

Halosulfuron for Weed Control in Watermelon

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Abstract

Halosulfuron at rates ranging from 0.05 to 0.10 lb AI/A with no adjuvant added to the POST application spray did not cause any injury to watermelons. Halosulfuron did not appear to cause significant crop injury earlier in the season to reduce marketable fruit yield at harvest. Halosulfuron was highly effective against London rocket but did not control purslane or groundcherry. Weed control efficacy was improved significantly when Latron CS-7 or Activator-90 was added to halosulfuron at either 0.05 or 0.075 lb AI/A. LI-700 did not improve the activity of halosulfuron over the treatments without an adjuvant.

Introduction

The spring melon crops grown in the desert are commonly grown under plastic using the mid-bed trench system. Melons are either direct-seeded or transplanted into a trench in the bed and then covered with a stretched clear plastic mulch for two to three months from January to March. The protected environment retains moisture and most importantly heat to enable the crop to grow in a simulated greenhouse environment. The near summertime type climate also is conducive for summer weeds to germinate under the plastic along with the typical winter annual weeds. Commonly, Prefar® (bensulide) is sprayed on the soil surface to offer preemergence weed control. Several weeds escape the herbicide treatment and when the plastic is removed in the spring, the weeds have often overgrown the melons. This experiment was conducted to evaluate the use of halosulfuron as a postemergence (POST) herbicide applied on large-sized weeds after the removal of the plastic in the spring.

Materials and Methods

A small plot field test was conducted on watermelons in a commercially grown field near Glendale, AZ. The crop was planted in February 1999 and grown under plastic using the mid-bed trench system. The melons were planted on typical 80-inch wide beds in a single row with plants spaced 36-inches in the row. The test was established with individual treatment replicates consisting of one bed measuring 40-ft in length. The test was set up with three replicates in a randomized complete block design. The plastic was removed just prior to initiation of the experiment. The watermelon vines measured approximately 22 inches long at the time of treatment application. The herbicide treatments were applied over the planted row using a CO₂ backpack sprayer equipped with a hand-held boom having two flat fan 8002 nozzles spaced 20-inches apart. The sprays were applied in water at 20 gpa pressurized to 30 psi. The non-ionic surfactants added to halosulfuron were Latron CS-7, LI-700, each at 0.25% v/v and Activator-90 at 1.2% v/v. The weather at the time of application on 23 Apr 1999 was 71F and cloudy with a slight wind at 7 mph. The weeds present were London rocket (*Sisymbrium irio*, SSYIR) at 4 to 10 inch height and flowering, common purslane (*Portulaca oleracea*, POROL) with stems measuring 6 inches, Wright's groundcherry (*Physalis wrightii*, PHYWR) at 4 to 12 inch height and some blooming, volunteer cotton (GOSHI) at 6 to 8 inch height, few scattered Russian thistle (*Salsola iberica*) and nettleleaf goosefoot (*Chenopodium murale*). At intervals following the applications, visual observations for weed control and crops injury were made and watermelon yield was determined at the end of the growing season.

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Results and Discussion

Halosulfuron at rates ranging from 0.05 to 0.10 lb AI/A with no adjuvant added to the POST application spray did not cause any injury to watermelons when evaluated at 12 DAT (Table). Watermelon yield among all treatments did not vary significantly from the untreated check. Unacceptable crop injury of more than 25% was observed on watermelons treated with halosulfuron plus Activator-90. Similar unacceptable injury was observed when Latron CS-7 was added to halosulfuron at 0.075 lb AI/A compared to minimal injury when added to halosulfuron at 0.05 lb AI/A. The addition of LI-700 to halosulfuron did not cause significant visible injury to the watermelons. Near harvest at 52 DAT, all of the watermelon plants recovered and no significant crop injury could be observed.

Weed control efficacy was improved significantly when Latron CS-7 or Activator-90 was added to halosulfuron at either 0.05 or 0.075 lb AI/A. London rocket control at 85 to 90% was the most readily controlled weed by POST applications of halosulfuron at either rate. Halosulfuron at 0.05 and 0.075 lb AI/A were nearly comparable when Latron CS-7 or Activator-90 were added. Halosulfuron without an adjuvant or the addition of LI-700 did not provide acceptable control of London rocket. Halosulfuron without a surfactant was less effective on larger sized weeds compared to good efficacy against smaller sized weeds. Halosulfuron did not demonstrate any efficacy against common purslane or Wright's groundcherry when applied POST. In some plots where nettleleaf goosefoot was observed, halosulfuron was not efficacious. Halosulfuron caused significant injury ranging from 22 to 53% on volunteer cotton at 12 DAT but the cotton recovered and little injury was observable at 52 DAT.

Halosulfuron did not appear to cause significant crop injury earlier in the season to reduce marketable fruit yield at harvest. Halosulfuron was highly effective against London rocket but did not control purslane or groundcherry. Similar to watermelon injury, volunteer cotton was injured after treatment but appeared to recover later in the season. The addition of Latron CS-7 or Activator-90 improved the activity of halosulfuron to cause greater crop injury and provide good London rocket control. LI-700 did not improve the activity of halosulfuron over the treatments without an adjuvant.

Acknowledgments

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Table. Halosulfuron for weed control in watermelon.

Treatment	Rate (lb AI/A)	Crop Injury		Melon Yield #/plot ²	SSYIR	Weed Control		
		12 DAT	52 DAT			POROL	PHYWR	GOSHI
		----- % -----			----- % -----			
Untreated check		0	0	11.0	0	0	0	0
Halosulfuron	0.05	0	0	11.0	40	0	0	22
Halosulfuron	0.075	0	7	14.3	37	0	0	27
Halosulfuron	0.1	0	5	15.0	45	0	0	32
Halosulfuron + Latron CS-7	0.05 0.25 ¹	10	5	10.7	85	0	0	33
Halosulfuron + Latron CS-7	0.075 0.25 ¹	27	8	10.3	93	0	0	43
Halosulfuron + LI-700	0.05 0.25 ¹	0	7	12.3	68	0	0	33
Halosulfuron + LI-700	0.075 0.25 ¹	5	7	11.3	40	0	0	33
Halosulfuron + Activator 90	0.05 1.2 ¹	27	3	12.3	88	0	3	53
Halosulfuron + Activator 90	0.075 1.2 ¹	25	8	15.0	90	0	0	47
LSD (p=0.05)		5.0	7.5	5.23	32.3	0	3.9	10.3

¹Adjuvants added to treatments at percent volume/volume.

²Total marketable fruit harvested per plot.

Treatments applied 23 April 1999 and watermelons harvested on 15 July.