

# Foliar Fertilizer Application for Hard Red Spring Wheat

Nearest Town: Fergus Falls—Otter Tail County

Soil Type: Formdale - Buse Complex

Experimental Design: Factorial design within a randomized complete block design with 4 replications

Factor 1: Wheat Variety (Faller, Glenn, Mayville, RB07, Select, and Vantage)

Factor 2: Foliar fertilizer source

1) No foliar fertilizer

2) 28% Urea ammonium nitrate solution (28-0-0)

3) Copper-field™ (21-0-0-0.3 Cu-0.15 Fe)

Foliar rates applied a total of 15 lbs of N per acre

5 GPA 28%; 7.5 GPA Copper-field

N-tense™ and Trophy Gold™ were added each at a rate of 0.25% v/v

All treatments applied with water at a total spray volume of 12 GPA

Soil Test Data: Bray P1-P: 16 ppm

Ammonium acetate K: 204 ppm

pH: 6.7

Soil organic matter: 5.0%

DTPA: Cu 1.9 ppm Fe 38.8 ppm

**Purpose of Study:** To compare sources of nitrogen for post-anthesis application to wheat for increasing protein concentration among six hard red spring wheat varieties.

**Results:**

Treatments compared two sources of foliar nitrogen. The 28% UAN treatment contained roughly 1/2 of the total nitrogen in the urea for. The copper-field treatment contained a higher percentage, 3/4, of the total nitrogen in the urea form. The copper-field also contained iron and copper in the chelated for.

Treatment main effects are summarized in Table 1. Yield varied among varieties with Faller producing the greatest grain yield and Glenn the least. Grain protein concentration response was the inverse of grain yield as expected.

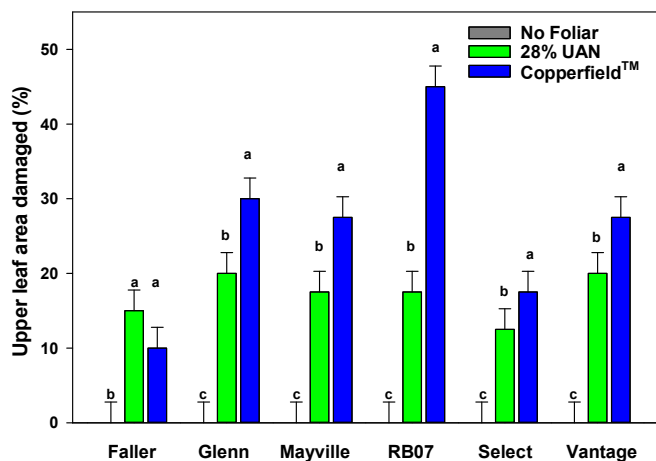
Foliar application of the two fertilizer sources affected grain yield and grain protein concentration. Grain yield did not differ between the 28% and the non-fertilizer control. The copper-field treatment generally reduced yield. Grain protein concentration was increased by 0.2 -0.3% on average for both foliar treatments. Increased protein concentration for the copper-field treatment may have been due to decreased grain yield.

**Table 1.** Summary of main treatment effects for hard red spring wheat grain yield and protein concentration and protein yield.

Main Effect	Grain		Protein Yield
	Yield	Protein	
<i>Variety</i>	-bu/acre-	---%---	--lb/acre--
Faller	89a	12.1f	638ab
Glenn	59d	14.2c	506d
Mayville	61d	14.9a	548c
RB07	72b	14.0d	607b
Select	65c	13.4e	524cd
Vantage	75b	14.7b	664a
<i>Foliar</i>			
None	72a	13.7b	591a
28%	73a	14.0a	612a
Copper-field	65b	13.9a	540b
Statistics ( <i>P</i> > <i>F</i> )			
Variety	<0.001	<0.001	<0.001
Foliar	<0.001	<0.01	<0.001
Var. x Foliar	0.03	0.01	0.02

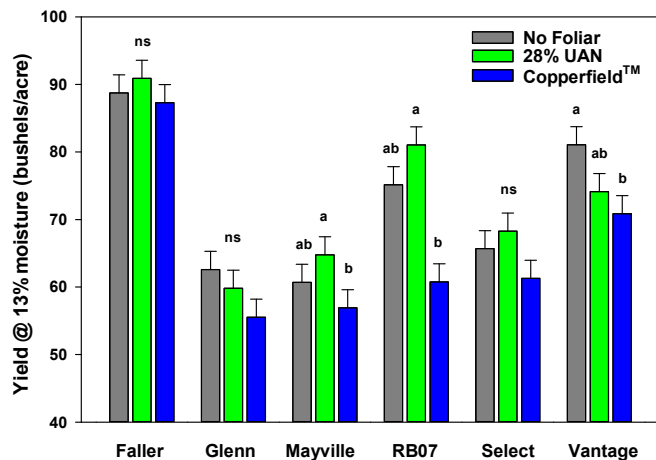
# Foliar Fertilizer Application for Hard Red Spring Wheat (continued)

Fergus Falls, 2014 HRSW Foliar Damage



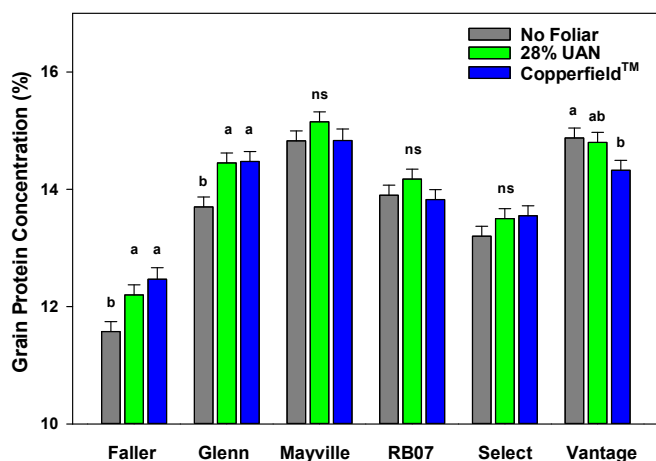
Foliar damage varied by foliar fertilizer source and by variety. Foliar damage was generally greater for plots treated with Copper-field. The only variety that did not exhibit greater damage with Copper-field was Faller while RB07 exhibited the greatest total damage. Increased damage was likely due to the higher percentage of total N as urea in Copper-field. Lower rates of this produce are typically suggested. In this study we wanted to compare equal amounts of total applied N. The amount of N applied post-anthesis, 15 lbs, is typically suggested for increasing protein concentration. Damage potential of the fertilizer source should be a major consideration when choosing a product to apply.

Fergus Falls, 2014 HRSW Grain Yield Data



Grain yield was not increased or decreased similarly across all varieties. Although a lowering trend in grain yield existed, statistically the yield of Faller, Glenn, and Select did not differ among treatment. No treatment differed relative to the control for Mayville. Vantage and RB07 both had lower yield for the Copper-field treatment. The large yield reduction for RB07 was consistent with the greater leaf damage from the foliar application. A lower application rate may have resulted in less damage and a smaller or no reduction in grain yield.

Fergus Falls, 2014 HRSW Grain Protein Data



Grain protein concentration was increased by foliar fertilizer but only for the varieties Faller and Glenn. Grain protein concentration was slightly decreased by foliar fertilizer use for the variety Vantage. There was no effect on grain protein concentration for the varieties Mayville, RB07, and Select. There was no indication why specific varieties responded for both grain yield and grain protein concentration.

For Additional Information:  
 Contact Daniel Kaiser ([dekaiser@umn.edu](mailto:dekaiser@umn.edu))