

GILES, J.F.\* , A.W. CATTANACH and N.R. CATTANACH, Dept. of Soil Science, North Dakota State Univ., Fargo, ND 58105. Effect of deep tillage (subsoiling) on sugarbeet yield and quality.

In recent years the amount of subsoiling by farmers has increased in eastern North Dakota and western Minnesota. The crop response reported has been varied and in many cases not quantified. Considering the disadvantages of deep tillage: the use of high power and time requirements,; the possibility of short lived effects, particularly on highly compactive soil; and in some instances, the undesirable mixing of soil horizons,; the objective of this study was to determine the potential benefits in a sugarbeet-small grain rotation. Tillage studies were initiated on silty clay and silt loam soils in the fall of 1991 and 1992 with a Blue Jet straight shank ripper and Tye Paratill implements. Depth of tillage was 17 inches. Soil conditions at the time of tillage were dry and moist in 1991 and 1992, respectively. A conventional fall chisel plow tillage treatment was included as a check. Sugarbeets and hard red spring wheat were planted perpendicular to the direction of deep tillage following seedbed preparation with a field cultivator in the spring. The two crops were rotated on the tillage treatments the year following initial deep tillage. Although a large amount of fracturing of the soil profile occurred during deep tillage operations both years, the soil loosening did not significantly change soil bulk density or crop production on either soil type during either year.