

Efficacy and Safety of Combinations of Preemergence and Postemergence Herbicides in Cantaloupes

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Abstract

Sandea at 0.03 lb AI/A combined with rimsulfuron at 0.02 lb AI/A gave exceptionally good control of prostrate pigweed and lambsquarters at 98% and 96%, respectively, when applied postemergence (POST) in cantaloupes. *Sandea* applied POST in a tank-mix with increasing rates of rimsulfuron showed marginally acceptable to unacceptable crop injury. All POST applications of *Sandea* following preemergence (PREE) herbicides or applied alone provided 90% or better control of lambsquarters. *Sandea* and Strategy gave unacceptable control of pigweed and lambsquarters at 60-70% relative to the standard, Prefar.

Sandea applied alone POST was less effective against pigweed than lambsquarters. A treatment of a PREE herbicide followed by *Sandea* was not as efficacious as the *Sandea* plus rimsulfuron tank-mix applied POST to control both pigweed and lambsquarters.

Introduction

*Sandea** herbicide (halosulfuron) was registered in Arizona for use on melons as a special local need in 2002. It has efficacy against purple nutsedge (*Cyperus rotundus*) and some other broadleaved weeds but does not have activity against groundcherry (*Physalis wrightii*) or grass weeds. Field trials have demonstrated that it has less efficacy against pigweeds (*Amaranthus* spp.) relative to lambsquarters (*Chenopodium* spp.). It has demonstrated better efficacy and crop safety when applied to the foliage compared to soil applications. Rimsulfuron (Matrix*), registered in tomatoes and potatoes, has shown varying degrees of safety in previous field trials conducted in melons. Prefar* (bensulide) is the standard herbicide for melon weed control in desert production regions and controls most grasses and some small-seeded broadleaved weeds. Strategy* [ethafluralin (20%) and clomazone (6%) package mix] was introduced for commercial use recently. Ethafluralin, marketed as Curbit*, is used on a limited scale in some desert production systems. This field trial was conducted to evaluate *Sandea* when applied in combinations with other soil-applied or postemergence herbicides to broaden the spectrum of weeds to be controlled in melons.

Materials and Methods

A small plot experiment was conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, Arizona. Cantaloupe cv. Cruiser was planted on every other raised and shaped 40-in bed such that the single seedlines were 80-in apart. The melons were furrow irrigated with water running in only the north furrow as opposed to every furrow to prevent salt build up in the seedline on the beds. Each treatment plot consisted of one 40-in bed measuring 30 ft in length. Herbicide treatments were replicated four times in a randomized complete block design. All herbicide treatment applications were made using a backpack CO₂ sprayer equipped with a hand-held boom consisting of two flat fan 8002 nozzle tips spaced 20-in apart. All sprays were applied in 30 gpa water at a pressure of 40 psi. Preemergence (PREE)

herbicide applications were made on 25 March 2002, one day after the planting. At the time of applications, the weather was clear with a slight breeze, air temperature at 72°F and soil dry at 68°F. The furrow irrigation was applied within a day and the beds were sub-irrigated nearly completely across to activate the herbicides. The postemergence (POST) herbicides were applied on 18 April at 24 days after treatment (DAT) of the PREE applications. The weather was clear with no winds and air temperature at 80°F. The cantaloupe was at the 2 to 3 leaf stage of growth, prostrate pigweed at the 4 to 12 leaf stage, lambsquarters at the cotyledon stage, and few annual yellow sweetclover and junglerice were present. All POST herbicide treatments included an adjuvant, Latron CS-7 added at 0.25% v/v. Cantaloupe injury and weed control was rated visually at intervals after PREE and POST applications of herbicides.

Results and Discussion

A single POST application of Sandea sequential to Prefar was safe on cantaloupes with less than 10% injury observed at 2 weeks after treatment (WAT) (Table). Sandea applied POST following a PREE application or applied only POST caused minimal injury at 11% and 9%, respectively. Strategy applied PREE caused cantaloupe injury of 19% and the injury was not as severe following Sandea applied POST to the same melons with 14% injury. Strategy applied to the cantaloupe did not cause chlorosis or bleaching of the foliage typically associated with clomazone injury. Sandea applied POST in a tank-mix with increasing rates of rimsulfuron showed marginally acceptable to unacceptable crop injury.

At 2 WAT-POST, Sandea at 0.03 lb AI/A combined with rimsulfuron at 0.02 lb AI/A gave exceptionally good control of prostrate pigweed and lambsquarters at 98% and 96%, respectively. All POST applications of Sandea provided 90% or better control of lambsquarters. Sandea applied POST alone or sequentially after PREE treatments gave marginally acceptable or less control of prostrate pigweed.

Prefar applied PREE offered very good control of both pigweed and lambsquarters at better than 90%. Sandea and Strategy gave unacceptable control of pigweed and lambsquarters at 60-70%.

Near harvest at 8 WAT-POST, Sandea at 0.03 lb AI/A plus rimsulfuron at 0.02 lb AI/A continued to exhibit acceptable control of lambsquarters and very good control of pigweed at 94%. Two sequential applications of Sandea gave marginally acceptable weed control that was comparable to Sandea tank-mixed with a lower rate of rimsulfuron at 0.01 lb AI/A. Sandea applied POST after PREE applications of Prefar or Strategy provided continued control of lambsquarters at better than 90% while pigweed control declined to less than acceptable.

Prefar demonstrated that it is a safe and superior PREE herbicide relative to Sandea or Strategy for pigweed and lambsquarters control in this test. The tank-mix of Sandea with rimsulfuron controlled both prostrate pigweed and lambsquarters effectively. Sandea applied alone POST was less effective against pigweed than lambsquarters. A treatment of a PREE herbicide followed by Sandea was not as efficacious as the Sandea plus rimsulfuron tank-mix applied POST to control both pigweed and lambsquarters.

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Table. Efficacy and safety of preemergence and postemergence herbicides in cantaloupes

Treatment	Rate (lb AI/A)	Timing	<u>Crop Injury (%)</u>			<u>Weed control (%)</u>					
			3 WAT-PREE	2 WAT-POST	8 WAT-POST	3 WAT-PREE		2 WAT-POST		8 WAT-POST	
						AMABL	CHEAL	AMABL	CHEAL	AMABL	CHEAL
Untreated check			0	0	0	0	0	0	0	0	0
Prefar + Sanda	6.0 + 0.03	PREE POST	6	3	6	90	93	84	92	71	91
Prefar + Sanda	6.0 + 0.05	PREE POST	5	3	10	90	95	85	90	73	90
Sanda + Sanda	0.05 + 0.03	PREE POST	9	11	14	71	63	85	93	83	85
Sanda + Rimsulfuron	0.03 + 0.01	POST POST	-	14	13	-	-	90	90	83	84
Sanda + Rimsulfuron	0.03 + 0.02	POST POST	-	16	10	-	-	98	96	94	85
Sanda	0.05	POST	-	9	11	-	-	76	90	55	79
Strategy + Sanda	1.0 pt/A + 0.05	PREE POST	19	14	10	61	62	78	93	63	90
LSD (p=0.05)			11.5	5.8	8.1	31.9	62.3	6.6	6.3	9.4	6

AMABL = *Amaranthus blitoides* (prostrate pigweed), CHEAL = *Chenopodium album* (lambsquarters)

PREE treatments applied on 25 March 2002 and POST treatments applied on 18 April.