2010 Demonstration Report

THE LEARNING CENTER

at Monmouth, Illinois

Impact of Residue Removal in Continuous Corn

Corn residue in continuous corn should be managed to avoid potential problems during the growing season. Excessive residue at planting can interfere with good seed to soil contact, leading to poor emergence and vigor. In addition, corn diseases can overwinter in corn residue. Finally, if most of the residue decomposition is occurring during the growing season, the nitrogen (N) required for decomposition can limit the N available for corn growth.

Study Guidelines

A long term demonstration trial has been conducted at the Monsanto Learning Center near Monmouth, IL to assess the effects of removing crop residue from a continuous corn system. The third year of yield data was collected in 2010. Four different percentages of residue are removed annually from the trial; 0% removal, 50% removal, 75% removal, and 100% removal (Figure 1). Stalk residue was shredded and baled in the fall to remove the different percentages of residue. Conventional tillage was used in-season. A chisel plow and a soil finisher were run in the fall and spring, respectively. Soil samples were analyzed to quantify phosphorus (P), potassium (K), soil pH, and percent organic matter in 2008 and 2010. These soil parameters will be monitored throughout the span of this long term trial.

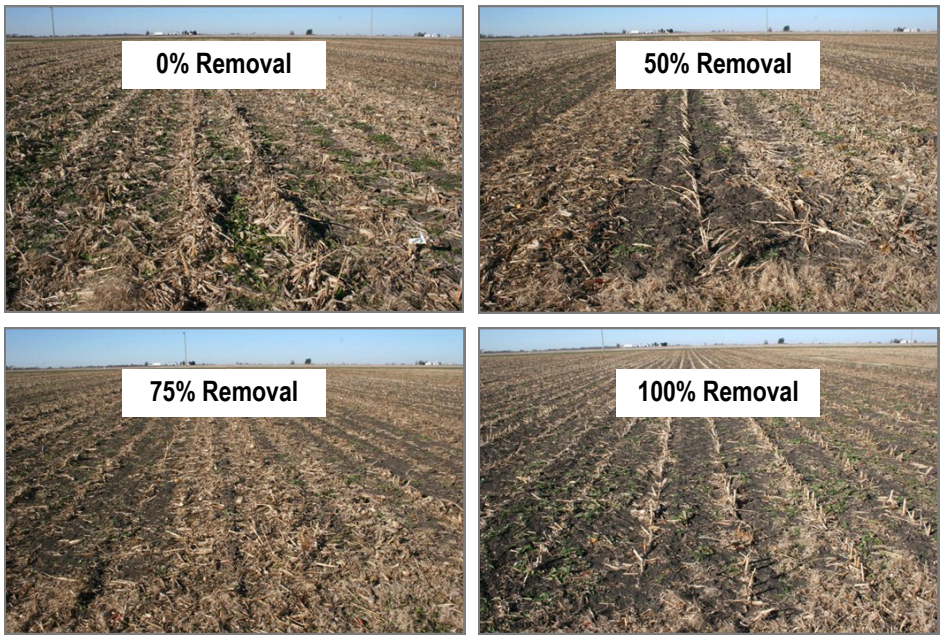

Figure 1. Percentage of residue removed for each treatment at the Monsanto Learning Center near Monmouth, IL in 2010.

Results

In 2008 corn yields were similar across each of the corn residue removal rates (Figure 2). In 2009 corn yields were also similar across the different corn residue removal rates, even though the yields were consistently lower in 2009 compared to 2008.

In 2010, major differences in corn yields were observed across the different crop residue rates. The plots with 100% of the residue removed had the highest yields. Corn yields decreased as the amount of residue left in the field increased. As a result the lowest corn yields were found in the plot where 0% residue had been removed.

Soil test results from 2010 showed no discernible differences between treatments when compared to 2008 test results. With the exception of April, the spring of 2010 was extremely wet and colder than normal. Twenty-six inches of rain fell from April 28th to June 28th. The excess water led to severe N deficiency (Figure 3). The combination of cold and wet conditions in 2010 likely resulted in little to no decomposition of the previous year's residue until temperatures warmed up in July. The onset of warmer temperatures likely resulted in rapid decomposition of remaining residue, which may have limited the amount of N available to the crop even further during key developmental growth stages.

When microbes break down residues that are high in carbon (C), such as corn, they can compete with growing corn for available N in order to maintain their ideal C/N ratio of 10:1. This immobilization of available N can result in N deficiency symptoms until the majority of the decomposition is complete and microbes die and release the N back into the soil in the process termed mineralization.

In conclusion, the 2008 and 2009 trials showed little differences in yield across the four different rates of corn residue removal. In 2010 a major difference in yield was observed, most likely due to weather conditions that occurred during the season. The 2010 yield results mirror the lower than average yields seen in 2010 on much of the continuous corn in Northern Illinois.

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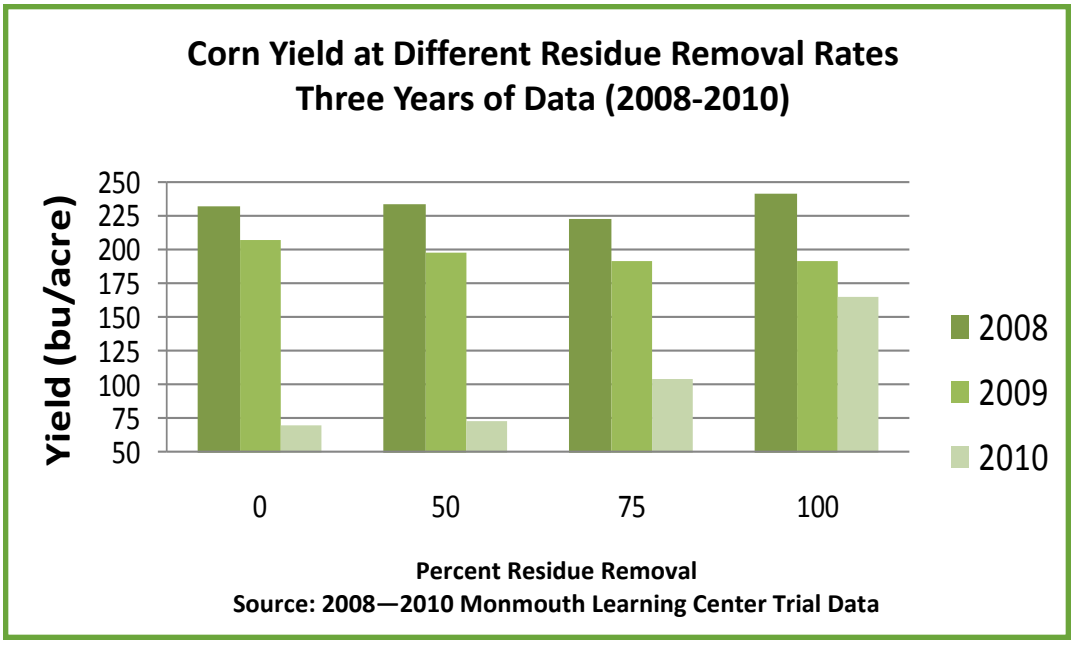

◄ **Figure 2.** Corn yield at 0%, 50%, 75%, and 100% residue removed at the Monsanto Learning Center near Monmouth, IL in 2008, 2009, and 2010.

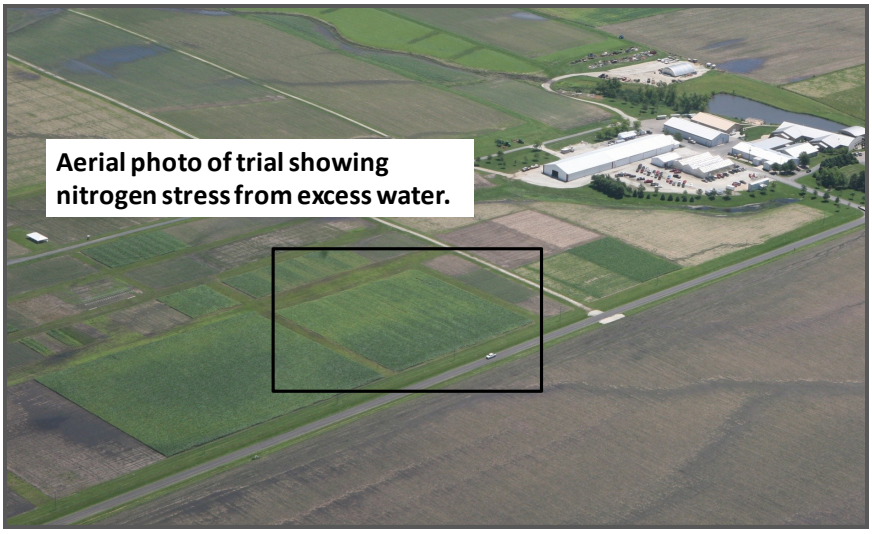

Figure 3. ►
The light green color outlined by the black rectangle shows where excess water caused nitrogen stress at the Monsanto Learning Center near Monmouth, IL in 2010.

The information discussed in this report is from a single site, non-replicated, three-year demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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