

Fracture compaction, save soil

Key Points

- Smart Till's tines fracture compaction while leaving soil structure intact.
- Tine design makes it easier to penetrate soil; tool requires no added weight.
- Reducing soil compaction means better infiltration and aeration, and less runoff.

By TYLER HARRIS

FARMER Don Hanson has learned firsthand the differences between the rich black soils of northern Iowa and the clay loam of central Missouri. "It's fairly rare in Iowa if you dig a hole and the water doesn't go down very fast," he says. "This soil in Missouri is pretty tight." After he moved to his farm near Kingdom City, Hanson initially used the same tillage practices he used in Iowa. "But it washed this Missouri soil so bad, it was pitiful," he says. "My yields began going down."

So, he started no-tilling, which helped yields for three or four years before the ground began to form a hard crust. No-tilling is often used on highly erodible ground, although it can bring challenges. After no-tilling for several years, Hanson's ground gets tight. "The water won't soak in," he says.

For 15 years, he's used aeration tillage, which has significantly improved the soil structure. For the past three years, he's used HCC's Smart Till, which he says has advantages over other aeration tillage tools. Aeration tillage, a type of vertical tillage, is the class HCC's Smart Till fits best with, says Nebraska-based agronomist Dan Davidson. "It's kind of in a class of its own," he says.

In the flat region of Kossuth County in northern Iowa, Nate Kitzinger's farm also benefits from Smart Till. In the three years he's used it, he's saved fuel by saving a pass. "My goal is to work everything in the fall to leave it planter-ready in spring," Kitzinger says. "We're using less fuel per acre because the Smart Till doesn't pull as hard as other tools do."

Cracks open crop residue

Smart Till fits different operations, including no-till because of how it fractures stalk residue and soil compaction, Davidson says. "A disk will cut a cornstalk in pieces," he notes. "The Smart Till cracks it open, so it decays faster."

Kitzinger says the tool allows crop residue to break down naturally, cracking the stalk, letting it take in moisture and allowing soil microbes to enter and break it down. "We leave most of the crop residue on the top inch or two of soil, instead of burying it 4 or 5 inches deep, as you might do with a more conventional till system."

Smart Till has a unique way of leaving residue, notes Hanson. It stretches the stalk out and lays it down the whole width of the row. This weaves a pattern, covering the entire field and leaving a minimum amount of soil exposed. "With this pattern it's easy to identify a field that's run by a Smart Till," says Kitzinger.

The system fractures the crust as well as compaction created by machinery. "The weight of machinery moving over a field compacts the soil," Davidson says. "You're



BREAK THE CRUST: Don Hanson has been using Smart Till for three years. It helps break surface crust on the clay loam soil of his central Missouri farm and corrects soil compaction.



TINE COMPARISON: Some aeration tillage tools require added weight to penetrate the ground. The Smart Till's tine design and weight of the tine makes the tool penetrate the ground without adding extra weight. "The tooth design is quite a bit heavier," notes Don Hanson.

going to get some compaction, it's inevitable. You need to break it up. Compacted layers restrict root growth, and compacted soil doesn't hold as much water."

The Smart Till system's tines run at an angle. "As the tines come in and twist the soil, they fracture compaction," says Davidson. "At the same time they open the soil up for infiltration and aeration. It warms and dries faster in spring."

Twisting action in soil

Other aeration tillage tools cost less, but Davidson says they are less efficient because they require added weight to go into the ground. "With the angle of the faces on Smart Till's tines, they go in the ground by themselves," he says. "It actually pulls easier." Other systems use four tines; Smart Till uses three. An extra tine would raise the wheel up, while another tine is in the ground. With Smart Till, the third tine

is pulling the next tine down.

Due to added weight required to penetrate the ground, which can total 8,000 pounds, other systems can create more compaction. "When you put a force on something that's going in the ground, you're not just poking into the ground, you've also got shearing forces going out both sides," Davidson says. "Shearing forces create compaction. They're also more difficult to pull, while Smart Till works well at 8 to 10 miles per hour."

Hanson says, "The faster you pull this tool, the better it goes into the ground. It takes horsepower, but it stays in the ground."

The unit's weight is well-suspended on tires, Davidson says. "The only weight that's penetrating is the weight of the tine itself. That tool slices in and slices out based on the angle and patented design of the tine."

The tine's weight helps. "The tooth design on this tool is quite a bit heavier," says Hanson. "This one, without any added weight, stays in the ground."



WOVEN PATTERN: Fields worked by a Smart Till tool are easily recognizable by how they leave residue, allowing it to break down naturally. "The tool stretches the stalk out," says Don Hanson, "and lays it down the entire width of the row."

The angle and motion of the tines does the job. "It has a twist to it which creates a fracture," Davidson says. "The fracturing action counteracts any sidewall forces."

The harrow modules and tines are adjustable for different angles, to get the amount of action you want.

Better soil productivity

More infiltration means less erosion and runoff. "When you open soil up and get more infiltration, you can store more water," Davidson says. "You're getting more water in the soil and getting reduced soil erosion as well. In a wet year, soil will absorb more water instead of letting it run off."

In the flat region of north-central Iowa, this helps prevent ponding, Kitzinger says. "The faster we can move water into the soil profile, the better off we are in the long run," he says. "That was a major goal of mine for moving to the Smart Till system."

Water was an issue for Hanson in last summer's drought, but the improved infiltration paid off last fall. "It's unbelievable the difference in the bean ground versus the ground I didn't go over with this tillage tool," he says. "We ended up with close to 30-bushel-per-acre beans last fall. The crop did far better than I could have dreamed, considering the heat and drought we had."

In the end, better infiltration and aeration pay off. "It leads to better soil productivity, better crops, and you can probably get into the field earlier," Davidson says.

Improved infiltration and aeration also builds soil tilth. "Tilth isn't something you can measure in a lab; it's a combination of many things. You can see it; you can feel it," he says. "Once you get more aeration in the soil, you're contributing to better soil tilth. Good tilth is what you need for better yields."