

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

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Summary

Overall in 2014, adding nitrogen (N) improved average wheat yields, but different N placement methods resulted in similar yields. Double-crop soybean yields were unaffected by tillage or the residual from N treatments that were applied to the previous wheat crop.

Introduction

Many crop rotation systems are used in southeastern Kansas. This experiment is designed to determine the long-term effects 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) continues in the same areas as during the previous 22 years. The conventional system consists of chiseling, disking, and field cultivation. Chiseling occurs in the fall preceding corn or wheat crops. The reduced-tillage system consists of disking and field cultivation prior to planting. Glyphosate is applied to the no-till areas prior to planting. The four N treatments for the crop are: 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-numbered years is 125 lb/a. The N rate of 120 lb/a for wheat is split as 60 lb/a applied preplant as broadcast, dribble, or knifed UAN. All plots except for the controls are top-dressed in the spring with broadcast UAN at 60 lb/a N.

Results and Discussion

In 2014, wheat yields were low, averaging less than 30 bu/a (data not shown). Fertilizing with N increased wheat yield by approximately 70%, but preplant application method (broadcast, dribble, or knife) did not affect yields. Tillage had no effect on wheat yields. Average yield of soybean planted double-crop after wheat harvest exceeded 45 bu/a in 2014, but yield was not affected by tillage systems or the residual from N fertilizer treatments that were applied to the wheat.