

# SOIL/WATER RESEARCH

## *South Dakota State University*

### 2008 Progress Report

Agricultural Experiment Station  
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#### **Influence of Chloride, Copper and Fungicide application timing on spring wheat flag leaf rating, and grain protein and yield near Brookings SD in 2008. (41108)**

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#### **Introduction**

Hard Red Spring Wheat has been shown to respond to chloride (Cl)

application when Cl soil test in the top 0-24 inch layer is below 60 lbs/a. The spring wheat response to Cl is primarily due to foliar disease suppression. Potash (KCl), the dry fertilizer source for Cl, has sharply increased in price. Could other sources of Cl and or fungicide (Tilt) application work as effectively as Cl? Therefore, a research project was initiated to measure the effects of Cl from CaCl and fungicide application timing when compared to the traditional use of KCl (potash).

#### **Materials and Methods**

##### **Item:**

##### **Description:**

Location	Crop Improvement farm, Aurora SD
Hard Red Spring Wheat Variety	Traverse
Planting date / seeding rate	April 20, 1.4 million PLS
Row Spacing	7 inches
Tillage Method	no-till
Chloride rates (lbs/a)	60 surface broadcast
Chloride sources	KCl (potash), CaCl (dry)
Chloride application timing	KCl and CaCl (dry after planting)
Copper source and application timing	5 lbs/a as CuSO <sub>4</sub> surface broadcast after planting.
Fungicide application timing and rate	4-5 leaf and heading, Bumper (Tilt) 5 oz/a
Dependent variables	grain protein and yield, flag leaf disease rating
Soil Samples	0-6 and 6-24 inch for Cl and other nutrients
Harvest date	August 8
Statistics	RBCD, 4 replications

## Results and Discussion

Soil test chloride (0-24 inch depth) was 34 lbs/a, which would require a recommended Cl application rate of 26 lbs/a in South Dakota (currently \$25/a). Soil test potassium (K) was only 114 ppm (Medium). Since soil test K could limit yield, chloride was applied as CaCl, which provides Cl without the influence of K. A grain yield response to K was not measured since there was no significant difference between the Cl treatments (2 and 3) with and without K. Significant treatment responses were measure from all three dependant variables (Table 1). Flag leaf rating was significantly improved with fungicide

applied at heading (Table 1. Treatments 6,7 and 8). However, grain yields were not directly related to flag leaf rating. The highest grain yield treatments either had chloride or copper applications and a heading fungicide treatment. Additional research is needed to investigate spring wheat responses to these treatment combinations.

## Acknowledgements

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Table 1. Influence of Chloride, Copper and Fungicide application timing on spring wheat flag leaf rating, and grain protein and yield near Brookings SD in 2008. (41108)

Treatment	Cl Source <sup>A</sup>	Copper <sup>B</sup>	Fungicide Timing <sup>C</sup>	Flag Leaf Rating <sup>D</sup>	Grain <sup>E</sup>	
					Protein %	Yield bu/a
1	none	none	none	8.0 a	14.6 ab	40.8 d
2	KCl	none	none	7.5 a	14.0 c	45.5 ab
3	CaCl	none	none	7.8 a	14.0 c	45.2 abc
4	none	yes	none	8.0 a	14.3 bc	40.3 d
5	none	none	5 leaf	7.8 a	14.5 b	41.1 cd
6	none	none	heading	2.3 c	15.0 a	42.3 bcd
7	none	yes	heading	3.8 b	14.3 bc	46.1 ab
8	KCl	none	heading	2.8 bc	14.4 bc	47.3 a
Pr>F				0.001	0.002	0.013
LSD <sub>(.05)</sub>				1.4	0.4	4.4

<sup>A</sup> 60 lbs Cl/a surface broadcast applied after planting.

<sup>B</sup> 5 lbs Cu/a as CuSO<sub>4</sub> surface broadcast applied after planting.

<sup>C</sup> 5 oz/a Bumper (generic Tilt)

<sup>D</sup> Rating of diseased surface of leaf at heading (0-best to 10 worst)

<sup>E</sup> adjusted to 13% moisture.

0-24 inch soil chloride = 34 lbs/a

No leaf rust was found on the flag leaf at time of rating.