Sprinkler application of a sugar beet herbicide

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Herbicide injury due to non-uniform application resulting from a stuck sprinkler head.

A new method of applying a preemergence herbicide in sugar beets by sprinklers may reduce costs to growers by eliminating power incorporation. More than 40 percent of Imperial Valley's 65,000 acres of sugar beets are normally sprinkled to achieve germination. Ro-Neet (cycloate) is commonly incorporated by power equipment as a preplant treatment to control troublesome weeds in sugar beets, whether germinated by sprinkler or by furrow irrigation.

Field study

A beet herbicide trial was conducted from September 4 to November 4, 1975, at the University of California Imperial Valley Field Station. Sprinkler-applied Ro-Neet was compared with the standard power-incorporated treatment on an Imperial clay soil. All plots were sprinkler irrigated for 24 hours. Two rates (3 and 6 pounds of active ingredient per acre) were used for both application methods. Each plot was in the center of an isolated grid of four sprinkler heads in a rectangular 30- by 40-foot spacing.

Sprinkler applications were made after 20 hours of sprinkling in a 2-hour set and were followed by 2 more hours of untreated water. Power-incorporated treatments were made preplant and then sprinkler irrigated for 24 hours. Rainbird 14V sprinklers were used with 5/32 orifices at a pressure of 65 psi at each head. Normal furrow irrigations were made after 1 day, 1 week, and 4 weeks following the initial sprinkler irrigation. Maximum temperatures during germination varied from a high of 108° F on September 4 to a low of 81° F on September 8. Weed counts and ratings were made September 29. On November 4 the beet seedlings were harvested and freshweighed plot by plot to avoid drying losses.

SPRINKLER APPLICATION AS COMPARED TO POWER INCORPORATION OF RO-NEET IN SUGAR BEETS — U.C. IMPERIAL VALLEY FIELD STATION, 1975

Treatment	Lb ai/A	Percent nettleleaf goosefoot control*	Overall weed control rating†	Beet phytotoxicity rating†	Percent beet emergence*	Seedling gross wt. (lb)*	Root wt. (lb)*
						10' x 2', 40" beds	
Sprinkler	3‡	90 a	8.1	1.1	70 a	45.0 a	8.8 a
Power incorporation	3	82 a	8.0	1.3	65 b	42.0 a	8.4 a
Sprinkler	6	95 a	8.5	2.3	62 b	45.4 a	8.4 a
Power incorporation	6	98 a	9.2	2.3	67 b	39.1 a	7.6 b
Check (untreated)	–	0 b	1.3	0	69 ab	39.9 a	7.5 b

* Numbers followed by the same letter are not significantly different from each other at the 5 percent level, Duncan's multiple range test.

† 0 = no plants killed; 10 = all plants killed.

‡ One replication was omitted due to a stuck sprinkler head; data were analyzed by including a calculation for a missing plot.

Results

Control of nettleleaf goosefoot (*Chenopodium murale* L.) as well as overall weed control were similar for either power-incorporated or sprinkler-applied Ro-Neet. Beet emergence, seedling weight, and root weight were also similar for both application methods, and none of the treatments reduced stand or weight as compared to the untreated areas (see table). One of four sprinkler heads stuck in one replication of the 3-pound sprinkler application and applied all the chemical in one area. Beets in this area were killed (see photo), and weed control was reduced in the remainder of the plot.

Conclusions

Although sprinkler application of Ro-Neet is not currently registered for commercial use, sprinkler applications were uniform, and performance of the sprinkler-applied herbicide was equal to that of the power-incorporated herbicide. Although sprinkler applications require total coverage, incorporated bands (60 percent coverage) are generally applied at higher rates, so that herbicide costs are about the same for the two methods. Costs of power incorporation, although variable, are estimated at $8 to $14 per acre. Thus, where sprinklers are already used for sugar beet germination, considerable savings may be gained by applying the herbicide in the same operation and eliminating the power incorporation.

Under commercial conditions, careful attention should be given to sprinkler pressure, spacing, orifice size, plugged nozzles, stuck sprinkler heads, and wind variations. Failure to maintain optimum conditions may result in a non-uniform herbicide application, poor weed control, and beet phytotoxicity.

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