

Results of Weed-control Experiments in Sugar Beet Fields in the Eastern Area in 1947—A Progress Report¹

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TWO METHODS of weed control were studied in the Eastern Area in 1947. They were: (a) Pre-emergence spraying, and (b) post emergence or selective spraying.

Pre-Emergence Spraying

A late planting season combined with excessive rainfall made it necessary to abandon plans for carrying out the Foundation spraying test as it had been outlined. Instead, Diesel oil was used as the opportunity presented itself, in an effort to determine the feasibility of such a procedure.

In all cases Diesel oil was applied at rates approximating 100 gallons per acre to which had been added 8 quarts of Dow Contact Herbicide.

All spraying was done late in the season (after June 20) and with one exception all spraying was done on replanted beets.

Here is a summary of what we learned:

1. That Diesel oil fortified with Dow Contact Herbicide will destroy all plant growth above ground. This includes the top growth of biennial and perennial plants.
2. That the material dissipates within a few days and, therefore, does not injure emerging beet seedlings.
3. That weeds which have been covered slightly with soil during planting operations are protected. Therefore, if this occurs, time should be allowed for them to straighten up before spraying is done.
4. That "fogging" and drifting of the spray material will occur if spray pressure is too high and if the nozzles are too high off the ground.

Selective Spraying

The practice of using common salt (NaCl) in water as a selective weed killer on beets was begun by Dr. G. F. Warren of the University of Wisconsin. The possibilities offered by this method of weed control have created a great deal of interest in the Eastern beet-growing area.

Preliminary work which we did the summer of 1946 gave very encouraging results. Here a saturated salt solution was applied with a hand sprayer. This gave good control on ragweed, smartweed, wild mustard and rough pigweed. The principal annual weeds not affected were lambs-

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quarters and purslane. Weed control was much more effective if spraying could be done when the weeds were small.

It was observed that some beets were killed by the spray. Subsequent investigation showed that this killing was principally limited to those plants which had not yet developed their first pair of true leaves.

A power sprayer was purchased in 1947 to conduct field experiments with salt sprays. This machine was equipped to spray four rows of beets. The spray was applied by four fan-type weed nozzles, one being located directly over each row.

The salt solution was made up as the sprayer tank was being filled with water. Two pounds of finely ground NaCl per gallon of tank capacity were placed in the tank. By the time the tank was filled with water, all the salt had gone into solution. A "spreader" or wetting agent was added to the solution to increase its effectiveness.

The rate of application commonly used was 100 gallons of spray per acre. Approximately 100 acres were sprayed on eight different farms in 1947. Results varied from one location to another depending on the kinds of weeds present and their size. In many cases the weeds which were sprayed were not completely killed. However, their growth was stopped until the field could be cleaned up by hand labor. It should be borne in mind that most of this spraying work was done as a last resort before abandoning the field.

The highest rate of application used was 400 pounds (dry weight) of NaCl per acre. This was applied to a portion of a field which we had reserved for our mechanical thinning test. It gave perfect control on ragweed, but only stunted the yellow foxtail which was present. The beets were severely injured. Many plants were completely killed. The remainder were burned so that the crowns turned black and many of the outer leaves died. After about a week or 10 days, these beets began to recover and made excellent growth. At harvest time paired comparisons indicated higher tonnage, percentage sugar, and purity, than those beets which had not been sprayed. We have no logical explanation for this.

A summary of our work with selective sprays is as follows:

1. Common salt (NaCl) in water will control certain annual weeds.
2. Severe injury to beets will occur if they do not have at least one pair of true leaves.
3. Weeds are best controlled when small.
4. Effect on weeds is variable.

Very susceptible:

Annual smartweed
Ragweed

Medium in susceptibility:

Rough pigweed

Wild mustard

Not susceptible:

Lambsquarters

Purslane

At least one grower with whom we worked in 1947 is convinced that spraying saved his crop. He plans to make spraying for weed control a regular practice in his sugar beet growing operations.