

SODIUM CHLORIDE AS A SELECTIVE HERBICIDE FOR CONTROL
OF WEEDS IN SUGAR BEETS

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At one of these meetings a few years ago, Dean Rather of Michigan State College told of one of his earliest impressions of the Sugar Beet Industry. His story went something like this: "It was a hot 4th of July morning. There was to be the usual celebration in town, and our farm was located on one of the main roads leading into town. My Father had decided that it was more important that we get our beets blocked and thinned than that we attend the local celebration. As the morning wore on, the sun became hotter and steam began to rise up from the beet field. Then the neighbors began passing on their way to town and the kids would yell 'Hi, Howard! Aintcha comin' to town?' Then and there I decided that we could easily dispense with the sugar beet crop."

Experiences such as this one have led men to constantly look for ways to reduce the amount of hand labor required to produce a crop of sugar beets. Segmented seed and sugar-beet harvesters are the two outstanding products of this constant strife. Both are accepted by practically all of us. We all realize that harvesters are not perfect, however, many factory men would be willing to have their entire acreage harvested by machine. This would eliminate the need for hand labor in the fall and would greatly reduce costs - both for the grower and for the processor. If this could be done, the problem then would be to eliminate the need for hand labor during the spring and summer. At first glance, this seems like a back-sided approach to the problem, but that is the situation we find ourselves in at the present time. We all agree that it is necessary to do away with the need for hand-labor if the industry is to survive. The problem is how to do it.

In conducting mechanical thinning experiments last spring, we found that on segmented seed or pelleted seed plantings, made with a good drill, we could do an acceptable job of mechanically thinning the crop -- if -- weeds were not present. No machine yet made can distinguish between beets and weeds. Where weeds were present, there could be no saving in time or costs, since hand-labor was necessary to remove the weeds, and if the operation was delayed, the costs were frequently higher than if the beets had been blocked and thinned at the normal time.

Keith Barrons of the Dow Chemical Company informed us of the work done by Dr. Warrén of Wisconsin, using a saturated salt solution on red beets. He reported that he could kill many kinds of weeds without any apparent injury to the beets. We applied the same principle to sugar beets, and found that it worked there, too.

The saturated solution consisted of all the common salt (NaCl) which would dissolve in a given quantity of water. We found this to be almost 3 lbs. of salt per gallon of water. This solution was sprayed only on the rows, with the thought in mind that it was more practical to control weeds between the rows by cultivation. We also attempted to combine borax with salt in order to give the solution a wider killing range, but gave it up as impractical because of the low solubility of the borax.

Here is a summary of what we learned:

1. That we could kill the following annual weeds:
 - (a) Ragweed
 - (b) Wild Mustard
 - (c) Smartweed
 - (e) Wild Buckwheat ✓
 - (f) Annual grasses (When very small)
2. That we could kill top growth on the following perennial weeds - if small:
 - (a) Canada Thistle
 - (b) Milkweed
3. That we could do nothing to control:
 - (a) Lambs-Quarters (Sometimes called Pigweed)
 - (b) Purslane or Pusley
 - (c) Field Bindweed
 - (d) Sow Thistle
 - (e) Quack Grass
4. That we killed some beets - Subsequent experimental work showed that very few beets were killed after they had started the first pair of true leaves.
5. That large beets yellowed somewhat after being sprayed.
6. That weeds could be most effectively killed when they were small - The smaller the better.
7. That spraying should be done in the evening or on cloudy days to avoid scalding of the beets.

Recent correspondence with Warren of Wisconsin, and with Sweet and Dearborn of Cornell shows that they recommend the following:

1. 2 lbs. Salt per gallon of water.
(Sweet) 2 lbs. Sodium Nitrate per gallon of water.
2. Use of a "spreader" to assist wetting.
3. Rates of 90 gallons to 200 gallons - 1 acre applied only on the rows.
4. Do not spray until the beets have one pair of true leaves, but do it as soon thereafter as possible.
5. Spray before weeds are 4 inches tall.

From a practical standpoint, in addition to savings in blocking and thinning costs, spraying might enable us to save some fields of early planted beets which are torn up because they become too weedy.

We plan to use a 4-row Power-Operated Sprayer this season and to conduct fairly large-scale field experiments using salt, sodium nitrate and any other materials which show promise. Possibly this method of weed control is the wrong approach to the problem. Certainly it would be much better to kill weed seeds in the soil before planting time, but as yet, no one has demonstrated the workability of such a plan. In the meantime, experimental work with salt sprays may lead to the discovery of more effective materials.

Keith Barrons has suggested the possibility of grinding the material and applying it as a dust when the leaves are wet with dew, thus eliminating the need for the large quantities of water required for spraying. There is also the possibility of applying manganese and borax in the spray in fields where it appears there is a deficiency of these elements. In years to come, we may either spray or dust with a combination of materials in order to control weeds in beet fields. There is a definite need for such a practice if we are to eliminate the need for hand labor in the production of sugar beets.