Watermelon Herbicide Weed Control Study

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Abstract

Bensulide (Prefar®), clomazone (Command®), sulfentrazone (FMC), and halosulfuron (FMC) treatments applied preemergence (PREE) gave very good weed control of prostrate pigweed (Amaranthus blitoides), lambsquarters (Chenopodium album), and common purslane (Potulaca oleracea) at 5 weeks after treatment (WAT). Bentazon (Basagran®) and halosulfuron applied postemergence (POST) alone were marginally effective at less than 85% against the pigweed species at 2 WAT and controlled lambsquarters and common purslane. POST treatments following PREE treatments were highly effective to control most weeds. Watermelon injury was acceptable for Command and halosulfuron treatments. Basagran caused slight injury when applied POST on the watermelons. Carfentrazone was not effective against the weeds present in this test site and was safe on the crop. The greatest number of marketable watermelons were harvested from plots having treatments that provided effective weed control. Command plus Prefar PREE followed by Basagran POST and Prefar PREE followed by halosulfuron POST treated watermelons yielded high numbers of marketable fruit.

Introduction

An effective broadspectrum weed control program is not available for commercial melon production in the low desert production region of Arizona. The use of PREE herbicides is limited to controlling very few weeds and there is no labelled POST herbicide against problem weeds. Prefar is the commonly used herbicide in desert production systems and its efficacy is primarily against grass weeds, common purslane, and few other small seeded broadleaved weeds. New herbicides recently introduced in corn and soybean weed control programs have demonstrated efficacy and safety in cucurbit crops. Command and halosulfuron are two relatively new herbicides that have potential use in cucurbit crops and field studies are being conducted to evaluate and determine efficacy and crop safety. This study was conducted to evaluate potential combination herbicide programs to manage watermelon weeds.

Materials and Methods

A small plot field study was conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ to evaluate and determine efficacy and safety of PREE and POST herbicide treatments on watermelon. Watermelon cv. Sangria was planted on 40-inch beds in a single line on every other bed on 19 March 1997. Furrow irrigation was applied in a single furrow on one side of the bed throughout the season. Treatment plots measured 3.3 ft by 40 ft and were replicated four times in a randomized complete block design. PREE treatments were applied immediately after planting and watered to completely wet across the beds immediately after herbicide applications. POST treatments were applied on 22 April when the air temperature was 88F, the sky was clear with an occasional slight breeze. Watermelon was at the 4-leaf stage of growth, lambsquarters ranged from the 1- to 12-leaf stage, prostrate pigweed was at the 4- to

6-leaf stage, tumble pigweed was at the 3- to 4-leaf stage, and common purslane was about 12-leaf stage of growth at the time of application. All treatments were applied using a hand-held boom equipped with two flat fan 8002 nozzle tips spaced 20 inches apart. A backpack CO_2 sprayer pressurized to 40 psi delivered the herbicides in water at 25 gpa. POST treatments included 0.25% v/v nonionic surfactant Latron CS-7. Visual weed control and crop safety evaluations were made at intervals after herbicide applications and watermelons were harvested at the end of the season in June 1997.

Results and Discussion

At 5 WAT, on 22 Apr, most PREE herbicide treatments gave acceptable (85%) or very good (>90%) control of most weeds. Halosulfuron at 0.10 lb AI/A alone gave near complete weed control. Watermelon exhibited marginally acceptable injury (13%) when treated with halosulfuron. The combination of halosulfuron plus Prefar did not improve weed control compared to when either was applied alone. Command applied at either 0.50 or 0.75 lb AI/A controlled weeds similarly and watermelon injury was equivalent at 11%. Tumble pigweed control was difficult with most of the herbicide treatments. Halosulfuron applied PREE appeared to offer better season-long control than did the POST applications. Halosulfuron applied POST was safer on watermelons than PREE applications. Basagran following PREE treatments also provided better control of tumble pigweed compared to single PREE or POST treatments. POST treatments alone did not adequately control pigweeds and purslane. Basagran injured watermelon by causing a leaf margin burn that was evident at 2 WAT on 06 May.

Sulfentrazone at the two rates evaluated controlled weeds similar to Command and watermelon was slightly injured at less than 10%. Carfentrazone applied PREE was not effective against any of the weeds and was safe on the watermelons. Watermelon yields showed that a higher number of marketable fruit were harvested where weed control was good. The number of marketable fruit appeared to be reduced where early crop/weed competition may have occurred or where herbicide injury may have delayed crop maturation.

The combination of Command plus Prefar applied PREE followed by Basagran POST offered very good season-long weed control with minimal visible crop injury. Prefar or Command followed by Basagran or halosulfuron also gave good weed control for the whole season. Sequential applications of PREE herbicide applications followed by POST treatments and integration of cultivations could provide season-long complete weed control.

Table. Watermelon herbicide weed control study. (Umeda, Gal, and Strickland)

Treatment	Rate (lb AI/A)	Timing	Watermelon				Weed Control							
			Crop Injury		Yield*		AMABL		AMAAL		CHEAL		POROL	
			22 Apr	06 May	Mktble.	Nonmkt	22 Apr	06 May	22 Apr	06 May	22 Apr	06 May	22 Apr	06 May
			--------% --------		No./10 ft		----------% ----------							
Untreated Check			0	0	2	8	0	0	0	0	0	0	0	0
Prefar	6.0	PREE	0	0	3	7	88	80	86	69	95	86	98	96
Command	0.5	PREE	11	5	2	6	90	81	89	70	99	96	99	95
Command	0.75	PREE	11	0	2	8	91	90	90	70	97	98	99	97
Command +	0.5 +	PREE	9	4	5	6	96	91	94	90	98	97	99	99
Prefar +	6.0 +	PREE												
Basagran	0.5	POST												
Sulfentrazone	0.25	PREE	3	4	2	8	96	89	91	81	97	94	89	94
Sulfentrazone	0.5	PREE	9	4	4	7	95	86	90	74	96	89	83	91
Carfentrazone	0.008	PREE	0	0	2	6	46	35	40	18	40	33	38	41
Carfentrazone	0.031	PREE	0	6	1	7	69	60	58	30	59	69	63	84
Halosulfuron	0.1	PREE	13	13	4	5	98	95	98	92	98	94	95	97
Prefar +	6.0 +	PREE	0	14	4	5	94	94	92	88	98	98	99	98
Basagran	0.5	POST												
Prefar +	6.0 +	PREE	4	14	5	5	91	92	89	83	96	96	99	99
Halosulfuron	0.1	POST												
Command +	0.5 +	PREE	9	16	3	6	89	91	88	86	96	97	99	99
Basagran	0.5	POST												
Command +	0.5 +	PREE	14	9	3	6	90	84	86	74	96	97	99	97
Halosulfuron	0.1	POST												
Basagran	0.5	POST	0	9	2	6	0	83	0	68	0	97	0	95
Basagran	0.75	POST	0	11	3	7	0	86	0	73	0	96	0	69
Halosulfuron	0.05	POST	0	3	2	8	0	81	0	63	0	96	0	89
Halosulfuron	0.1	POST	0	5	2	8	0	85	0	73	0	93	0	89
LSD (p=0.05)			5	7	2	3	24	21	20	20	21	14	20	17

PREE treatments applied on 19 March 1997 and POST treatments applied on 22 April 1997.

*Number of marketable and nonmarketable fruit per plot counted at harvest time.

AMABL = *Amaranthus blitoides* (prostrate pigweed), AMAAL = *A. albus* (tumble pigweed), CHEAL = *Chenopodium album* (lambsquarters), POROL = *Portulaca oleracea* (common purslane)