

GILES, JOSEPH F.*, ALLAN W. CATTANACH and NORMAN R. CATTANACH, Dept. of Soil Science, North Dakota State Univ., Fargo, ND 58105. - Effect of post emergence tillage on yield of sugarbeet.

ABSTRACT

A practice that may allow farmers to reduce row crop cultivations is the use of herbicides early in the growing season. The objective of this research was to determine the effects of different number of cultivations on yield and quality of sugarbeet.

Experiments with various cultivation times were established on silt loam soil near Amenia, ND in 1988, 1989 and 1992, on silt loam soil near Casselton, ND in 1990 and 1991, and on a silty clay soil near Fargo, ND each year from 1988 to 1992. A total of seven cultivations, in combinations of every week or every other week, beginning at the two leaf stage were analyzed during 1988 to 1990. In the 1991 and 1992 experiments, a total of five cultivations in nineteen possible combinations which included five of the previous seven treatments, were analyzed. All plots were kept weed free with preplant and post emergence herbicides and hand labor. Increasing the number of cultivations had no significant effect on sugarbeet stand, root yield, sucrose content, and recoverable sucrose yield when averaged over the five-year period. However, the main effects, location and year, and the location x year x treatment interaction were statistically significant. Use of stability analysis, which is the linear regression of treatment mean on the location x year environmental mean, showed zero or one cultivation demonstrated superior response in high yielding environments versus lower yielding environments when compared to a greater number of cultivations. The results indicate that sucrose production under weed free conditions can be maintained without the use of a row crop cultivator.

ABSTRACT

Sediment, water, nitrogen, and phosphorus losses and sugar beet yield, quality, and recoverable sugar were measured for the W2-FM9 variety grown on a Noyes silt loam soil at 3 percent slope with and without wheat straw mulch mechanically applied to irrigation furrows. Water inflow, water outflow, and sediment loss were measured over time on each of 24 plots for all thirteen irrigation. Infiltration was calculated after each irrigation and irrigation durations were managed so that total water infiltration would be the same in strawed and non-strawed sugar beets. Runoff water and sediment from each plot were independently analyzed for nitrate, ammonium, total N, phosphate and total P during one irrigation. Mechanically applied straw mulch increased the beet yield by 2.5 t/ha and recoverable sugar by 888 lb/ha. Furrow mulching decreased the loss of sediment from 78.8 to 8.7 tons per acre, decreased estimated total P loss from 133 to 12 lb/ha, and decreased total estimated N loss from 324 to 75 lb/ha. Most N losses were in the form of organic N in the sediment and most P losses were in the form of insoluble P in the sediment.