What is strip-tillage

Strip-tillage is defined as less than full-width tillage of varying intensity that is conducted parallel to the row direction. Generally no more than one-fourth of the plow layer is disturbed by this practice. The goal of strip-tillage is to create a seedbed condition in the row that is similar to that achieved by moldboard plowing, while leaving a relatively high amount of crop residue on the inter-row soil surface to reduce erosion.

There are several terms that are synonymous with strip tillage including: zone-tillage, row clearing, and deep zoning. Strip-tillage is often a separate operation, usually conducted in the fall, although some tools and row crop planters are equipped to do strip-tillage in the spring at planting. Many are designed to apply fertilizer simultaneously.

Three major types of strip-tillage can be described by the nature of the tools used and the intensity of the soil disturbance.

1. **Row or residue clearing**
   - move residue from row area
   - finger coulters, disks, sweeps, or a combination of finger coulters and cutting coulters
2. **Strip-tillage (shallow)**
   - cut and move residue, seedbed prep., fertilizer placement
   - fluted coulters
3. **Strip-tillage (deep)**
   - move residue, disrupt compaction, deep fertilizer placement, create ridges
   - coulters, knives, subsoiling shanks, closing disks

Benefits of strip-tillage

Grain farmers in the northern Corn Belt have been frustrated with the slower growth and lower yields often associated with no-till slot planting. Research studies have shown a potential for earlier planting, dryer and warmer soil in the row, more consistent seed depth, better stands, increased early growth, and increased yield when compared to no-till. Figure 1 shows the soil temperature measured at two inches in the late afternoon at Arlington, Wis. Soil temperature in the fall zone treatment is similar to those where chiseled, and about 5°C warmer than no-till. Emergence and early growth were delayed in the no-till compared to the chisel and fall zone systems.

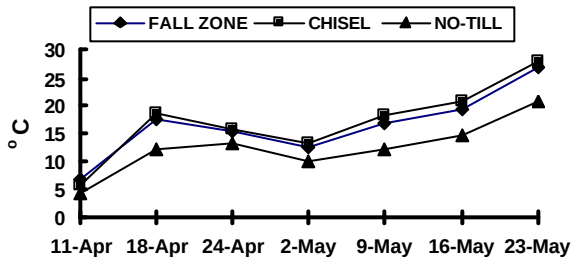

Figure 1. Two inch soil temperature as affected by tillage, Arlington, Wis., 1994.

There may also be an economic incentive for strip-tillage because of the time and equipment cost savings compared to full-width tillage. Strip-tillage can be a one-pass tillage and planting operation depending on the type of system that is selected. A producer can plant more acres when time is limited early in the growing season.

Furthermore, the producer may be able to maintain a smaller equipment inventory.

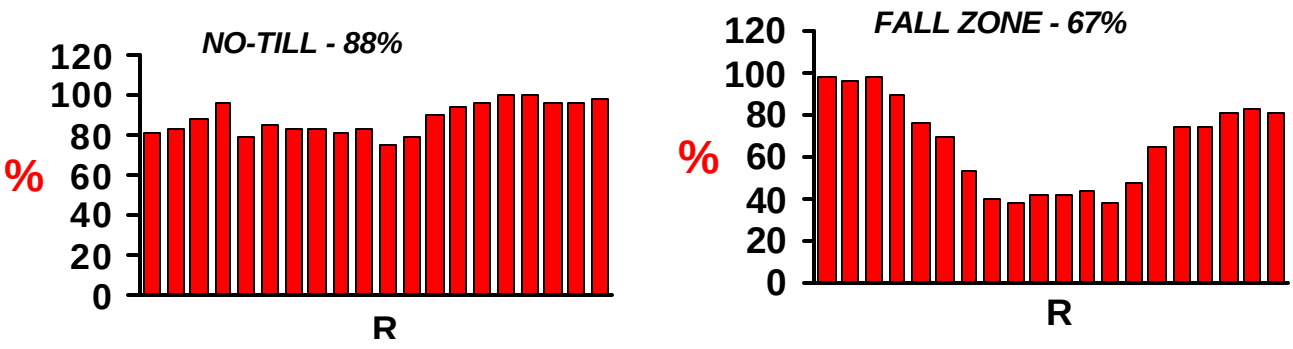

Figure 2. Surface crop residue across the row center (R) in continuous corn follow planting in a no-till and fall zone (Yetter Residue Manager) treatment, Arlington, Wis., 1994.

Selecting a strip-tillage system

Before changing tillage systems evaluate your current system. Often the modification of an existing system is all that is required (e.g., adding coulters to a row-crop planter). Ask yourself some simple questions.

- Are you meeting conservation goals?
- Is tillage limiting planting timeliness?
- Are stands and early growth satisfactory?
- Is compaction an issue?

The selection of a strip-tillage system is dependent on the grower's soil, cropping system, and management capabilities. For example, if the major concern is cooler, wetter soils from shading by residue then moving the residue may be all that is necessary. Figure 2 shows the residue levels across the row in a no-till and fall zone system that used finger-type coulters. These were operated with limited soil engagement and left a significant amount of finer residue in the row that would provide erosion protection.

Soils with a relatively high clay content may have a greater response to systems that provide some shallow in-row tillage and movement of residue along with the formation of small ridges to promote drying in the row. This will improve seed to soil contact and permit planting into more favorable conditions. If compaction is a concern, then there may be a need to consider deep strip tillage. It is critical to identify that compaction exists and to locate the depth of the restrictive layer. Tools for this operation should provide minimal soil inversion that would bury residue.

Evaluating the economics of tillage systems is very complex. Consideration must be given to the initial and maintenance costs of equipment, the size of tractor needed to pull the tool, equipment depreciation, labor costs, conservation program incentives, and increaseed management costs related to fertilizer and pest management. Producers will have to determine if it is cost effective to strip-till all row crops, as opposed to strip-tilling the corn, but using a drill to plant soybean.

Summary

Strip-tillage will not correct all crop production problems. Like no-till, concerns with weed shifts, insect problems, and nutrient and soil pH stratification will require more management attention. Strip-tillage does offer a high residue alternative to full-width tillage systems. Producers will be able to meet crop residue much easier with strip-tillage than with some form of full-width tillage.