LAMB, JOHN A.[1], MARK W. BREDEHOEFT[2], and STEVE R. ROEHL[2], [1]Univ. of Minnesota, St. Paul, MN 55108, and [2]Southern Minnesota Beet Sugar Cooperative, Renville, MN **Management zones for nitrogen management.**

Optimum use of nitrogen fertilizer is needed to produce the most sucrose. Variable nitrogen application could be a key component. To use this technology in Southern Minnesota, a soil nitrate-N map is needed for the field. Several methods could be used to develop this map. A study was conducted in Southern Minnesota with the objectives to determine if management zones for variable rate N fertilizer application will result in better root yield and quality than the use of a single N fertilizer rate for the whole field and to determine what information is necessary to best delineate management zones in a southern Minnesota landscape. A three year study was initiated in 2001 in a Southern Minnesota Beet Sugar Cooperative grower's field near Danube, Minnesota. The 32 acre field was in a soybean-corn-sugar beet rotation. The treatments for the study were the following four nitrogen application strategies: 1. no N fertilizer applied to determine the need for N fertilization, 2. N applied based on a nitrate-N soil test for the whole field, 3. N applied at a rate based on a nitrate-N soil test from a management zones determined from the soil survey, and 4. like 3, N would be applied based on soil tests from the management zones. The basic difference between treatments three and four is the knowledge used to create the management zones. The use of nitrogen fertilizer did not increase root yield and recoverable white sucrose per acre but did reduce the sucrose concentration. There were differences in the root yield and recoverable white sucrose between the two zone treatments. The use of an order 2 soil survey for creating zones did not yield as well as the use of zones based on crop and soil parameters. Neither zone treatment affected the measured parameters different than the conventional treatment based on the average soil nitrate-N for the field.