



2013 DEMONSTRATION REPORT

Monsanto Learning Center at Monmouth, IL

Comparison of Tillage Systems in Continuous Corn

Background

Crop residues can increase efficiency of irrigation, conserve soil moisture, and reduce soil and water erosion. However, excessive crop residue at planting can interfere with good seed-to-soil contact, leading to poor emergence and vigor. If not properly managed, residues can harbor diseases, insects, and immobilize nitrogen which may lead to potential yield loss. Corn is a high residue crop with a high root carbon to nitrogen (C/N) ratio of 48:1. Thus, corn residues decompose less quickly than legume crops like soybeans and alfalfa that have lower C/N ratios. Residue management, especially in continuous corn cropping systems, can be challenging.

Depending on the environment and field conditions, no-till may not be an option when planting corn after corn. Tillage may contribute to the success of continuous corn acres by helping to reduce soil compaction, incorporate fertilizer, and break up residue from the previous season. Conventional and strip tillage are two of the tillage options available to continuous corn growers.

Two separate experiments under continuous corn production systems were established during the 2013 growing season at the Monsanto Learning Center near Monmouth, IL to determine:

1. Effects of tillage and fungicide on corn yield.
2. Effects of tillage and population on corn yield.

Study Guidelines

Both experiments were conducted in a conventional tillage system, which included chisel plow in the fall and soil finisher in the spring; and strip tillage in the fall with row cleaners used at planting (Figure 1). Standard weed management practices were used to maintain a weed-free environment. Table 1 lists the management practices that were followed in each experiment.

Results

Fungicide application greatly improved yield, with a 10 bu/acre advantage in strip tillage, and a 12 bu/acre advantage in conventional tillage. Across fungicide treatments, conventional tillage out-yielded strip tillage by as much as 20 bu/acre, with yields of 170 and 150 bu/acre, respectively (Figure 2).

The highest yields were achieved with 35,000 seeds/acre under both tillage systems. Under both tillage systems, 28,000 seeds/acre slightly out-yielded 42,000 seeds/acre. Across populations, conventional tillage out-yielded strip tillage, with yields of 181 and 146 bu/acre, respectively (Figure 3).

In both experiments, conventional tillage out-yielded strip tillage, by an average of 27.6 bu/acre. These results were similar to results from 2012 in which conventional tillage out-yielded strip tillage by 21.4 bu/acre. Crop residue can affect the growing environment in many different ways. Some of these effects can be positive, but others can lead to increased plant stress, thus proper residue management is critical. Even though conventional tillage out-yielded strip tillage, many factors influence tillage decisions and growers should consider economic and agronomic components to make the best tillage choices for their fields. Corn product selection should match the agronomic needs of the field and farming operation.

Legal

The information discussed in this report is from a single site, non-replicated. The information discussed in this report is from a single site, 4 replicate 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.

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Experiment	Details
Tillage x Seeding Rate	<ul style="list-style-type: none"> • Two Genuity® SmartStax® RIB Complete® corn blends (105 and 112 RM) planted 5/2/2013 in a continuous corn rotation system in 30-inch rows. • Seeding rate: 28,000; 35,000; and 42,000 seeds/acre.
Tillage x Fungicide	<ul style="list-style-type: none"> • Genuity® SmartStax® RIB Complete® corn blend (112 RM) and Roundup Ready® Corn 2 (111 RM) with soil insecticide at planting. • Planted 5/1/2013 in a continuous corn rotation system in 30-inch rows. • Fungicide application: Headline® fungicide at growth stage R2 at 0.145 fl oz/acre + Crop Oil Concentrate at 1% volume COC/volume mix.

Table 1. Treatments for the tillage practices study at Monmouth Learning Center, 2013.



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Figure 1. Conventional tillage (left) and strip tillage (right) fields under continuous corn systems at Monmouth, IL.

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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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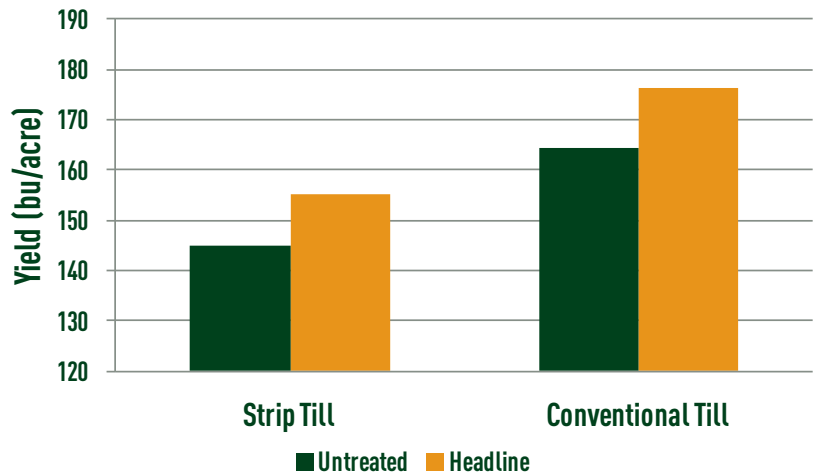


Figure 2. Effect of tillage and fungicide treatment on corn yield under continuous corn systems averaged across corn products at Monmouth, IL.

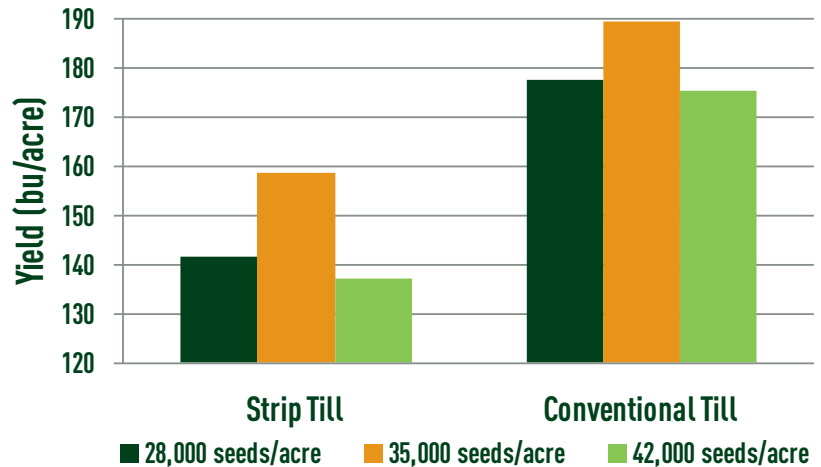


Figure 3. Effect of tillage and plant population on corn yield under continuous corn systems averaged across corn products at Monmouth, IL.

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