

BREDEHOEFT, MARK W. ^{1*} and JOHN A. LAMB², ¹Southern Minnesota Beet Sugar Cooperative, P.O. Box 500, 83550 County Road 21, Renville, MN 56384 and ²University of Minnesota, 439 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108. **Whole rotation effects on soil nitrate-N for sugar beet production.**

ABSTRACT

Managing nitrogen to achieve low soil nitrate-N amounts before sugar beet production is important to grow high quality sugar beet. A majority of Southern Minnesota Beet Sugar Cooperative producers grow corn before sugar beet production in the rotation. The objective in this study was to determine the effect of nitrogen application rate for corn production on the soil nitrate-N before sugar beet production. The study involved five sites with a soybean/corn/sugar beet rotation. Because of weather conditions, only three of the sites were completed through the sugar beet production year. A split plot experimental design with five replications was utilized. The whole plots were N applications before corn production of 0, 134, and 224 kg N/ha. The 134 kg N/ha is the recommended application rate while the 224 kg N/ha is considered very aggressive. Before sugar beet was grown, the whole plots were divided into N application rates of 0, 45, 90, 134, 179, and 224 kg N/ha. Soil nitrate-N was measured to a depth of 120 cm after each crop in the rotation. Corn yields and sugar beet root yields and quality were measured. At four of the five sites, the use of 224 kg N/ha for corn production resulted in significant increases in residual soil nitrate-N when compared to the corn grown with 134 kg N/ha. These effects were reflected in the sugar beet yield and quality measured at the three sites where sugar beet was harvested.