

NO-TILL WHEAT

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No-till wheat production has been practiced in Kentucky for many years. Currently, between 25 and 30 percent of the wheat acres in Kentucky are no-till planted. Many farmers remain skeptical of the practice and feel significant yield is sacrificed with the practice.

Previous research in the 1980s by the University of Kentucky showed favorable results. With these conflicting reports and experiences, the Kentucky Small Grain Growers Association entered into a cooperative effort with the University of Kentucky to take an intensive look into no-till wheat.

RESEARCH APPROACH:

A replicated trial was established on a Huntington Silt loam soil at Princeton, Kentucky, in the fall of 1992. Two small adjacent fields were placed in a three-crop, two-year rotation of corn, wheat, and double-cropped soybeans. Both no-till and conventionally tilled (chisel-disk) wheat were planted and compared with different nitrogen, fungicide, and herbicide treatments. The corn and double-cropped soybean crops were planted no-till. Stand counts, weed control ratings, disease, and insecticide ratings, as well as yield and compaction results, were obtained for wheat. The long-term effects of the two different wheat tillage practices on the succeeding soybean and corn crops and on soil changes were also measured and are included in another report.

RESULTS:

Ten years of results (1993-02) are presented in this report.

Yields

The ten-year average yields have been high (Table 1). The conventional till planted wheat averaged about 3.7 bu/a more than the no-till wheat. The yields of no-till wheat have been significantly lower than wheat planted with tillage four of the ten years, due to compaction one year (1993) and freeze damage in 1996, 1998 and 2001. The yields of no-till wheat have been similar or exceeded that of conventionally tilled wheat the other six years.

Stands

The number of emerged plants was lower with no-till. Planting at the rate of 32 viable seeds/sq. ft., the final stands averaged 27.0 and 28.9 plants/sq. ft. for no-till and conventional till, respectively. Both stands were high enough for maximum yields. Seeding rates may need to be increased by ten percent as one moves from conventional till to no-till seeding.

Nitrogen Rates

No-till wheat may require more nitrogen than conventional tilled wheat. Nitrogen in this trial was managed for intensive production with one-third applied at Feekes stage 3 (February) and the remainder at Feekes stage 5 (mid-March). The no-till wheat sometimes appeared to be slightly nitrogen deficient before the second application, but in most years this had little effect on yield. Increasing the nitrogen rate from 90 to 120 lbs/A had only a small effect on yield for the ten years (Table 1). Although more nitrogen is recommended for no-till plantings, it may not always be justified. The years that the high rate of nitrogen resulted in higher yields were when late winter freezes resulted in

wheat damage or when excessive amounts of rain fell after the first application of spring nitrogen.

Weed Control

Good weed control was obtained in no-till wheat by three treatments: 1) Harmony Extra applied in the fall, 2) a contact herbicide at planting plus Harmony Extra in the spring, and 3) Harmony Extra in the spring. Yields were similar for all three herbicide treatments (Table 1). Wild garlic, which is sometimes associated with no-till wheat, was not a significant problem when Harmony was used. Without fall or spring herbicide treatments, weed competition was a problem (especially with henbit and some chickweed) and resulted in lower yields (no-till check).

Head Scab

Head Scab was prominent in 2002 due to favorable environmental conditions. The disease was significant for this first time since the experiment was initiated in 1992. The treatments were evaluated for the amount of head scab and there were no differences between the treatments.

EFFECT OF TILLAGE ON THE PERCENTAGE OF HEADS WITH HEAD SCAB	
Treatment	Head Scab Incidence (% of heads infected)
No-Tillage	12.7
Tilled	11.3
	N.S.*

*No statistical difference between numbers at 0.1 level

Insects

Diseases and insects were monitored over the life of this experiment. No significant insect infestations occurred. There was no significant disease on any treatments over the ten years except for Barley Yellow Dwarf during the first year. This

is consistent with no yield increases from the use of fungicides found during the first five years.

SUMMARY:

No-till wheat can produce as well as conventionally tilled wheat when properly managed. Stand establishment and weed control appear to be where the greatest changes in management are necessary.

TABLE 1. SUMMARY OF TEN-YEAR WHEAT RESULTS (1993-02)		
Treatment Comparison	Yield (Bu/Ac)	Wheat Stands (Plants/sq ft)
Tillage Effect		
Conventional	95.6	28.9
No-Till	91.9	27.0
Nitrogen Rate (lb/ac)		
No-Till (90)	89.9	
No-Till (120)	94.0	
Conventional (90)	94.1	
Conventional (120)	96.7	
Weed Control		
No-Till Fall Gramoxone + Spring Harmony Extra	94.1	
No-Till Fall Harmony Extra	93.2	
No-Till Spring Harmony Extra	92.0	
No-Till Check	80.5	

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