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

John H. Grove, Plant and Soil Sciences Department
Department of Plant and Soil Sciences
University of Kentucky, Lexington, KY 40546
PH: (859) 257-5852: 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: Southern States 8302 and Southern States 560
Planting Date: Oct. 25, 2006
Seeding Rate: 42 (SS8302) and 49 (SS560) seed/sq. ft
Harvest Date: June 27, 2007
Fertilizer:

Basal Nitrogen – 25 lb N/acre as 34-0-0 on 3/21/07 (Feekes 3) and 50 lb N/acre as 34-0-0 on 4/09/07 (Feekes 5)

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

Herbicides:

Gramoxone – 1 quart/ac on 10/30/06
Harmony – 0.5 oz/ac on 4/19/07
Brominal ME4 – 0.75 pint/ac on 4/19/07

Fungicides:

Folicur at 8 fl oz/ac on 5/31/06

Results: Average 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 two weeks later (not shown) were significantly influenced by wheat cultivar and positively influenced by late application of both ammonium nitrate and ammonium sulfate. Wheat yields were below expectation, as there was a serious spring freeze during stem elongation and a severe drought during grain filling. There was a strong impact of cultivar choice on yield, with the 8302 out yielding the 560. There was a significant late N source effect, where all N sources tended to result in greater yield than the non-N-fertilized control, and especially ammonium nitrate. The late K source treatments did not significantly influence wheat yield. Nitrogen or potassium sources of S were not generally beneficial. There were no significant interactions among cultivars, late N sources and late K sources on grain yield. Though neither K nor S increased yield, we cannot definitively conclude whether there was a benefit to the late nutrition treatments because yields were generally suppressed by the spring freeze and the drought during grainfilling. The study will be continued another season.

Table 1. Effects of Cultivar and At-Heading Applications of Different Nitrogen and Potassium Sources			
Cultivar	At-Heading Nitrogen Sources	At-Head Potassium Sources	Grain Yield (bu/acre)
SS560			68.8b
SS8302			76.7a
	None		70.3b
	Ammonium Nitrate		75.4a
	Urea		72.0ab
	Ammonium Sulfate		73.5ab
		None	72.3a
		Potassium Chloride	73.9a
		Potassium Sulfate	72.1a