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Tillage and Nitrogen Placement Effects on Yields in a Short-Season Corn/Wheat/Double-Crop Soybean Rotation

Abstract

In 2013, late planting resulted in corn yields that were less than 100 bu/a. Nitrogen (N) placement did not affect yields in the higher-yielding conventional tillage system, but knifing tended to result in greater yield in reduced and no-till systems.

Keywords

tillage, nitrogen placement, short-season rotation, corn yield, wheat yield, soybean yield

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Tillage and Nitrogen Placement Effects on Yields in a Short-Season Corn/Wheat/Double-Crop Soybean Rotation

D.W. Sweeney

Summary

In 2013, late planting resulted in corn yields that were less than 100 bu/a. Nitrogen (N) placement did not affect yields in the higher-yielding conventional tillage system, but knifing tended to result in greater yield in reduced and no-till systems.

Introduction

Many crop rotation systems are used in southeastern Kansas. This experiment was designed to determine the long-term effect of selected tillage and N fertilizer placement options on yields of short-season corn, wheat, and double-crop soybean in rotation.

Experimental Procedures

A split-plot design with four replications was initiated in 1983 with tillage system as the whole plot and N treatment as the subplot. In 2005, the rotation was changed to begin a short-season corn/wheat/double-crop soybean sequence. Use of three tillage systems (conventional, reduced, and no-till) continued in the same areas used during the previous 22 years. The conventional system consisted of chiseling, disking, and field cultivation. Chisel operations occurred in the fall preceding corn or wheat crops. The reduced-tillage system consists of disking and field cultivation prior to planting. Glyphosate (Roundup; Monsanto, St. Louis, MO) was applied to the no-till areas. The four N treatments for the crop were: no N (control), broadcast urea-ammonium nitrate (UAN; 28% N) solution, dribble UAN solution, and knife UAN solution at 4 in. deep. The N rate for the corn crop grown in odd years was 125 lb/a. Corn was planted on May 15, 2013.

Results and Discussion

In 2013, wet field conditions delayed planting until mid-May. The lack of rain for more than four weeks prior to silking resulted in low corn yields that were less than 100 bu/a in any treatment (Figure 1). Overall yields were greatest with conventional tillage, with no difference between N placements. In the lower-yielding reduced and no-tillage treatments, knife application tended to result in greater yields than with dribble, broadcast, or the no-N control. In no-till, however, the trend was significant only for the comparison of the knife vs. no-N control treatments.

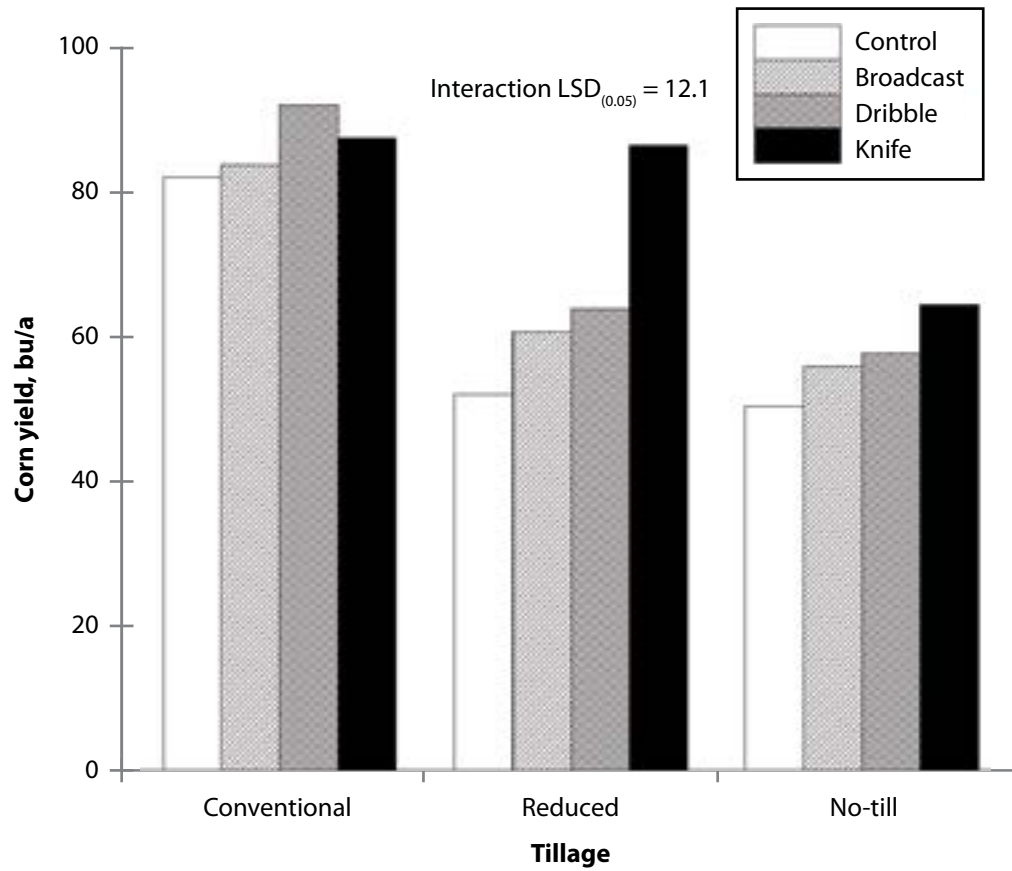


Figure 1. Effects of tillage and nitrogen placement on short-season corn yield in 2013.