

THE LEADING EDGE

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Stacked Hybrids Bring New Era in Seeding & Residue Management

It has been nearly two decades since the first insect-protected corn hybrid was developed and ten years since weed- and insect-resistant seeds were commercialized. In recent years, biotechnology (Bt) seeds have been enhanced to carry as many as three or four desirable traits.

Biotechnology Benefits

Farmers have readily adapted to the use of these Bt, triple- and quad-stacked hybrids. No-till farming has expanded progressively as herbicide-tolerant, bio-tech crops have been adopted by growers. Growers can pick from an array of hybrids offering all the traits they need in one package, such as Roundup-ready seeds that are both corn borer and rootworm resistant.



High yields bring tons of residue, but Bt hybrids leave fields looking very similar in the spring.

The benefits of Bt hybrids are many. One is that “stacked” hybrids allow growers to take a proactive stance in the prevention and control of crop-devastating disease.

Additionally, corn growers have seen a huge reduction in insecticide applications since switching to Bt varieties—a big win for the environment and the pocketbook. Herbicide tolerant options have enabled growers to apply less expensive herbicides in a broader application window and can prevent damage caused by applying an herbicide not compatible with the hybrid in the field.

Genetically altered seeds also have a higher yield potential. In the 2007 Ohio corn performance trials, 114 of the 237 seed entries were triple- or quad-stacked. Triplestacked hybrids generated the highest yields: eight of the ten top-yielding varieties were triple-stacks.¹

The Trouble With Tough Plants

In a perfect world, this would be the end of the story. Healthier, more tolerant corn plants result in stronger stalks, and after harvest, those can become a real problem. In fact, experts estimate that a biotech hybrid that resulted in a yield of 200 bushels per acre also leaves an additional two to three tons of residue per acre compared to traditional varieties.²

Genetically altered plants remain resistant to potential threats even after harvest. The plant cell walls contain lignin, a compound that holds cells together. The microbes that work to break down residue, making next year's planting possible, have trouble tackling these tougher stalks in a short window of time because these microbes go dormant when the soil cools to below 45 degrees.

Non-Bt corn stalks have often been weakened by some insect damage, giving microbes a head start at the breakdown process. And the heavier the residue, the more likely a large portion of it is not in contact with the soil. And no soil contact means microbes have little chance of doing the job producers depend on.

Bio-tech farmers need practical options for effectively managing and removing residue and placing it to the side of the row. This method preserves the residue as a protective cover, trapping vital moisture needed in drier times and preventing the soil from crusting in heavy rains. In order to be successful, growers need to be careful to choose equipment that is able to take on trash and wet, heavy residue without bunching it.

Standing Up to Stacked Residue Starts in the Fall

Producers have a small window of time to get into the field after harvest and incorporate residue into the soil before it cools. When that residue is from Bt plants, sound management techniques are even more critical. Only timely action will get the breakdown process started.

Planning for management of tough residue begins in the fall. Last year's cornstalks still leave behind more to contend with than bean stubble. This residue needs to be distributed as evenly as possible. Uneven residue cover makes every successive process more difficult, especially planting.

Some growers choose to cut residue to a manageable height or size residue after harvest with new vertical tillage attachment alternatives. Vertical tillage attachments can be used in the fall to lightly till the soil and incorporate and size residue, which facilitates residue decomposition.

Power Through Bt Residue in the Spring

Planter manufacturers are beefing up coultter tillage coulters and residue manager options are available to help residue in the Fall and Spring. Combine head manufacturers have gotten on board as well, offering stalk chopping and sizing functions.

Toolbars specially equipped with a variety of combinations of cutting coulters, rolling baskets, and reel stalk choppers are also readily available.

**Only after the residue is cleared
can the rest of the planting setup**



Vertical tillage machines can be used in the fall to size Bt cornstalks to encourage residue breakdown.

To take on tough Bt residue, producers can also look for attachments that will modify equipment they already own. These

perform properly. Seed trench preparation, seed placement, and seed trench-closing devices can only operate as intended if they are operating in a clean soil environment.

solutions should move residue only from the row, avoid hairpinning, and leave room for residue flow-through to avoid planter clogs.

Residue management wheels specially designed to handle stacked, Bt residue will grab and completely sever residue for easier removal. Wheel designs will have teeth that are constantly in contact with the soil surface to cleanly cut residue with minimal soil disturbance. Backwards-angled teeth are designed not to plug, even in the toughest residue conditions.

No matter what residue management option is used, producers can often make adaptations to the tool itself in how the tool is run. Varying driving speed or changing the angle at which the blades or teeth contact the ground can give farmers further control over the residue situation.

The Seeds of the Future

Stacked hybrids are the future of crop production. To reap the benefits of biotechnology, farmers must adapt their practices to handle the challenges these tough seeds bring to the table. When producers change to biotech crops, or add more biotech crops to their operation, that change will affect subsequent cropping years and residue management practices need to be adapted to accommodate for the accompanying challenges.



Planters need to be properly equipped to handle multiple years of heavy residue as Bt cornstalks often do not breakdown in one year.

¹ Peter Thomison, Rich Minyo, Allen Geyer, Bert Bishop, David Lohnes, 2007 Ohio Corn Performance Trials – Results and Observations, C.O.R.N. Newsletter, Ohio State University, November 21, 2007. August 4, 2008.

< <http://corn.osu.edu/story.php?setissueID=212&storyID=1295> >

² Disks Stage a Comeback, *Farm Industry News*, Nov. 1, 2006. August 4, 2008.

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