

Results with T.C.A. on Barnyard Grass Control in Sugar Beets in Montana and Wyoming

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One of the most vital things in the development of a beet crop is the control of weeds when the beet plants are in the seedling stage. Great progress has been made in this direction with the use of chemical sprays, both before the beet seedlings emerge and after emergence. When the right chemical is found and the proper method of applying it, a great stride will have been made.

In 1949 several chemicals were used on an observational basis at the Holly Experiment Station at Sheridan, Wyoming. Most of these had little or no value. However, two which had shown promise in 1949 were incorporated into a replicated test in 1950 and are reported herewith.

Table 1.—Results with Pre-emergence Weed Sprays on Sugar Beets at Sheridan, Wyoming, in 1950.

Treatment No. ¹	Beet seedlings per 100 ft. of row	Plants per Sq. Ft. of row			Stand after thinning	Acre Yield		
		Grass ²	Broadleaf	Total		Gross Sugar	Tons	% Sucrose
1	362	17	1	18	107	3,354	10,544	16.90
2	366	24	2	26	83	3,286	9,720	16.94
3	458	53	5	58	87	2,295	6,779	16.93
S. E. of Mean						71	.238	.12
Sig. Diff. (5%)						231	.776	ns
S. E. M/Gen. Mean (%)						2.33	2.64	.74

¹ 1. Sodium T.C.A.—12½ lbs. per acre in 22 gal. water applied four days after planting.

² 2. Di-nitro secondary butyl phenol—one and one-half pts. with one and one-half gal. diesel oil and 21 gal. water applied four days after planting.

³ 3. Check—no treatment.

⁴ ⁴ Average of 10 counts. Taken from an area in row six inches wide and 24 inches long, 18 days after planting.

⁵ ⁵ Barnyard grass (*Echinochloa crus-galli*)

The spring of 1950 was late but rainfall was about normal. Seed beds were spring plowed and poor stands were the rule. Early weed growth was extremely fast. Under these conditions excellent weed control was obtained by an application, four days after planting, of 12½ pounds per acre of Sodium T.C.A. in 22 gallons of water per acre, and also a mixture of di-nitro secondary butyl phenol at the rate of one and one-half pints with one and one-half gallons of diesel oil in 20 gallons of water. Data in Table 1 indicate that at least two-thirds of the grasses were controlled by T.C.A. and the stand after thinning increased about one-fourth. Yields of the treated plots also significantly outyielded the check.

Rainfall was ample after applications were made. A rain of .11 inches on the day after applying the sprays was followed by two other rains during the week. This moisture, no doubt, dispersed the spray material into the soil very effectively in the areas occupied by the grass seed which germinated.

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No record was kept on relative cost of weeding the treated and untreated plots but the time consumed for the check plots was estimated to be at least four times as much as for the X.C.A.

Seedlings on the di-nitro secondary butyl phenol plots showed no effect of the spray. Seedlings in the T.C.A. plots showed a slightly yellowed appearance the first week but quickly regained the normal green color.

T.C.A. had outstanding value at the rate of 12¹/₂ pounds per acre. A lower rate would probably be effective. Di-nitro secondary butyl phenol also was promising.

In 1951 a followup of the 1950 pre-emergence test with T.C.A. was conducted on a very grassy field. Three rates (five, seven and one-half and 10 lbs.) at three dates (1) immediately after planting, (2) a week after planting, and (3) two weeks after planting were used. Also, a comparison between Sodium T.C.A. and Calcium T.C.A. at the seven and one-half-pound rate was included, as well as the use of 40 percent Technical Endothal at the then recommended rates of five, 10 and 20 pounds per acre.

An extremely dry period of about three weeks following the planting of the test afforded a much different condition of soil than in 1950. Germination of beets and weeds was slow and it was necessary to irrigate the field before beets would sprout. Resulting stands were irregular and the test was abandoned after making a few weed counts. Data secured indicated that the use of T.C.A. at rates of seven and one-half pounds and above retarded growth of all grassy weeds and that there was little, if any, difference between Calcium T.C.A. and Sodium T.C.A. Endothal at these rates was quite effective in controlling broadleaf weeds also.

In an observation area, Endothal at the 10-pound per acre rate had little effect on the beet seedlings but completely eliminated the button weed (Malva) and retarded the growth of wild oats. It was very promising for Malva control and will be followed up in 1952.

At several of the factory areas in which Holly Sugar Corporation operates, strip tests with T.C.A. were conducted in commercial fields in 1951. Extremely dry weather following planting seemed to limit effectiveness of the T.C.A. Under dry conditions where irrigation was necessary to germinate the beets, T.C.A. was more effective on the lighter textured soils. In some cases, such as those at Sidney and Hardin, Montana, a thorough irrigation even three weeks after planting resulted in fair control of grassy weeds and much grower interest in its further use.

Summary

Results of test in the Sheridan, Wyoming, area indicate good control of grassy weeds with Sodium T.C.A. when rainfall following planting is adequate. Heavy irrigations in dry seasons to sprout beet seeds have merit but did not seem to equal rainfall in effectiveness. On commercial fields T.C.A. was most effective on lighter soils following irrigations.