

## Research Report

Sugarbeet Conference, Fort Collins, Colorado

February 5, 6, 1974

Prepared by J. H. Dawson, January 2, 1974

A. Location of Project: Western Region  
Oregon-Washington Area  
Irrigated Agriculture Research and Extension Center  
Prosser, Washington 99350

B. Work Reporting Unit Title: Control of dodder in alfalfa and control of annual weeds in sugarbeets.

C. Work Reporting Unit: No. 10860

D. SMY's for Past Year at Location: 1 SMY, of which .5 SMY was devoted to sugarbeet research.

E. Names of Scientists in Project at Location: J. H. Dawson

F. Mission of Research:

To define principles and develop practices for improving weed control in sugarbeets.

G. Objectives of Research:

To characterize the problem of weeds in sugarbeets by determining: (a) life histories and growth habits of weeds of importance in sugarbeets; (b) competitive relationships between sugarbeets and weeds; (c) periods of the growing season when weed problems occur in sugarbeets. To develop improved techniques for controlling weeds in sugarbeets that are more effective and/or less expensive than traditional methods using hand labor. Thus reduction in hand labor required to weed control in sugarbeets is a major objective. To determine the behavior of herbicides in soil and plants, and thus to determine methods for their use that will maximize weed control and maintain safety to sugarbeets, to other crops, and to the environment in general.

H. Research Accomplishments:

Four separate and fairly distinct periods with respect to weed control were found to comprise the sugarbeet growing season. Control measures are required in three of these periods. Methods of control were developed for these periods. These practices were synthesized into programs of full season control. When properly applied, the sugarbeets can be thinned without regard for weeds, weed competition does not suppress the crop, weeds do not interfere with harvest or storage of the sugarbeet roots, and the requirement for hand labor is reduced to 10% of that required using previous methods. Considerable information has been gained concerning the competitive relation between weeds and crops.

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

For a cost of about \$50/A for chemical, mechanical, and labor inputs, sugarbeet growers in Washington can achieve weed control that is equal or superior to that previously obtained with labor and mechanical inputs that today would cost about \$90/A. The savings of \$50/A amounts to \$3,600,000 per year on the 90,000 acres of sugarbeets grown in Washington. Increased income for sugarbeet growers, and more economical food for the general public result from this research. Basic understanding of ecological relationships involved in weed-crop competition has been expanded.

J. Obstacles to Achieving Objectives:

Progress had been steady and the research has been productive, without major obstacles being encountered. Looking to the future, we might anticipate that the greatly increased costs of developing new pesticides might deter the chemical industry from making new candidate herbicides available for a relatively low-acreage crop like sugarbeets. A lack of new chemistry could be a real obstacle to improving weed control in sugarbeets.

K. Future Plans and Needs:

The program that has been developed controls barnyardgrass (Echinochloa crus-galli), pigweed (Amaranthus spp.), common lambsquarters (Chenopodium album), and hairy nightshade (Solanum sarachoides). These species presently constitute more than 95% of the weed problem in sugarbeets in Washington. Attention must be given to other species which may be tolerant of all or part of the presently used herbicides, in order to head off new weed problems. Although labor requirements for weeding sugarbeets have been drastically reduced, labor has not been, and probably will not be, eliminated. Future research should determine how to use labor most efficiently in a full-season weed control program. As new herbicides become available, they must be evaluated to determine their potential for further improving weed control in sugarbeets. Effective control of pre-thinning weeds has made it possible for the new selective mechanical thinners to be used. Research is needed to determine the relationships between these machines and weeds, especially with respect to residual weeds that survive other control methods.