

SOIL/WATER RESEARCH
South Dakota State University
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 Agricultural Experiment Station
 Plant Science Department
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Influence of soil chloride on tri-foliate leaf chloride concentration and grain yield near Brookings SD in 2008. (42608)

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Introduction

Soybean rust is a new disease for US soybean producers which at this date has occurred in states

south of SD. Some evidence has shown that chloride could reduce the incidence of soybean rust. Researchers in southern and eastern United States have seen that some soybean varieties have a negative response to chloride application. Little work in the Northern Plains has been conducted to investigate soybean varieties and chloride interactions. Therefore, a research project was initiated to measure the influence of soil chloride on soybean variety tissue chloride and grain yield.

Materials and Methods

Item:	Description:
Location	Larsen farm, Brookings SD
Soybean Varieties	several, names with-held
planting date / seeding rate	May 28, 180,000 PLS / a
Tillage method	No-till
Row spacing	7 inches
Cl rate (lbs Cl/a)	120 lbs Cl/a (267 lbs/a potash)
Soil samples	0-6 and 6-24 inch
Harvest date	Sept. 30
Dependant variables	Tri-foliate leaf at R2 for Cl analysis and grain yield
Statistics	RCBD, 4 replications

Results and Discussion

Soil results showed Olsen P at 65 ppm (Very High), extractable K at 678 ppm (very high), and Cl at 12 lbs/a which is low for soils in eastern South Dakota. Because potash has K in it, we are concerned that plot will be affected by a K application. At this site since K is very high (678 ppm) therefore, we are not concerned that any applied K will have an effect on the plots. Grain yields were not significantly influenced by Cl application (Table 1). We were most interested in individual variety responses to Cl, therefore the statistical analysis was performed at each variety level. Only one variety

showed a significantly positive response to Cl application, which is contradictory to what our hypothesis. Cl application did not significantly influence tri-foliate Cl concentration (Table 2). However, 4 varieties showed a significantly higher chloride levels in the Cl treated plots which could indicate Cl accumulation.

Acknowledgments

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Table 1. Influence of chloride application on grain yield of 10 soybean varieties at Brookings SD in 2008. (42608)

Variety Number ^A	Maturity Group	Chloride ^B		LSD _(.10)	Pr>F
		no	yes		
----- bu/a -----					
1	1.4	33.7	35.9 a	NS	0.55
2	1.1	33.4	34.4 ab	NS	0.62
3	0.9	33.8	32.2 abc	NS	0.32
4	0.9	34.2	33.6 abc	NS	0.84
5	1.0	31.3	31.9 abc	NS	0.82
6	1.4	32.6	30.8 bc	NS	0.43
7	1.0	33.5	33.4 abc	NS	0.99
8	1.0	32.2	35.8 a	NS	0.14
9	1.1	32.4	34.0 abc	0.5	0.01
10	1.1	28.4	30.1 c	NS	0.59
LSD _(.10)		NS	3.3		
Pr>F		0.68	0.08		

^A variety names kept anonymous.

^B Chloride (120 lbs/a) applied as surface broadcast potash (0-0-60-45Cl)

NS = non significant difference

means with similar lower case letter are not significantly different within a comparison column

Table 2. Influence of chloride application on tri-foliate leaf chloride concentration of 10 soybean varieties at Brookings SD in 2008. (42608)

Variety Number ^A	Maturity Group	Chloride ^B		LSD _(.10)	Pr>F
		no	yes		
----- % -----					
1	1.4	0.31	0.33 bc	NS	0.60
2	1.1	0.28	0.33 bc	NS	0.13
3	0.9	0.19	0.21 e	NS	0.59
4	0.9	0.26	0.30 cd	NS	0.39
5	1.0	0.30	0.26 de	NS	0.29
6	1.4	0.29	0.38 ab	0.05	0.02
7	1.0	0.25	0.41 a	0.07	0.01
8	1.0	0.24	0.30 cd	NS	0.17
9	1.1	0.25	0.39 ab	0.05	0.01
10	1.1	0.27	0.41 a	0.09	0.03
LSD _(.10)		NS	0.07		
Pr>F		0.12	0.01		

^A variety names kept anonymous.

^B Chloride (120 lbs/a) applied as surface broadcast potash (0-0-60-45Cl)

NS = non significant difference

means with similar lower case letter are not significantly different within a comparison column