Corn and Soybean Yield Response to Strip Tillage

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Objective

To compare the yield response and economics for strip tillage, no tillage, conventional tillage and minimum tillage.

Methods

This study was designed to evaluate the impact of strip tillage against no tillage and other tillage systems. All treatments were replicated a minimum of 4 times in alternating strips (2 treatment trials) or in randomized strips (trials with more than 2 treatments). All strip tillage work was conducted in the fall of 2015 using an Orthman 1TRPR. Where noted fertilizer was applied in the strip and then matched equally in the spring. Fertilizer was applied on the surface in the spring to minimized nutrient loss associated with fall applied surface fertilizer. Within each trial location, all planting, fertilizing, pesticide application and harvesting was consistent.

Measureable data points included yield, economics, soil temperature at planting, and average growth stage at a particular date. Stated soil temperatures and growth stages are the mean of 10 measurements per treatment. Yield data were analyzed using a simple Analysis of Variance (ANOVA) and considered to be significant at $P<.05$. Economics were calculated using relevant crop prices and custom tillage/fertilizer application rates from the 2016 Ohio Farm Custom Rates Survey.

Results

For easier readability, see results chart on the next page.

Discussion

In the Ohio trials, three out of four trials showed no statistical difference in yield for strip tillage and the highest yielding treatment. In one trial, strip till showed a statistically significant yield difference over a no tillage system. In Michigan, the disk ripper followed by spring cultivator showed a statistically significant yield increase over strip tillage in the corn crop. However, the soybean strip tillage trials showed one trial where strip tillage was significant over the disk ripper system and one trial where strip tillage was not significant. It is important to remember that these trials represent one year's worth of data from one region of the country. Multi-year data will increase the validity and confidence of these research results.

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Ohio-Michigan Strip Till Data

Location	Soil	Crop	Tillage Treatment	Fertilizer Applied	Soil Temp at Plant	Stage on 7/1	Mean Yield (bu/ac)	Significant Difference (p<.05)	Net Return over Cost*
Lenawee Co-1	Hoytville	Soybeans	Strip till	Broadcast VRT over both treatments			58.1 a	LSD 7.10; CV 4.9	$500.15
			Disk ripper/S. Cultivate				63.6 a	Not significant	$540.55
Lenawee Co-2	Hoytville	Soybeans	Strip till	Broadcast VRT over both treatments			53.4 a	LSD 3.23; CV 2.63	$457.85
			Disk ripper/S. Cultivate				49.5 b	Significant	$413.65
Lenawee Co-3	Hoytville	Corn	Strip till	Broadcast VRT over both treatments			165.8 b	LSD 2.54; CV .088	$557.55
			Disk ripper/S. Cultivate				181.8 a	Significant	$604.45
Lenawee Co-4	Hoytville	Corn	Strip till	Broadcast VRT over both treatments			219.5 b	LSD 3.23; CV 1.07	$745.50
			Disk ripper/S Cultivate				229.8 a	Significant	$772.45

Location	Soil	Crop	Tillage Treatment	Fertilizer Applied	Soil Temp at Plant	Avg Growth Stage on 7/13	Mean Yield (bu/ac)	Significant Difference (p<.05)	Net Return over Cost*
Fulton Co-5	Hoytville-Mermill	Corn	Strip till	200# Potash fall	60.7	11.6	189.7 a	LSD 2.07; CV .74	$641.20
			No till	200# Potash spring broadcast	58.1	11.3	190 a	Not significant	$658.75
Fulton Co-6	Hoytville-Nappanee	Corn	Strip till	50# MAP, 50# Potash fall	67.2	12.4	205.6 a	LSC 3.01; CV 1.15	$696.85
			No till	50# MAP, 50# Potash spring broadcast	61	11.9	196 b	Significant	$679.75
						6/23			
Fulton Co-7	Haskins-Nappanee	Corn	Strip till	50# MAP, 50# Potash fall	67.6	6.0	219.5 ab		$745.50
			No till	50# MAP, 50# Potash spring broadcast	61.4	5.9	211.2 b	LSD 10.8; CV 3.08	$732.95
			F.chisel/S.cultivate	50# MAP, 50# Potash spring broadcast	66.7	6.4	218 ab		$724.90
			Spring cultivate	50# MAP, 50# Potash spring broadcast	65.9	6.0	224.6 a	Significant	$765.85
Fulton Co-8	Haskins-Nappanee	Corn	Strip till	50# MAP, 50# Potash fall	67.6	5.7	208.9 a		$708.40
			No till	50# MAP, 50# Potash spring broadcast	61.4	6.0	201.6 b	LSD 6.23; CV 1.90	$699.35
			F.chisel/S.cultivate	50# MAP, 50# Potash spring broadcast	66.7	6.3	205.2 ab		$680.10
			Spring cultivate	50# MAP, 50# Potash spring broadcast	65.9	6.0	205.3 ab	Significant	$698.30

*Equipment costs based on 2016 Ohio Farm Custom Rates

Soybean Price	$9.00
Corn Price	$3.50
Strip till with fertilizer	$22.75
Dry bulk fertilizer	$6.25
Disk Rip/Disk Chisel	$17.85
Spring Cultivate/Finish	$14.00

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