Strip-Till: The Best of Both Worlds

No-till for a new millennium

The no-till revolution posted some impressive numbers in the last two decades of the 20th Century. Consider this: no-till expanded from 2 percent of the acreage in Illinois in 1978 to 30 percent in 2002. Today, one out of every two farmers in the state is doing some no-tilling—leaving the soil untilled and the residue cover in tact to buffer the land from erosion.

That’s the good news.

Unfortunately, while no-till soybean numbers have soared, some no-till corn growers hit tough times in the 1990s, as they found that the cool, moist conditions under the blanket of residue delayed germination, emergence, and early growth in wet years.

Strip-till provides one effective solution to this problem for corn growers.

Strip-till combines the best of the conventional tillage world with the best of the no-till world. Its dry, warm seedbed makes it possible to match the early planting dates and high yields of conventional tillage, while its heavy residue cover provides the impressive erosion control and improved water-use efficiency that you get with traditional no-till.

Think of strip-till as an insurance policy that protects against potential problems with no-till corn in cool, wet springs.

What is strip-till?

With strip-till, producers till a narrow, 5- to 7-inch strip down each row, 6 to 8 inches deep—a task typically done while applying anhydrous ammonia in the fall. The fall pass creates 3- to 4-inch mounds, which producers plant into the following spring.

The elevated mounds and lack of residue in the strip make for warmer, drier seedbeds. The elevation allows the soil to drain more easily and increases airflow to the mound, spurring warming. In fact, data show that strip-till can create seedbeds early in the spring that are 1 to 5 degrees warmer than with no-till (Figure 1).

A warmer, drier seedbed, in turn, translates into improved stands due to better germination, faster early corn growth, and potentially earlier planting.

With such a narrow strip being tilled, a full 80-percent of the field typically remains covered with heavy residue—a percentage that qualifies strip-till as a form of no-till. This heavy residue will also make for a cooler and wetter soil between the rows, which is a big advantage during the hot summer months.
Who needs it?

Strip-till is a promising option, particularly for those who fit into one of three categories:

• Producers who have been finding it difficult to no-till corn and are considering a switch back to reduced tillage.

• Producers who are looking for greater erosion control and want to shift away from reduced tillage.

• Producers and landlords who need to meet conservation compliance on their highly erodible land (HEL) to maintain program eligibility and payments.

If you are already successfully using no-till, strip-till may **not** be the choice for you.

Yield data

Researchers have been taking a close look at the effect of different tillage systems in the state through the groundbreaking Illinois SOILS Project (Save Our Illinois Soils). The project has run field-scale trials on 80-acre plots at 11 locations across the state since 2000—ensuring that the trials are conducted in a variety of soil types and climates.

The study compared strip-till, no-till, and mulch-till. But as Figure 2 indicates, the yields from 2000 to 2003 were not significantly different, with mulch-till averaging 166.8 bushels per acre over four years, strip-till at 165.3 bushels per acre, and no-till at 163.1 bushels per acre.

Meanwhile, the complete economic picture favored strip-till. Because of lowered production costs, strip-till had an economic advantage over mulch-till of $3.79 per acre. In addition, strip-till topped no-till by $1.40 per acre (Figure 3).

It’s possible that strip-till might have come out even further ahead of no-till, but two of the four years of the study (2000 and 2001) saw warm, dry springs. Strip-till’s advantage over no-till typically shows up in wet, cold springs, when its seedbed is warmer and drier.

The SOILS project is coordinated by the Illinois Department of Agriculture in cooperation with the University of Illinois, county soil and water conservation districts, and 11 farmers.
Some have argued that strip-till yields do not stack up when compared to deep tillage (14 to 16 inches deep) using rippers. However, the opposite has been observed in University of Illinois research conducted in 1999 and 2000. Comparing two different corn varieties (Asgrow 740 and Asgrow 770), strip-till yields were actually slightly higher than deep tillage—although the difference was not statistically significant (Figure 4).

Even if yields are comparable, it would not justify the added expense of deep tillage. Deep tillage requires a high-horsepower tractor, plus added fuel and labor costs. These added expenses explain why deep tillage with a disk subsoiler (ripper) more than doubles the cost per acre when compared to a tandem disk. Consider these figures:

<table>
<thead>
<tr>
<th>Tillage method</th>
<th>Cost per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination Tool</td>
<td>$7.50</td>
</tr>
<tr>
<td>Coulter chisel plow</td>
<td>$10.80</td>
</tr>
<tr>
<td>Disk subsoiler (ripper)</td>
<td>$15.60</td>
</tr>
<tr>
<td>Field cultivator</td>
<td>$5.00</td>
</tr>
<tr>
<td>Tandem disk</td>
<td>$6.70</td>
</tr>
</tbody>
</table>

For more information on the SOILS Project, visit [http://www.soilsproject.org/](http://www.soilsproject.org/)
Strip-till benefits

- Drier, warmer soils at planting
- Reduced soil erosion compared to mulch-till
- Improved water quality
- Improved nutrient availability and uptake
- A well-distributed workload
- Earlier no-till planting, which offers higher yield potential
- Consistent yields
- Improved no-till corn stands
- Improved germination and faster early no-till corn growth

Strip-till concerns

- The time-crunch in establishing ridges during the fall
- Wet soils in the fall
- Additional costs compared to no-till
- Difficulty seeing the rows while planting in the spring
- Difficulty staying on the row when planting in contoured fields
- The need to stay off of ridges to avoid destroying them (by changing the timing or equipment used when applying herbicides and dry fertilizer)
- Lack of properly equipped strip-till bars
- Greater horsepower required than with a typical no-till system

Strip-till: What’s in it for the landlord?

- Maintains or enhances yields
- Meets Conservation Compliance—maintaining program eligibility and payments
- Improves capitol assets—improving soil texture, organic matter, biological life
- Satisfies tenant—improving timeliness, lessening financial pressure
- Reduces farm upkeep by reducing soil erosion
- Develops a conservation ethic for future generations

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Sources
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