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Update on Ridge-Tillage in Kentucky

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UPDATE ON RIDGE-TILLAGE IN KENTUCKY

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Grain crop producers in Kentucky are constantly evaluating various tillage systems that will best fit their particular cropping environment. One such tillage system that has shown some promise primarily in the mid-west is a system referred to as ridge-tillage. Ridge-till is basically a system by which a grain producer plants his crop on an elevated row that is maintained each year during cultivation for week control. The same ridge is re-used year after year thereby developing a controlled traffic pattern. Since the cultivation procedure is also recommended for maintaining the ridge, many ridge-till farmers have reduced their herbicide cost by spraying only a small band over the row and relying on the cultivation for weed control between the ridges.

In 1985, a tillage study was initiated at the University of Kentucky Research and Education Center at Princeton designed to evaluate the ridge-till system and compare it to a conventional (chisel & disk) and no-till system.

Methods

This study was established on a Tilsit silt loam soil where internal drainage is restricted by a fragipan located at about 20-24 inches from the soil surface. Saturated soil conditions at this site are common during late fall, winter and spring months, often delaying the planting of corn. Soils with similar drainage characteristics have not been considered as well suited for no-tillage. However, with proper management, success can be improved. In theory, planting on elevated rows should result in a warmer and dryer environment earlier in the season.

In addition to the three tillage treatments, an in-row liquid starter fertilizer treatment was evaluated for each tillage treatment. The starter fertilizer (12-36-0 suspension provided by the TVA Agricultural Institute) was placed in the corn row at planting at a rate of 11.7 gal/ac. The remainder of the fertilizer requirement was broadcast on the soil surface at planting.

Table 1. Effect of Tillage System and Starter Fertilizer Application on Corn Yields

Tillage Treatment	1986			1987		
	Starter	No Starter	Ave.	Starter	No Starter	Ave.
	bu/A					
Conv-Till	82	83	83	93	110	102
No-Till	86	92	89	87	104	95
Ridge-Till	88	80	84	93	104	99

Total Fertility: 140-100-30 lbs/A $N\text{-}P_2O_5\text{-}K_2O$
Variety: Pioneer 3320
Starter: 12-36-0 @ 11.7 gal/ac in-row (16-50 lbs $N\text{-}P_2O_5$/ac.)

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A Buffalo ridge-till planter with no-till and conventional-till planting attachments was used to establish the corn crop (Variety: Pioneer 3320). Herbicides were applied in a 10 inch band centered over the ridge and a broadcast application made over the no-till and conventional-till plot area. Ridge-till plots were cultivated approximately 6 weeks after planting. All treatments were replicated 3 X in a randomized complete block design.

This study was also designed to include a planting date variable. Plans were to plant corn in each tillage treatment as conditions became suitable. However, due to above normal temperatures and below normal rainfall during the springs of 1986 and 1987, all tillage treatments were planted on the same date.

Results

Corn yields averaged over the fertilizer treatments for both years indicated no significant differences between tillage treatments (Table 1). Plots receiving the starter fertilizer treatment did show early signs of increased height and darker green color over plots receiving the same amount of fertilizer in a broadcast surface application at planting. However, these early visual differences between fertilizer treatments diminished as the growing season progressed and did not translate into higher yields. In fact, with the exception of the ridge-till treatment in 1986, a slight decrease in yield was measured in plots receiving the starter fertilizer (Table 1).

Conclusions

After two years of study at Princeton under below normal rainfall conditions, the ridge-till system has not emerged as a cropping method that will greatly enhance corn production over the conventional and no-tillage methods. However, under wetter climatic conditions the ridge-till system may have created a warmer and dryer environment as compared to conventional and no-till systems that were more conducive to earlier planting and possibly resulted in higher yields. Based on this data, the economics of converting to ridge-tillage is somewhat in question. Some savings may be experienced when herbicide use is reduced by banding. Naturally, this type of weed control is adaptable to other tillage systems and not specific to the ridge-till system. Other savings may be realized when corn and soybeans are planted in areas where surface drainage is poor and replanting is a common problem. A 4 to 6 inch high ridge may be all that is necessary to protect a crop from prolonged shallow standing water. The permanent row width established in the ridge-till system forces a producer into a controlled traffic pattern but does not lend itself well to the narrow row double crop soybean cropping system. Adjustments may be necessary for particular crop rotations and row widths. Growers considering the adoption of ridge-tillage should proceed with caution. Some growers may be able to justify the purchase of ridge-till equipment based on the other advantages of the system rather than yield performance. Use of starter fertilizer did not increase yield of corn for any of the 3 tillage systems tested.

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