RESEARCH REPORT

Sugarbeet Workshop, Ft. Collins, Colorado

February 5-7, 1974

Prepared by G. D. Griffin, January 14, 1974

A. Location of Project: Western Region
Utah-Idaho-Montana Area
Crops Research Laboratory
Utah State University
Logan, Utah 84322

B. Work Reporting Unit Title: Biology and Control of Nematodes on Alfalfa, Sugarbeets, Tree Fruits and Potatoes

C. Work Reporting Unit: No. 16080

D. SMY for Past Year at Location: 0.5 SMY

E. Name of Scientists in Project at Location: G. D. Griffin

F. Mission of Sugarbeet Research:

To utilize all suitable techniques and methods in as compatible a manner as possible that maintains populations of the sugarbeet nematode, Heterodera schachtii, below levels causing economic injury.

G. Objectives of Sugarbeet Research:

To develop proper methods of control of H. schachtii in the Intermountain and Northwestern areas of the United States as related to proper application and dosage of nematicides (specifically systemics) correlated with time of application; effect of soil types, soil moisture, and soil temperature; continuous chemical usage on population dynamics of plant-parasitic organisms; interaction between nematodes and other soil-borne pathogens; and integrated control involving two or more factors including chemicals, rotation, and environmental and climatic factors.

H. Research Accomplishments:

Major emphasis has been placed on the efficacy of using systemic nematicides to reduce pathogenicity of H. schachtii below the economic injury level. Results show that aldicarb, used under proper application and field conditions, enhances plant growth resulting in yields comparable to that of 1,3 dichloropropene. However, since systemic nematicides have to be moisture activated sufficient soil moisture must be maintained

in the root zone until formation of a tapered root. This, however, is dependent upon soil temperature and degree of nematode infestation. In the Treasure Valley Area of Idaho and Oregon, initial plant growth is made before the nematode becomes active because of the early planting procedures, and the aldicarb residual does not give a sufficient length of protection.

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

Aldicarb nematicide was registered for use on sugarbeets in 1972. Since then it has been used throughout the Intermountain Area for control of the sugarbeet nematode. It has greatly aided the sugarbeet industry by adding one more tool to the farmers' "arsenal" of control. Its importance is magnified since it can be applied at time of planting, requiring only one trip through the field for chemical application and planting. However, 1,3 dichloropropene, the standard nematicide, requires a 7-10 day waiting period after application and two trips through the field for application and planting; this 7-10 day period may result in a loss of soil moisture and a poor sugarbeet stand. Proper time of application of 1,3 dichloropropene is in the fall; but if poor weather conditions delay application, aldicarb can be used effectively in the spring. Aldicarb also controls root maggot and other sugarbeet pathogens, which enhances its use as a control agent.

J. Obstacles to Achieving Objectives:

Significant advancements have been made in using aldicarb to control the sugarbeet nematode in the Intermountain Area. However, poor results have been obtained in the Treasure Valley Area of Idaho and Oregon where one is confronted with a longer growing season and higher nematode populations. Poor results have also occurred in some areas where improper soil moisture was maintained. Insufficient studies have been made to determine how nematode populations, soil types, and soil temperatures affect method of application, nematicide dosage, and time of application.

K. Future Plans and Needs:

Previous work has been limited to greenhouse, microplot, and farmer-cooperator fields with limited use of nematicides. To better determine efficacious methods of control of H. schachtii, a model should be built to show loss per acre for interactions of nematode infestation, soil type, environmental factors (temperatures, moisture, etc.), agronomic practices, and crop rotation. Some of the questions we wish to answer are: Under what conditions would post treatments be advantageous? How effective are systemic nematicides on early planted beets (temperature below that of nematode activation) as compared to late-planted beets? What effect do chemicals other than nematicides have on host-parasite interactions? What plants are best for rotational practices in given areas? How important are interactions between nematodes and other organisms?

This can only be accomplished with the proper research farm, equipment, and facilities to maintain studies.