

## LONG TERM NO-TILL AND REDUCED TILLAGE CROP ROTATION RESEARCH

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No-till production systems have been adopted to reduce soil erosion, input costs, and increase soil organic matter. At the time this research was established, improved planters and weed management systems allowed the rapid adoption of no-till production systems while wheat acres had reached 15 to 20% in Northeast Missouri. However, producing no-till corn after wheat was a challenge. One of the main objectives of this research was to determine grain yield differences between tillage systems in a corn-soybean-wheat rotation. This article summarizes corn grain yields for the past 10 years of this experiment.

Research was established in the fall, 1993 at the Greenley Research Center on claypan soils that included an Adco silt loam, Mexico silt loam, and Leonard silt loam. Three corn-soybean-wheat rotational crop tillage systems evaluated in this research included: 1) no-till corn, no-till soybean, no-till wheat and double-crop soybean; 2) no-till corn, no-till soybean, no-till wheat and legume cover crop; and 3) reduced tillage corn, reduced tillage soybean, reduced tillage wheat. Standard weed management programs were utilized in each system. Plots were scouted and treated for insects when needed. Grain yield was determined and adjusted to 15.5% prior to analysis. All data were subjected to ANOVA and means separated using Fisher's Protected LSD at  $p=0.05$ .

Corn grain yield in a reduced tillage system was 22 to 30% greater than no-till in 1995; 15% greater than no-till corn following a legume cover crop in 1996; and 18 to 27% greater than no-till in 2000 (Table 1). One of the primary factors affecting corn grain yield in no-till corn is cool, wet soils in the spring. Additional research is needed to help no-till corn production compete with reduced tillage systems.

Table 1. Corn grain yield of tillage systems from 1994 to 2003.

Tillage system	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
	Yield (bu/acre)									
No-till corn following double-crop soybean	131	94	156	112	49	55	119	64	91	145
No-till corn following legume cover crop	135	83	135	114	52	50	135	54	96	145
Reduced tillage corn	131	120	160	112	55	49	164	73	88	143
LSD ( $p=0.05$ )	NS	18	19	NS	NS	NS	28	NS	NS	NS