Research Report

Sugarbeet Workshop, Fort Collins, Colorado

February 5-7, 1974

Prepared by W. M. Bugbee and D. F. Cole

A. Location of Project: North Central Region
Dakotas-Alaska Area
North Dakota State University
Fargo, North Dakota 58102

B. Work Reporting Unit Title: Sugarbeet Production Practices (Diseases and Quality of Sugarbeets in North-Central States).

C. Work Reporting Unit: No. 10710

D. SMY'S for Past Year at Location: 1.5 SMY

E. Names of Scientists in Project at Location:

W. M. Bugbee and D. F. Cole (Reported to Project 6/73)

F. Mission of Research:

To develop knowledge on the most effective methods for storing sugarbeets; to determine the influence of diseases on sugarbeet growth and storability; to determine the effect of growth regulators on sucrose development; to assess the effect of environmental factors and agronomic practices on growth and storability of sugarbeets.

G. Objectives of Research:

To investigate different methods of storage in the Red River Valley; to measure the effects of disease on reducing the storability of sugarbeets; to investigate various agronomic practices such as fertility, harvest date, variety selections and growth regulators on growth and storability; and to test and select roots which are resistant to storage rots for use in a breeding program.

H. Research Accomplishments:

1. A selective agar medium has been developed to measure populations of Phoma betae from soil and improve the assay of seed samples.

H. 2. Using the above medium it has been shown that P. betae: i) can survive in soil through various crop rotations for up to 26 months; ii) invade roots of lambsquarter and oats; iii) can survive, probably perennially, in soil of storage yards.

3. Sugarbeets were more susceptible to phoma storage rot when grown under low available nitrogen than under adequate levels.

4. Bacterial parasites increase in numbers in stored sugarbeet roots even in a proper storage environment.

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

The use of better storage methods and cultural practices have a potential of saving several million dollars by reducing sugar losses during storage. This potential savings represents a significant investment which growers and processors may be able to save in the future. Selection for disease resistance and methods to increase sugar yield per acre by management and/or growth regulators could significantly increase returns to growers and processors.

J. Obstacles to Achieving Objectives:

Progress has been limited in the past due to inadequate facilities and technical support. Presently, a storage facility provided by the Growers Association is operational and technical support is improved. Additional greenhouse space may be needed in the near future for selection of disease resistant plants and for physiological studies.

K. Future Plans and Needs:

Present studies on selection for resistance to storage rots will continue. Studies have been initiated to determine the effect of bacterial growth on sugar inversion and the effect of phenolic compounds on microbial growth. Effects of various agronomic practices are presently under study.