Yetter FARM EQUIPMENT

Leading Edge

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Residue Revitalizes Stressed Fields

A dry year can lead to significant residue challenges, but the benefits are many

As the dry summer draws to a close, farmers face an early harvest and accompanying challenges that could affect the next growing season. An early harvest means that fields will be exposed for longer than normal to the elements, potentially leading to erosion, soil crusting, and other undesired circumstances. In a year like this, effective residue management is key.

Conservation tillage, which leaves residue on the surface, can help avoid the consequences of exposed soil, especially after a drought year when the soil structure has been weakened. Due to the drought, some farmers may be considering harvesting their corn for silage. In this situation, care should still be taken to leave enough residue to protect the soil. And while residue can lead to problems of its own, there are numerous tools available to help overcome the challenges.

The benefits and challenges of surface residue

Leaving residue on the ground over winter has many advantages. By rebuilding organic matter, the quality of the soil and soil structure improves, as does soil tilth. The residue makes the soil less prone to crust, which leads to better water infiltration. At the same time, the residue catches more snow, also improving water infiltration. Wind erosion is virtually eliminated, water erosion is significantly reduced, and weed growth may be limited as well.

During a dry year, it can be easy to remove residue while cutting for silage or baling. The extra time between harvest and winter can seem like the perfect time to till as well. However, research has shown that removing residue adversely affects soil structure, water infiltration, soil moisture-holding capacity, and soil bulk density.[i]

That's not to say, of course, that leaving a residue cover is a carefree decision. If the residue is too thick or not evenly spread, producers can face other challenges in the spring. Poor seed germination and related problems such as uneven emergence and thin crop stands could result. Cold soil or slow-drying soil are possible concerns as well.

Even residue spread is critical at harvest

Properly sized residue keeps your equipment from plugging in the spring and reduces the workload for residue manager wheels that create a residue-free zone in front of the cutting coulter, knife, or seeding disc.

Uneven residue distribution can be a problem for producers, with a negative impact on yields and profits.

As headers get wider, however, this becomes more challenging for producers. New, wide headers are often not equipped with spreaders or choppers capable of distributing residue across the swath.

Since soybean residue contains so much nitrogen, an even distribution of this residue across the header width is essential to avoid concentrating as much as 70 pounds of nitrogen in one band and leaving the next bare.[ii] Uneven nutrient supply will adversely affect next year's corn crop.

Banded residue also means covered areas will stay wet and cold in the spring while residue-free bands warm more quickly. These variances have a negative impact on yields and profits, especially for no-till producers using 30-foot headers.

For headers up to 25 feet, producers can try adjusting the deflector for each crop to get the most spread. However, for those with wider headers, investing in a chopper and spreader to attach to your combine will ensure the best residue management.

Tougher residue requires effective solutions

Seed companies are engineering seeds that result in healthier, more tolerant corn plants with stronger stalks. After harvest, those stalks can become a real problem. In fact, experts estimate that a biotech hybrid that resulted in a corn yield of 200 bushels per acre also leaves an additional two to three tons of residue per acre compared to traditional varieties.

A good stalk roller will push stalks over, crushing them, which allows tires/tracks to easily roll over the stalk without damage.

Heavy piles of residue make proper planter performance more difficult. The fact that many corn producers are switching to narrower rows and corn-on-corn crop rotations only adds to the residue pile-up.

To combat this resulting blanket of residue, there are several tools to encourage decomposition over the winter months—keeping the soil-enriching benefits of residue while enabling the soil to warm and dry more quickly in the spring.

- Rollers can be added to corn heads to push the corn stalks over, opening up the root ball and placing stalks on the ground and therefore closer to earth worms and soil microbes.
- Adapting or adding on aggressive knife rollers that are designed to crush corn stalks and open them to further decomposition is another option producers can consider. As long as the stalk is left partially attached at the roots, its erosion-preventing and moisture conserving properties will be retained. The crushed stalks will be easier on tracks and tires as well.

Speed decomposition with vertical tillage

Another way to facilitate residue breakdown over the winter months is vertical tillage (VT). VT tools are available that penetrate, at most, the top three inches of soil. These offer the benefits of tilled soil while at the same time leaving a layer of residue to protect the soil from erosion. Most conservation-focused producers will find this lighter tillage application acceptable.

Vertical tillage attachements can be a relatively inexpensive way to retrofit existing equipment.

These "top only" VT tools are also known and marketed as vertical finishers. Many manufacturers refer to the blades on their VT tools as coulters, which vary in blade curvature and fluting. And some are making vertical tillage tools that are compatible with field cultivators, chisels, and fertilizer application shanks, giving producers the opportunity to multitask with existing equipment. Other beneficial attachments for vertical tillage tools may include rolling baskets to further fluff residue and smooth the seedbed.

VT tools can be used to cut and size residue in the fall. Most shallow, coulter-based VT tools have fairly low horsepower requirements and can be operated at relatively fast speeds of 6 to 10 mph.

A quick pass at that speed in the fall provides more soil-to-residue contact and better breakdown over winter. VT anchors some residue in the soil, putting it in contact with active microbes. This contact speeds residue breakdown, a big benefit for those who plant Bt corn hybrids. Other residue is chopped to a manageable size but left on the soil surface as an erosion-preventing cover. The VT attachments can even be used for very shallow incorporation of fertilizer and herbicides.

While the investment in a complete shallow vertical tillage set-up could be expensive, several manufacturers offer the option of purchasing only the attachments. An old chisel plow is the perfect candidate to be modified to accept these vertical tillage attachments.

Producers can create a customized tool by choosing the right vertical tillage coulter option—straight or slightly angled—for their needs. Narrow coulter blades provide the least amount of tillage, while wider waves result in more soil disturbance.

Begin preparations in the fall to welcome your seeds in the spring

During harvest, reduced tillage operators should be taking steps to ensure that their soil will be ready to welcome next spring's seeding operations. Residue, particularly after a drought year, can revitalize soil for spring—and even the toughest residue can be controlled with the proper equipment. Now is the time to start thinking about spring planting.

Endnotes

1 Mahdi Al-Kaisi, "Early Corn Harvest and Residue Management this Fall," http://www.extension.iastate.edu/CropNews/2012/0802al-kaisi.htm, accessed on August 7, 2012

2 Martha Ostendorf, "Harvest-Time Residue Management Hurdles and Solutions," http://www.no-tillfarmer.com/pages/Spre/Harvest-Time-Residue-Management-Hurdles-And-Solutions.php, accessed on August 7, 2012.

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