THE LEADING EDGE

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A PUBLICATION DEDICATED TO MAXIMIZING YIELD POTENTIAL

Equipment Advancements, Economic Savings Mean No-Till, Strip-Till Make Sense

Conservation tillage makes sense—the strategy is not new and the data supports its benefits from an environmental and input-cost standpoint. Residue cover prevents erosion, increases healthy organic matter in soil, and keeps moisture levels high. Furthermore, reduced-tillage operations use less fuel, require fewer pieces of large equipment, and have lower labor costs. And there are plenty of studies and real-world situations that prove just how much producers can and have benefited from conservation tillage.

Yetter Maverick™ strip-till unit running in standing corn stalks.

The obvious benefits of reduced tillage

Conservation tillage leaves more erosion-preventing and moisture-conserving residue on the soil surface. True no-till systems aim to leave 100% coverage, and many strip-till systems leave 50% coverage or more. More traditional tillage methods leave less coverage; for example, moldboard plowing leaves around a 10% residue cover. And ground with such a small amount of residue cover could be problematic. Soils left exposed to the elements with less than 30% coverage—the amount of residue required to qualify as conservation tillage--could experience up to 50% more erosion. Erosion-susceptible soil is a concern because this soil is more likely to release carbon dioxide into the air, which has two major drawbacks. One is obviously environmental; the other has to do with the health of the soil. Carbon retained in soils leads to soil with a high organic matter content, which is closely associated with healthy soils. In addition to the benefit no-till and strip-till systems provide for the soil, these systems also require fewer passes through the field and therefore save fuel money. Because higher fuel prices are likely here to stay, fewer passes have an obvious benefit over the economic hardships that accompany a conventional tillage system that requires four or five passes worth of diesel fuel.

Read more about this Texas farming

Labor costs associated with no-till and strip-till are also generally lower. One Texas farming family, whose 6,300 acres are nearly all conservation and strip-tilled, estimates their labor costs to have fallen from $12.50 per acre to $8.00 per acre. They also report fuel costs were cut in half once they completed the switch from conventional tillage.

In a Minnesota study, field operations in a strip-till system averaged $57 per acre for corn, while conventional tillage costs were $60 per acre. Savings came largely from lower fuel costs, a finding that was confirmed by an April 2006 report from the University of Illinois. That study found that strip-tilling corn averaged 2.9 gallons of fuel per acre, while typical conventional tillage operations consumed 3.4 gallons.

Overcoming reduced tillage challenges

2987 Series Magnum™ running in no-till wheat stubble.

It's easy to see why more and more producers are diligently throwing their resources behind conservation tillage. But challenges remain, especially for strict no-tillers in corn residue. Getting plants whose health and yields consistently match those grown in conventional tillage systems is challenging.

Cool spring soil temperatures and slow emergence often result in plants that are not as strong as young plants emerging from warmer conventionally-tilled soils. Even though lower operating and input costs often offset the yield difference, no producer is satisfied with lower yields when more is possible.

So, agriculture equipment manufacturers are designing tools to overcome reduced tillage challenges. These challenges demand tough tools that power through residue to ensure consistent seed and/or fertilizer place- ment. For no-tillers, these tools must also leave the residue cover as undisturbed as possible.

2984 Series Maverick™ on John Deere planter toolbar.

New anhydrous ammonia applicators that feature large blades set to run at angles achieve this goal. These tools can be run through the field at speeds exceeding 10 mph. Applicators can be spaced on toolbars to complement producers' planters' row widths.

Read more about this farming operation.

For Nebraska farmer Dave Neilsen, that spacing is 18 inches, which enables him to apply two bands of nitrogen between ridges that are 36 inches apart without disturbing the ridges. This placement also ensures that he avoids placing a high concentration of nitrogen too close to seeds.

Strip-till finds the right balance

By removing residue from only the soil that will become the seedbed, producers are able to retain the benefits of residue coverage and add the advantages of a warmer seedbed. Research done by the University of Minnesota Extension in southern Minnesota and reported in a study by North Dakota State University shows an aggressive strip-till machine can clear enough residue to promote soil warming similar to moldboard plowing, even in a continuous corn rotation.

Review this study.

The soil temperature advantage with strip till compared with no till allows faster plant emergence and development, the study reports. Earlier plant establishment normally increases crop yield and quality by extending the growth timeframe.

Because precision placement of seed and fertilizer is very important in strip-till systems, GPS equipment that guides steering and placement will likely soon result in a return-on-investment.

Earlier emergence and stand establishment also promote quicker crop canopy closure, reducing mid- and late-season weed seed germination and providing a better chance for young plants to establish and withstand disease and insect pressure with minimal damage.

While strip-till will require an investment in new equipment, the ability to adapt slowly by starting with 6-, 8- or 12-row toolbars, retrofitted from existing conventional tillage equipment, helps offset those costs. Typical strip-till setups include coulter blades, row cleaners, tillage shanks, berm-building disks, and packing wheels or conditioning baskets. Some strip-till equipment designs include paired coulters or a large disk without a tillage shank.

Fall strip-till is preferred to spring strip-till, but weather does not always cooperate. Producers should note that studies have shown that spring strip-till still produces better yields than straight no-till.

Strip-till costs averaged $8 per acre more than no-till in the previously referred to Minnesota study. But the extra tillage expense was offset by an additional $14 of revenue per acre. When it came to net farm income, strip-tillage surpassed conventional tillage by an average of $2.37 per acre, and no-till by $5.50 per acre.

No-till, strip-till have the potential to produce high yields

Conservation tillage systems differ from conventional tillage system in one other significant arena: they require more management and contingency

plans in the event of crunched fall labor schedules or uncooperative weather. However, this management can generally be done at a lower cost than the labor and equipment required for conventional tillage systems. And with proper management, these conservation tillage systems can achieve high yields.

Smart management, combined with the new equipment advances and already-proven input savings and environmental benefits, place no-till and strip-till systems firmly in the center of the picture of the future of the agriculture industry.

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