benefits of both may be combined.

Materials and Methods

This trial was conducted in 2011 with the strip tillage and chisel plow tillage being applied on November 11, 2010. In both the strip tillage and chisel plow treatments 200 lb N/acre was applied as anhydrous ammonia at the same time as tillage. Urea ammonium nitrate was applied at the rate of 200 lb N/acre on June 6, 2011 for the no-tillage treatment. No additional phosphorus and potassium was applied based on soil test levels for the plot area. Pioneer 33W84 was planted on May 6,

2011 at 34,000 seeds/acre in 30-in. rows into the prior year's corn residue. Each plot was 30 ft wide by 450 ft long.

Yields were collected using a John Deere 9410 with a Harvest Master weigh system. Additional data collection included residue cover at planting, emergence rate index, spring and fall plant population, plant height at V6, and grain moisture.

Results and Discussion

The results of this trial indicate spring and fall plant populations were not significantly different between the tillage systems. Early season plant height at the sixth leaf stage indicated better early season growth from the strip tillage system compared with the no-tillage system.

However, any slight advantage early season growth had for the strip tillage system did not result in significant grain yield differences between tillage systems. Grain moisture of the no-tillage system was significantly higher than the conventional chisel plow system.

Table 1. Residue cover, spring and fall plant populations, emergence rate index, early-season plant height, grain moisture, and grain yield for three tillage systems at the ISU Johnson farm south of Ames in 2011.

Treatment	Residue cover	Spring plant population	Emergence rate index	Plant height	Fall plant population	Grain moisture	Grain yield
	%	plants/acre		in.		%	bushels/acre
No-tillage	76.3	31,875	10.6	17.46	30,438	21.9	168.4
Strip tillage	70.5	32,625	12.5	21.85	30,750	19.1	165.1
Conv. tillage	23.8	30,625	10.8	20.01	29,375	19.7	172.6
Pr > F	0.0001	0.275	0.128	0.0056	0.82	0.007	0.356
LSD _(0.05)	10.1			2.1		1.0	