GILES, J.F.[1]*, A.W. CATTANACH[2], and N.R. CATTANACH[1], [1]Dept.of Soil Science, North Dakota State Univ., Fargo, ND 58105, and [2]American Crystal Sugar Co., Moorhead, MN 56560. **Effect of sodium chloride application on sugarbeet production in the Red River Valley.**

ABSTRACT

Sodium chloride application for sugarbeet is a common recommendation on the high potassium testing soils in Europe. Objective of this study was to evaluate the possibility of a similar increased sugar production on Fargo silty clay (Fine, smectic, frigid, Typic Epiaquert) near Fargo, ND, Wheatville silt loam (Coarse-silty over clayey, frigid Aeric Calciaquoll) near Crookston, MN and Bearden silt loam (Fine-silty, mixed, frigid Aeric Calciaquoll) near Glyndon, MN in the Red River Valley of the North.

Fall and spring application rates of 100, 200 and 400 pounds of sodium chloride and 200 pounds of slow release (sulfur coated) sodium chloride were applied to three soil types prior to the 1997 and 1998 growing seasons. Beta 3712 was seeded at each location during the last week of April or the first week of May with either a John Deere 71 Flex or MaxEmerge 2 planter. Due to a drying seedbed following planting, the Fargo location was replanted on May 23, 1998. Stand counts were taken during the first four weeks following first seedling emergence. Post emergence herbicides, cultivation and hand labor were used as needed for weed control at all locations.

Root maggot infestation during the month of July at the Glyndon site resulted in the abandonment of the site prior to harvest in 1997. Unusual rainfall occurring during May and June in 1998, resulted in severe root rot at the Fargo and Glyndon locations and reduced the harvested replications at Fargo to five. Sugarbeets were harvested during the last week of September.

Sugarbeet plant emergence was not significantly affected by sodium chloride applications on the Bearden and Fargo soils either year, but was significantly reduced by the spring applications on the Wheatville silt loam.

The potassium soil test level of the check treatment for the Wheatville silt loam was in the medium range and high for the Bearden silt loam and Fargo silty clay, while the sodium level was greater for the Fargo silty clay and Wheatville silt loam than the Bearden silt loam.

The sodium chloride treatments had only a slight non-significant increasing effect on the yield of recoverable sugar on the Wheatville silt loam either year. This effect decreased as the amount of sodium chloride increased, except for the 400 pounds spring application in 1998. The sulfur-coated material had a greater effect in 1997 than in 1998. The decreasing effect with increasing sodium chloride amount was greater on the Fargo silty clay both years. The spring slow release application in 1997 and the fall slow release in 1998 had the greatest positive effect on recoverable sugar production. These effects were also statistically non-significant. The greatest positive responses of sodium chloride applications occurred on the Bearden silt loam with high potassium soil test levels and moderate soil sodium levels. The spring application of sulfur-coated material had the greatest negative effect at this location. This may have resulted from the large amount of precipitation during May and June leaching the other fall and spring applications. In general, the sulfur-coated sodium chloride had a greater effect than regular granules.

Residual sodium chloride had no effect on the production of subsequent crops (spring wheat and dry beans) in the rotation on any of the three soil types.

With the possibility of serious disturbance of the structure of clay soil by the displacement of calcium by sodium in the clay complexes and the lack of significant increase in the production of recoverable sugar, addition of sodium chloride is not being recommended in the Red River Valley.