

TILLAGE, PREVIOUS TILLAGE, AND THE NITROGEN REQUIREMENT OF WHEAT FOLLOWING FULL-SEASON SOYBEAN

John H. Grove, Agronomy Department

OBJECTIVE:

Determine whether the past and present soil management system (no-tillage vs. chisel plowing) will influence the fertilizer nitrogen requirement of wheat following full-season soybean.

METHODS:

Location	Fayette County/Spindletop
Soil Type and Drainage	Maury silt loam – well drained
Previous Crop	Soybean
Tillage	No-Tillage (Lilliston 9680) Chisel Plow + Secondary Discing
Cultivar	Pioneer 25R26
Planting Date/Rate	Oct., 24, 2000; 34.1 seed/sq.ft
Harvest Date	June 27, 2001
Fertilizer:	
Nitrogen	25% of all N rates on 3/14/01 75% of all N rates on 4/10/01
Herbicides:	
Harmony	0.5 oz/ac on 4/13/01
Brominal ME4	0.75 pint/ac on 4/13/01
Fungicides: Tilt 3.2EC –	4 fl oz/ac on 5/11/01
Results:	Average of 4 replications – see Table 1

CONCLUSIONS:

In this, the fourth year of this experiment, the tillage management had a significant effect on the average yield of wheat following soybean residues. The more recent the chisel tillage, the greater the wheat yield. Wheat yields were reduced with greater duration of no-tillage. There was a large average response (+31.8 bushels/acre) to fertilizer nitrogen (N), with yields increasing up to a total fertilizer N rate of 80 lb N/acre. There was no statistically

significant interaction between tillage and fertilizer N rate. There was a trend for no-till wheat to require more N (between 80 and 120 lb N/acre) to optimize yield than did the chisel plow wheat (between 40 and 80 lb N/acre). The more modest N response of tilled wheat was likely due to greater mineralization of N from organic matter. Lodging was observed in the chisel plow wheat at the highest fertilizer N rate.

Table 1. Effect of Tillage Sequence and Fertilizer Nitrogen on Wheat Yields

Annual Tillage Sequence:					
Fertilizer	1999	NT	*CH	NT	N Rate Average:
N Rate	2000	NT	NT	CH	
	2001	CH	NT	NT	
lb N/acre	grain yield (bu/acre)				
0		57.1	50.0	49.6	52.2c
40		80.8	68.1	68.4	72.4b
80		85.1	74.3	80.8	80.1a
120		82.7	82.6	86.5	84.0a
Tillage Average:		76.4a	68.7b	71.4ab	

*CH = chisel plow; NT = no-tillage