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Can residue be managed successfully with no-till?

Abstract
No-till farming systems have both advantages and challenges concerning the management of crop residue. One of the biggest advantages of this system is that it leaves significant amounts of crop residue on the soil surface, which protects the soil from water erosion and improves soil tilth. Conversely, these significant amounts of residue pose a challenge of their own: How to manage residue as a part of a no-till system. To ensure the success of no-till, farmers need to use a system approach in the management of residue. This involves the integration of planting, nutrient application, and harvesting processes.

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INTEGRATED CROP MANAGEMENT

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Soils

Can residue be managed successfully with no-till?

by Mahdi Al-Kaisi, Department of Agronomy

No-till farming systems have both advantages and challenges concerning the management of crop residue. One of the biggest advantages of this system is that it leaves significant amounts of crop residue on the soil surface, which protects the soil from water erosion and improves soil tilth. Conversely, these significant amounts of residue pose a challenge of their own: How to manage residue as a part of a no-till system. To ensure the success of no-till, farmers need to use a system approach in the management of residue. This involves the integration of planting, nutrient application, and harvesting processes. While each of these components is important, this article will focus on two ways to manage crop residue in a no-till system: (1) cutting residue after harvest and (2) adjusting the combine to ensure uniform height, volume, and distribution of residue during harvest.

Overcoming the challenges associated with managing crop residue during planting season starts at harvest time. The way residue is managed on the field after harvest is very critical to the success of providing a good soil seedbed environment for planting. Cutting residue at 12 inches or more will provide a better residue orientation for trapping snow and uniform distribution of it across the field. Many farmers have gotten into the habit of chopping corn stalks after harvest. This can present a significant management problem as well as other potential production problems that are associated

In the no-till farming system, significant amounts of crop residue remain on the soil surface, protecting it from water erosion and improving soil tilth. ***(Mark Carlton)***

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with low soil temperature early in the spring, potential soil diseases, and early germination problems just to name a few. Chopping residue also can reduce the effectiveness of it in protecting the soil surface from potential water erosion, especially during high intensity rainfall events, where residue will be washed away with the surface runoff. Chopped residue is no longer anchored into the soil and is more prone to plugging tillage implements or planters used in subsequent operations.

To have an effective and manageable residue cover at planting is to have corn residue cut as high as 12 to 24 inches. There are several reasons for that. (1) Cutting residue at that height minimizes the potential damage to equipment tires during planting and other field operations. (2) Standing residue will be much easier to manage during planting, where minimum loose residue on the soil surface can be managed with residue-removal attachments on the planter. (3) Upright residue can provide better protection to the soil surface from wind and water erosions by reducing wind and water flow near the surface. Given these reasons against chopping corn residue, no-till can be managed efficiently without affecting yield.

While cutting residue after harvest is one technique for managing crop residue, it is possible to avoid this step all together. This can be accomplished by calibrating the combine properly to ensure a uniform residue distribution on the soil surface. A few adjustments and fine tuning of a combine prior to harvest can pay off significantly in having uniform residue cover across the field.

The misconception about residue in no-till as an obstacle is widely used to avoid the adoption of no-till. The success of farmers who have been using no-till for many years shows that managing residue is possible and pays off economically and environmentally. Studies show that tilling corn residue prior to soybean planting did not improve soybean yield (see the April 3, 2006, *ICM* article, "Is tillage needed for your soybean crop?"). Removing residue for any purpose needs to be balanced with the potential impact that may take place—especially from water and soil quality perspectives. Although standing residue in the field is sometimes viewed negatively, it actually presents fewer problems for equipment or seedling establishment than chopped, detached residue.

The main idea is to look at no-till and residue management in a system approach by properly calibrating planting and harvesting equipment to achieve the intended results of no-till. Some producers approach no-till with the mindset to prove it does not work. Others approach no-till with the attitude that it can be done and they manage to achieve that. Despite the challenges faced with no-till, there are no shortcuts. No-till residue management should be executed in a system approach and given time to work, bearing in mind that it is a long-term commitment.

Mahdi Al-Kaisi is an associate professor of agronomy with research and extension responsibilities in soil management and environmental soil science.

Insects and Mites

Bean leaf beetles return—with a vengeance

by Jeffrey D. Bradshaw, Marlin E. Rice, and David Dorhout, Department of Entomology

We started detecting bean leaf beetles on April 19 this year as part of our annual bean leaf beetle monitoring program in central Iowa. As noted last week, bean leaf beetle mortality was predicted to be low, and based on last year's low numbers, we expected a slight increase in their numbers this year. However, we were surprised by the numbers we have found this past week!

We are finding about 340 bean leaf beetles per 50 sweeps in alfalfa. This average is only 84 beetles less than the early-season high (in alfalfa) from 2002 (our most abundant year to date). With these numbers, some growers may exceed the early-season economic threshold for bean leaf beetle injury (see tables). Palle Pedersen, extension soybean specialist, reported a 400-acre field near Grand Junction that averaged 3 beetles per seedling plant, so large populations can be found in Iowa this spring.

So what can farmers do now? Follow our current recommendations (see flowchart) for soybean management and choose the approach that best fits the end use of the soybeans (see graph).

Delayed planting

Planting from this date on could be considered as delayed, but planting in mid to late May still could yield near optimum yields without the beetle pressure. With high beetle pressure, late April and early May planting dates are at risk for sustaining large bean leaf beetle populations, pod damage, and poor seed quality.