

Research Report

Sugarbeet Conference, Fort Collins, Colorado

February 5, 6, 1974

Prepared by E. E. Schweizer, January 7, 1974

- A. Location of Project: Western Region
Colorado-Wyoming Area
Crops Research Laboratory, CSU
Fort Collins, Colorado
- B. Work Reporting Unit Title: Weed and Nematode Control for Field Crops
- C. Work Reporting Unit: No. 401-5602-10860
- D. SMY's for Past Year at Location: 1 SMY
- E. Names of Scientists in Project at Location: E. E. Schweizer
- F. Mission of Research:

To discover more efficient chemical, cultural, and combination methods of selectively controlling weeds in sugarbeets and rotational crops grown under irrigated conditions of the western region, and to develop principles, methods, and practices of weed control that are safe to man, other animal life, and desirable plants.

- G. Objectives of Research:

To determine the competitive relations between crops and weeds; to evaluate herbicides for selective phytotoxicity; to explore methods of influencing the penetration and translocation of herbicides in plants; to characterize the fate and behavior of herbicides in soils; to integrate treatments into programs of weed control; and to investigate the physiological response of weeds and crops to herbicides as affected by genetic constitution, varying environmental conditions, stage of growth, and rate of metabolic activity.

- H. Research Accomplishments:

Kochia must be removed from sugarbeets within six weeks after emergence to prevent reductions in yield of roots and sucrose. A density as low as one kochia plant per 25 feet of row reduced the average yield of roots by 2.6 T/A and sucrose by 960 lb/A. Kochia can be controlled satisfactorily with phenmediphan if the herbicide is applied when the rosette of kochia is less than one inch in diameter and before seedling elongation has begun. Weed control and sugarbeet tolerance are affected by the type of herbicide used, method of application, stage of growth, and environmental conditions. For example, our results have shown that yield and quality of sugarbeet roots would not be affected provided trifluralin was not sprayed directly on the hypocotyledonary tissues.

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

Herbicide treatments and cultural practices have been integrated into successful programs to selectively control many weeds in sugarbeets in the intermountain West. Some programs can be used to produce a crop of sugarbeets without the need for hand weeding by minimizing competition from certain annual weeds all season. In fields where kochia plants are still present after thinning, growers can determine whether they can justify the use of hand labor to remove these kochia plants by using the equations that were derived from the kochia competition studies. Understanding the reasons how aberrations in sugarbeet roots cause by trifluralin could be prevented, assured the availability of an effective herbicide for the control of late-season weeds.

J. Obstacles to Achieving Objectives:

Considerable progress has been made in our knowledge about the competitiveness of weeds in sugarbeets and in integrating herbicide treatments into systems to control specific weeds. Additional professional and technical support are needed to pursue in greater depth the methods of influencing the penetration and absorption of herbicides in plants and the physiological responses of weeds and crops to herbicides.

K. Future Plans and Needs:

Present studies will be continued to determine (1) the fate and behavior of herbicides in soils as they affect sugarbeet production and other crops in rotation with sugarbeets and (2) how to integrate new herbicide treatments into specific weed control systems. At the present level of funding and personnel, the phase of research dealing with the penetration and absorption of herbicide in plants and the physiological responses of weeds and crops to herbicides will have to be restricted.

A definite need exists to expand the research effort in the physiological areas enumerated above; however, until additional funds and personnel are made available, it is difficult to pursue this area of research in depth. Facilities for another full-time scientist have been available since 1968, when the Crops Research Laboratory was constructed.