

Research Report

Sugarbeet Conference, Fort Collins, Colorado

February 5-7, 1974

Prepared by M. E. Jensen, January 11, 1974

- A. Location of Project: Western Region  
Idaho-Montana-Utah Area  
Snake River Conservation Research Center  
Kimberly, Idaho
- B. Work Reporting Unit Title: Soil Profile Modification and Structure Improvement on Northwest Soils
- C. Work Reporting Unit: No. 5704-16000-001
- D. SMY's for Past Year at Location: 1.5 SMY
- E. Names of Scientists in Project at Location: W. W. Rasmussen and  
J. W. Cary
- F. Mission of Research:
- Develop management practices to improve the physical characteristics of Northwest soils.
- G. Objectives of Research:
- To develop economic practices that will increase rooting depths on soils with shallow lime-silica cemented zones; and to develop economical and practical methods of controlling crusting and maintaining reasonable infiltration rates on high silt soils in southwestern Idaho.
- H. Research Accomplishments:
- Studies on deep mixing (30 to 40 inches) soils with a lime-silica cemented zone at a depth of 15 to 30 inches has been shown by W. W. Rasmussen to produce a relatively permanent improvement in soil profile characteristics which increase rooting depth and available water storage capacity. Because of the costs of complete mixing the soil a new field study has been initiated by J. W. Cary on mixing the soil in narrow trenches to a depth of four feet at spacings of two and four-feet, and chiseling to four feet at spacings of two- and four-feet with a vibrating chisel. This experiment will have two irrigation levels to determine the effect of these tillage practices, on the required irrigation frequencies for sugarbeets in 1974.

A large proportion of soils in southwestern Idaho are very high in silt. These soils crust severely and frequently have very low infiltration rates. W. W. Rasmussen is conducting laboratory studies on aggresizing these soils to improve and stabilize soil structure in and above the seed zone.

I. Impact of Research Accomplishments on Science and General Public:

Thousands of acres in southwestern Idaho have been deep plowed which in most cases has increased their productivity substantially. If available soil water capacities can be increased, irrigation frequencies can be decreased reducing soil erosion and stream pollution and irrigation labor requirements. Practical methods of crust control can increase the effective length of the growing season and increase sugar-beet stands and sugar production.

Basic studies on freeze tolerance of sugarbeets as influenced by various chemicals clearly showed that increased osmotic pressure in the seedlings was largely responsible for the increased freeze tolerance.

J. Obstacles to Achieving Objectives:

Crusting and low water intake rates result, at least in part, from the uniform, fine (silt) particles. Aggregates formed on these soils are extremely unstable and slake readily when wet. Serious crusting commonly occurs with rapid drying following rains. However, serious crusting can occur from capillary wetting from furrows. This problem has been studied periodically over 30 years. Only limited resources are currently available to work on this perplexing problem with the current level of funding.

K. Future Plans and Needs:

Dr. Cary will be conducting growth chamber studies on the placement of certain fertilizers in relation to freeze tolerance of sugarbeet seedlings. This is a followup of previous studies of various chemicals on freeze tolerance.

W. W. Rasmussen will be conducting field trials of bed forming and aggresizing using sugarbeets as the test crop. This will be initiated on the problem soils in the Grandview area in the spring. R. V. Worstell will begin some work on the mechanical requirements for attaining increased lateral movement of water without crust formation.

Additional funds are needed to increase the research effort on this problem involving highly erodible silt soils in southwestern Idaho.