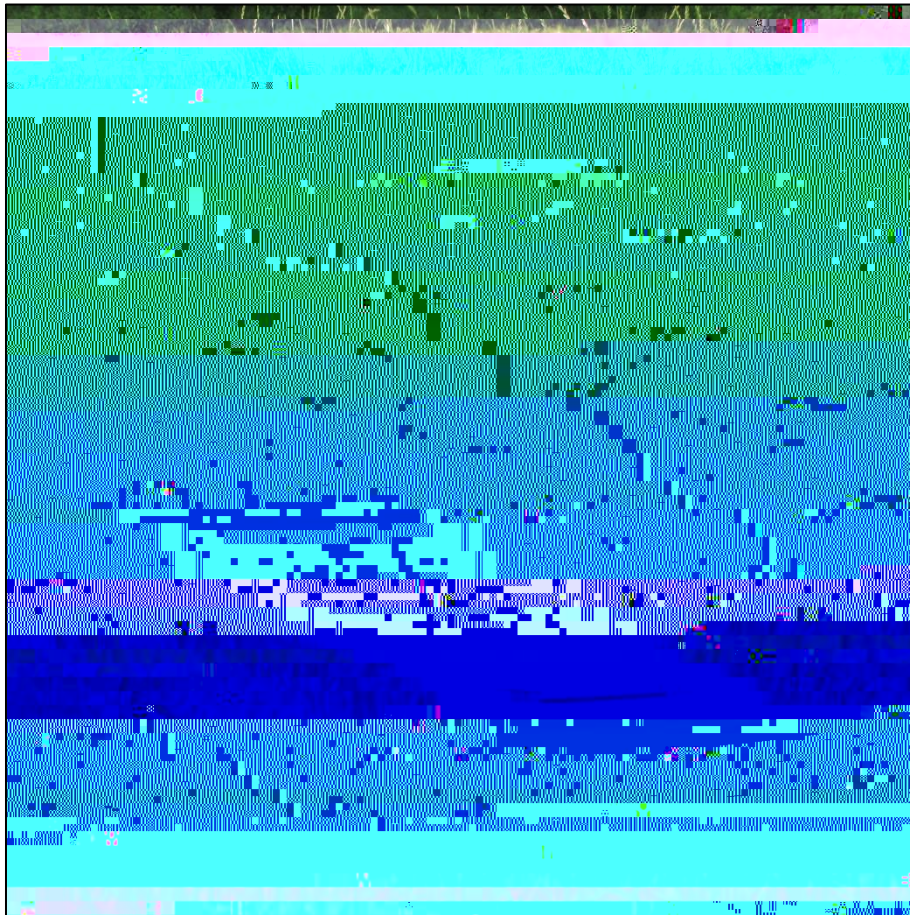


# 2013

## The Effects of Topdressing Nitrogen on Hard Red Winter Wheat



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**2013 THE EFFECTS OF TOPDRESSING NITROGEN ON HARD RED WINTER WHEAT**

Plots were sampled for plant nitrogen concentration prior to N applications and at key developmental stages until the wheat reached physiological maturity. Plant samples were taken to determine total nitrogen concentration by combustion analysis. The tissue samples consisted of 8 rows of wheat top growth, and 6 inches in length selected randomly within each plot. Samples were put into clean paper bags, kept cool, and transported directly to the UVM Horticultural Research Farm where samples were placed in a dryer. Once dried, plant samples were weighed and ground in a Wiley Laboratory Mill, Standard Model No.3. Samples were then sent to Cumberland Valley Analytical Services in Hagerstown, MD for nitrogen analysis.

On 19-Apr, the numbers of tillers were counted in eight 12 inch segments randomly selected within each plot in order to determine tiller density (tillers per square foot).

On 9-Jul, after the wheat had reached physiological maturity and was in the process of drying down, the number of spikes were counted from a plant biomass sampling of 8 randomly selected six inch segments per plot.

Plots were harvested with an Almaco SPC50 plot combine on 19-Jul 2013; the harvest area was . At the time of harvest, grain moisture, test weight, and plot yields were measured.



**Image 1. Spreading manure to the fall applied manure plots, Alburgh, VT.**

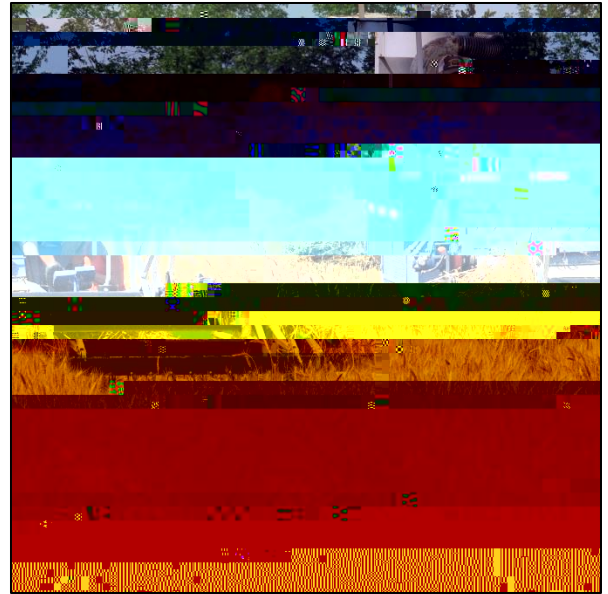
Following harvest, seed was cleaned with a small Clipper cleaner (A.T. Ferrell, Bluffton, IN). An approximate one pound subsample was collected to determine quality. Quality measurements included standard testing parameters used by commercial mills. Test weight was measured by the weighing of a known volume of grain. Generally the heavier the wheat is per bushel, the higher baking quality. The acceptable test weight for bread wheat is 56-60 lbs per bushel. Once test weight was determined, the samples were then ground into flour using the Perten LM3100 Laboratory Mill. At this time, flour was evaluated for its protein content, falling number, and mycotoxin levels. Grains were analyzed for protein content using the Perten Inframatic 8600 Flour Analyzer. Grain protein affects gluten strength and loaf volume. Most commercial mills target 12-15% protein. The determination of falling number (AACC Method 56-81B, AACC Intl., 2000) was measured on the Perten FN 1500 Falling



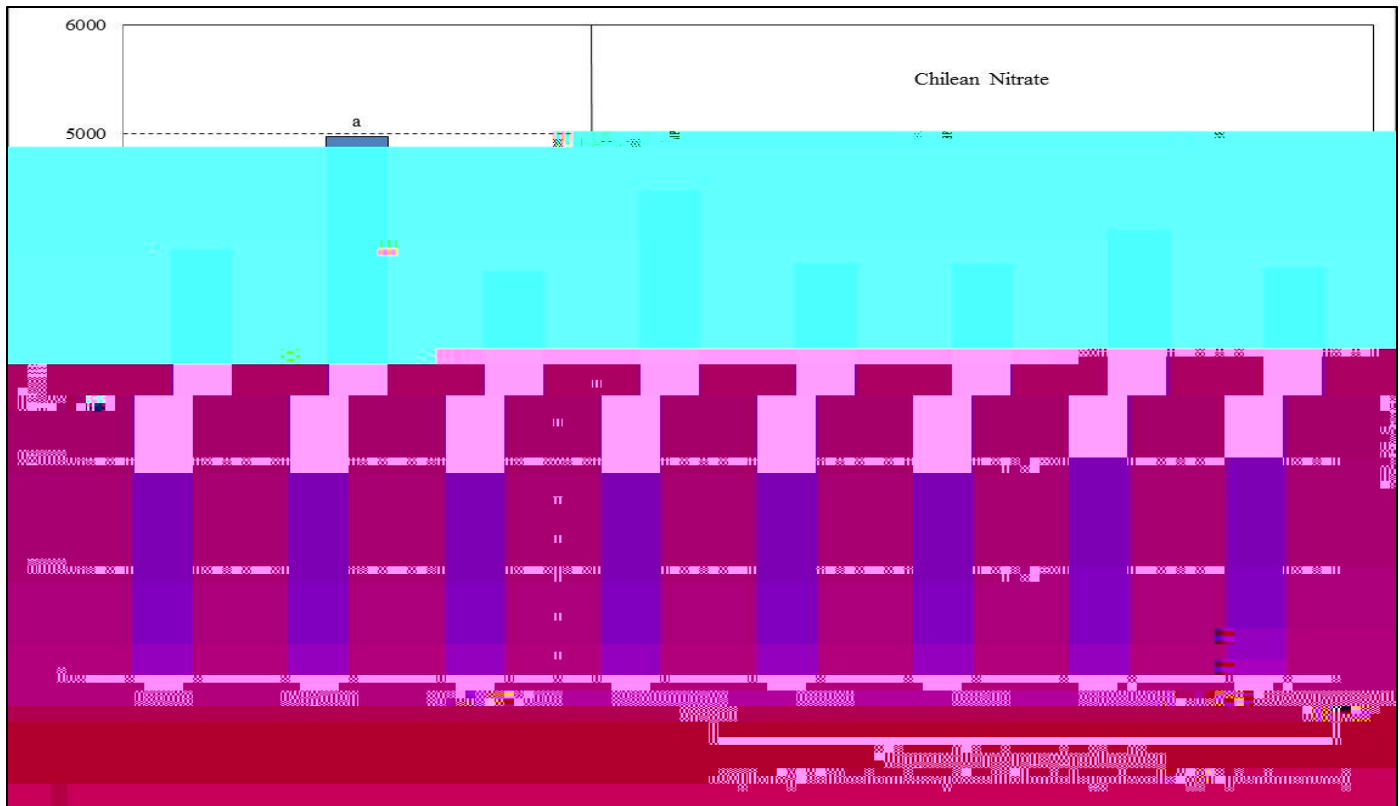
## Wheat Yield and Quality:

The treatments differed significantly in yield (Table 4, Figure 1). The highest yielding treatment was manure applied at a rate of 70lbs ac<sup>-1</sup> of plant available N in the fall of 2012 with (4973lbs ac<sup>-1</sup>) (Image 2). Interestingly, the lowest yielding treatment was manure applied at a rate of 140 lbs ac<sup>-1</sup> of plant available N in the fall of 2012 (3741 lbs ac<sup>-1</sup>). There were no significant differences in grain moisture and test weight.

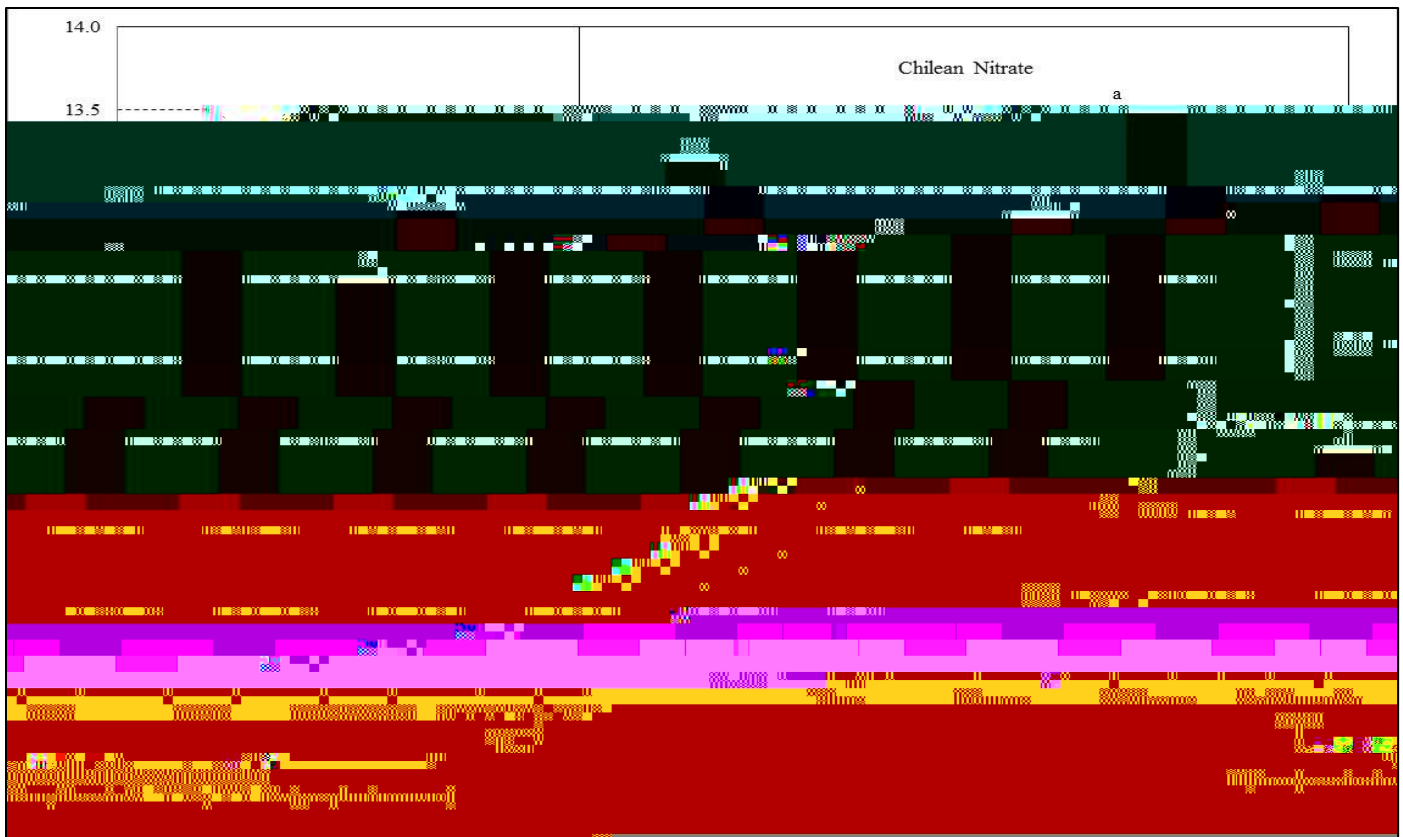
The treatments differed in protein concentration (Table 4, Figure 2). Chilean Nitrate (35 lbs ac<sup>-1</sup> PAN) applied at both GS25& GS30 stages had the highest protein content (13.5%). Other treatments with high protein content include; the 2x manure (140 lbs ac<sup>-1</sup> PAN) and 35 lbs ac<sup>-1</sup> Chilean Nitrate applied at GS30 treatment (13.2%), 70lbs ac<sup>-1</sup> PAN of Chilean Nitrate applied at GS25 (13.0%), and the fall applied manure (70 lbs ac<sup>-1</sup> PAN) (12.9%). All of the treatments had higher protein levels than the unamended control (11.4%). The pr



**Image 2. Harvesting the winter wheat topdress plots, Alburgh, VT.**



**Figure 1. Yield impact of topdressing organic N sources at critical wheat developmental stages, Alburgh, VT.**  
 Varieties with the same letter did not differ significantly in yield.



**Figure 2. The impact of topdressing organic N sources at critical wheat developmental stages on crude protein concentrations, Alburgh, VT.**  
 Varieties with the same letter did not differ significantly in protein concentration.

