# YIELD OF NO-TILLAGE WINTER WHEAT AFTER SURFACE AERATION/HARROW TILLAGE OF THE PREVIOUS CORN CROP'S RESIDUES – LORADALE SILT LOAM

John H. Grove
Department of Plant & Soil Sciences
University of Kentucky, Lexington, KY 40546
PH: (859) 257-5852; Email: jgrove@uky.edu

**Research Objective:**

Determine the impact of surface aeration/harrow tillage on the yield response of otherwise no-tillage wheat to fertilizer nitrogen.

**Methods:**

Location: Fayette County/Spindletop
Soil Type and Drainage: Loradale silt loam – well drained
Previous Crop: Corn
Tillage: No-Tillage (Lilliston 9680)
Aeration Tillage/No-Tillage
Cultivar: Southern States 8302
Planting Date & Rate: Oct. 17, 2005; 41 seed/sq. ft.
Harvest Date: June 29, 2006
Fertilizer: Nitrogen – 0, 35, 75, 105 lb N/ac as 34-0-0 on 3/29/06
Herbicides: Harmony – 0.5 oz/ac on 4/05/06
Brominal ME4 – 0.75 pint/ac on 4/05/06
Fungicides: Folicur – 8 fl oz/ac on 5/30/06
Results: Average of 4 replications (Table 1).

**Table 1. No-Till Wheat Yield Response to Surface Aeration and Nitrogen**

| | Aeration/Phoenix Tillage | | | |
|---|---|---|---|---|
| Fertilizer aeration? N Rate Phoenix? | No No | Yes No | Yes Yes | N Rate Avg. |
| Lb N/acre | grain yield (bu/ac) | | | |
| 0 | 69.6 | 73.0 | 66.7 | 69.8 d |
| 35 | 86.2 | 86.8 | 92.7 | 88.6 c |
| 70 | 94.7 | 94.9 | 100.1 | 96.6 b |
| 105 | 110.8 | 101.2 | 100.8 | 104.3 a |
| Aeration/Phoenix Avg. | 90.3 a | 89.0 a | 90.1 a | |

**Discussion/Conclusions:**

No-till wheat yields were excellent, likely due to the lower level of residues from the previous 140 bu/acre corn crop. These residues were redistributed with a hay tedder prior to the aeration treatments. A Genesis Tillage II unit equipped with helical tines and a Phoenix harrow was used to make the aeration treatments. The helical aerator was not angled, giving a very passive pass over the corn residues, but clearly pushed a portion of the residue into the soil. There was one treatment with the Phoenix harrow engaged and another with the harrow disengaged. There was a large average response (+35 bushels/acre) to fertilizer nitrogen (N), with yields increasing significantly, up to a total fertilizer N rate of 105 lb N/acre. There was no interaction between the aeration treatments and fertilizer N rate. Aeration plus the Phoenix tended to result in greater yields at the middle two N rates, changing the shape of the yield response to N. The simple effect of aeration treatment was not statistically significant (at the 90% level of confidence), though there was a trend for reduced yield with aeration. We continue to examine whether alternate methods of residue management will improve no-till wheat establishment and yield.