Results With Pre-Emergence Spraying in Beet Field for Control of Wild Oats

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Wild oat is a characteristic weed of a large part of the United States. Its occurrence is not peculiar to grain fields, for it occurs and takes its toll of losses in cultivated crops as well. In this connection volunteer domestic small grains can be equally injurious. The monocotyledonous plants, of which the above are members, are generally more resistant to herbicidal sprays than the dicotyledonous plants. This character has delayed the discovery of a good selective spray for the control of weeds in the culture of sugar beets.

In the absence of a selective spray it is necessary to make use of what other differentiating characters exist between weeds and beets. One of the characters employed has been the differential in the date of emergence. This can be used to advantage providing the weeds emerge first and provided there are herbicides available which are effective against the weeds without leaving a toxic residual affecting the beets. Chemicals showing promise in this regard are being tested.

In the spring of 1947 one test with 11 treatments and 4 replications was superimposed on a beet field near Longmont, Colorado. The field had been plowed during the spring and was planted to beets April 11. Flat-bed planting to a depth of 1½ inches had been used. Observations made subsequent to planting but before the beets had emerged revealed that portions of the field were turning green as a result of an abundant growth of wild oats. Plots, 2 rows wide and 65 feet long, were laid out on the field and various sprays were applied to the plots with a knapsack sprayer April 26. The sprayer was equipped with a flat spray nozzle and the applications were made as uniform as possible with a minimum of spray drift.

On May 7 stand counts of beets and weeds were taken on all plots. Pre-thinning beet counts per 100 feet of row, and weed (wild oats) populations in percentage of check as calculated from counts on five 1-square-foot areas per plot for the various sprays employed, are given in table 1.

All the sprays used gave partial control as is indicated by the results in table 1, and in only one case was the stand of beets significantly reduced. In addition to a reduction in the number of weeds, the sprays slowed the growth of those plants that did survive. This difference may be observed in figure 1.

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Table 1.—Stand counts of beets for 100 feet of row and wild-oat populations in percentage of check for various pre-emergence spray treatments.

Treatment	Beets per 100 feet of row	Wild-oat count in percentage of check
1. 50 gallons per acre of standard diesel fuel oil (No. 23-M) gravity 31.3	319	24
2. 50 gallon per acre of 1 part oil as above plus 4 parts water (no emulifier)	288	67
3. Same as No. 2 plus 1 percent sulfur by weight plus emulsifier	244	52
4. Same as No. 2 plus 1 percent pentachlorophenol by weight plus emulsifier	233	46
5. 50 gallons per acre of stove oil (No. 1 domestic fuel oil) gravity 35+	285	32
6. 50 gallons per acre of kerosene distillate, gravity 35+	302	47
7. 30 gallons per acre of diesel fuel oil, gravity 32+, plus 1 quart Sinox[1]	262	42
8. 100 gallons per acre of 1 part oil as in No. 7 plus 9 parts water plus 1 quart Sinox plus emulsifier	259	50
9. 100 gallons per acre of 1 part oil as in No. 7 plus 1 part water plus 1 quart Sinox plus emulsifier	159	36
10. 50 gallons per acre of water containing 3-percent Dow Contact[2]	235	54
11. Check	320	100
LSD 5-percent point	103	39
LSD 1-percent point	139	41

[1]Active ingredient 30-percent sodium dinitro-ortho-cresylate; product of Standard Agricultural Chemicals, Inc.
[2]Active ingredient dinitro secondary butylphenol; product of Dow Chemical Company.

Figure 1.—Pictured in foreground are two 2-row plots; on the left is the check and on the right treatment 1. In the background is pictured the mass of weeds left in the row where unsprayed areas had been cultivated.

Even though the plots needed weeding and cultivating to remove the remaining wild-oat plants and weeds that emerged subsequent to spraying the experiences of this test were very encouraging. Earlier treatment might have given a more complete control.

The straight diesel oil with the low gravity appeared to be the best weed-killer. This would be expected since the low-gravity oils generally contain more unsaturated compounds which are favorable components of petroleum herbicides.

Foul growth, such as wild oats and volunteer small grain, frequently cause an abandoning of beet fields in this area. The results of the test reported here, together with the results on the use of diesel oil for the control of barley[2] suggest that pre-emergence spraying might be a means of cutting down losses in beet acreage due to these weeds. Just how frequently pre-emergence spraying can be used in this area without delayed planting remains to be determined.

[2]Anonymous. Can We Plant Beets in Foul Fields? Through The Leaves. (Great Western Sugar Company Bimonthly Pub.) 24 (5): 8-12. 1947.