4-1986

Ridge-Tillage: Advantages and Disadvantages

David C. Ditsch
University of Kentucky, david.ditsch@uky.edu

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
Lexington, Kentucky 40546

COOPERATIVE EXTENSION SERVICE

Department of Agronomy

Soil Science News & Views

Vol. 7, No. 4, April 1986

RIDGE-TILLAGE: ADVANTAGES AND DISADVANTAGES

D.C. Ditsch

Ridge-Till is a crop production system that has become increasingly popular with grain producers in some areas of the mid-west. This unique tillage system may provide some Kentucky farmers with an alternative method of planting. Limited information on the adaptability of ridge-till on Kentucky soils and climatic conditions make it important that growers investigate the system thoroughly to determine how it would fit into their operation before deciding to change. Ridge-till involves planting on elevated rows that remain undisturbed after establishment. One or more cultivations are then made during the early part of each growing season to improve weed control, allow the soil to dry and warm faster, and to maintain the ridge for future planting. Most of the current information on ridge-till has been generated from studies conducted in the north and mid-west. Based on this research, ridge-till appears to be most suited for the poorly drained soils on 0-2% slope. Some advantages and disadvantages of ridge-tillage are discussed below.

Advantages

Controlled Traffic: After ridges are established, all field traffic is confined to the furrows between the ridges. Restricting traffic to the same middles each year may prevent soil compaction from occurring in the area of root growth. However, if previous traffic or tillage operations have created a compacted zone severe enough to reduce root growth, measures should be taken to eliminate the compaction before ridges are constructed.

Crop Residue Mgt.: Ridge-till is considered to be a form of conservation tillage since approximately 65% of the residues remain on the surface after planting (Table 1). By the time cultivation is necessary, the crop canopy is able to buffer the impact of intense rainfall. After harvest, all crop residues remain on the surface till planting the following spring.

Early Soil Warmup: Planting in ridges with the residue removed over the seed allows the soil to dry and warm faster in the spring compared to the no-till system (Table 1). This may be more important on the poorly drained soils where early no-till planting has

been generally less successful. If conventional seedbed preparation is left till planting time, excessive spring rains can delay timely planting.

Reduced Herbicide Cost: Herbicide usage may be reduced if chemicals are banded over the ridge and cultivations are relied upon to control weeds that emerge between the rows. However, the cost of additional fuel and labor needed to make multiple cultivations may offset the savings realized in less herbicide applied.

DISADVANTAGES

Specialized Equipment Needs: Converting to ridge-till planting involves adapting or replacing conventional tillage equipment. The ridge planter should be equipped with stabilizing gauge wheels to control seed depth, cut through crop residues and hold the planter on the ridge. Sweeps are also important for removing heavy accumulation of crop residues on the surface of the ridge to improve seed placement. Ridging wings on the cultivator are necessary for ridge establishment and maintenance. Combines, tractors, and other equipment used for custom applied fertilizers and chemicals must have a wheel base width capable of straddling the ridge. If a reasonable trade-in or sale value cannot be obtained for old equipment, switching to ridge-till should be delayed.

Permanent Row Width: Once ridges are established, the row width for all future crops are locked in. Farmers that prefer to plant soybeans in narrow rows have found it difficult to construct and maintain ridges on less than 30 inch spacing. Ridges may also limit the practicality of crop rotation that involves the seeding of a small grain crop. Reports indicate that wheat can be successfully drilled on ridges but require the use of a very flexible grain drill.

Potential Erosion Problems: Properly managed, ridge-tillage should provide adequate soil erosion control on slopes of 0-4%. As the percent slope increases, the potential for water to concentrate in the furrow and develop into gullies is greater. To prevent gully erosion from taking place, ridges would have to be built following the natural contour. due to the nonuniform topography of many Kentucky fields, strict contour planting could reduce planting and combine efficiency.

Research on ridge-tillage and how it compares to conventional and no-tillage is being conducted at the University of Kentucky West Kentucky Research and Education Center. Information generated from this study should provide grain producers with an opportunity to evaluate ridge-till as an alternative cropping system on Kentucky soils and climatic condition.

Table 1

PERCENT OF SURFACE RESIDUES REMAINING AFTER ONE OPERATION WITH VARIOUS TILLAGE IMPLEMENTS* AND AV. SOIL TEMPERATURE DURING THE FIRST 8 WEEKS AFTER PLANTING CORN ON A POORLY DRAINED SOIL

Tillage Implement	Percent of Residues	Temp (°F)
Moldboard plow	5	71.0
Chisel plow (curved)	50	----
Chisel plow (straight)	75	----
Ridge-till planter	65	69.4
No-till planter	90+	64.7

*Iowa State Univ. data. ** Purdue Univ. Data.

Kenneth L. Wells

Extension Soils Specialist, and Editor, SSNV