NO-TILLAGE WINTER WHEAT YIELD RESPONSE TO AT-HEADING APPLICATION OF DIFFERENT NITROGEN AND POTASSIUM FERTILIZER SOURCES

John H. Grove
Plant & Soil Sciences Department
University of Kentucky, Lexington, KY 40546
PH: (859) 257-3655; Email: jgrove@uky.edu

Research Objective:

Determine the potential nutritional and yield responses of wheat to late application (heading/flowering) of nitrogen, potassium and sulfur fertilizer sources.

Methods:

Location: Fayette County/Spindletop
Soil Type and Drainage:
Loradale silt loam – well drained
Previous Crop: Soybean
Tillage: No-Tillage (Lilliston 9680)
Cultivars: KY 93C-1238-17-1
Planting Date: Oct. 17, 2007
Seeding Rate: 38 seed/sq. ft.
Harvest Date: July 1, 2008
Fertilizer:
Basal Nitrogen – 25 lb N/acre as 34-0-0 on 4/2/08 and 50 or 75 lb N/acre as 34-0-0 on 4/15/08 (Feekes 6)
Late Nitrogen and Potassium – 0 or 40 lb N/acre as ammonium nitrate, urea or ammonium sulfate; 0 or 72 lb K_2O/acre as potassium chloride or potassium sulfate on 5/12/08
Herbicides:
Gramoxone – 1 quart/ac on 10/22/07
Harmony – 0.5 oz/ac on 4/16/08
Brominal ME4 – 0.75 pint/ac on 4/16/08
Fungicides:
Folicur – 8 fl oz/ac on 5/17/08

Results:

Avg. of 4 replications - see Table 1, on next page.

Discussion/Conclusions:

The major objective of this study was to determine the potential nutritional and yield responses of wheat to late application (heading/flowering) of nitrogen (N), potassium (K) and sulfur (S) fertilizer sources. Leaf and grain composition measurements are incomplete, so only yields will be reported upon here. Chlorophyll meter readings taken 10 days after the heading/flowering were significantly and positively influenced by the rate of early N, application of K or N at heading/flowering, regardless of K or N source. Wheat yields were excellent, especially as the late spring was both cool and wet. The cool, wet conditions likely contributed to a strong yield response (+10 bushels/acre) to the greater early N rate (Table 1). There was a significant late N source effect, where all N sources resulted in greater yield (average of +7 bushels/acre) than the non-N-fertilized control. The late K source treatments did not significantly influence wheat yield. Nitrogen or potassium sources of S were not especially beneficial over other N or K sources. There were no significant

interactions among early N rate, late N sources and late K sources on grain yield. This means that the late N addition was beneficial regardless of the early N rate. This was not expected and may, again, be due to the cool and wet late spring weather. Neither K or S increased yield, and, given the excellent yield levels observed, we can definitively conclude that these nutrients were not needed during grainfilling of this high-yielding wheat crop.

Table 1. Effects of Early N Rate and At-Heading Applications of Different Nitrogen and Potassium Sources

Early N Rate Lb N/acre	At-Heading Nitrogen Sources	At-Heading Potassium Sources	Grain Yield Bu/acre
75			94.2
100			104.5 a
	None		93.9 b
	Ammonium nitrate		99.7 a
	Urea		101.2 a
	Ammonium sulfate		102.4 a
		None	100.5 a
		Potassium chloride	99.4 a
		Potassium sulfate	97.8 a