CALIFORNIA MELON RESEARCH BOARD
Final Research Report Dec. 4, 2018

PROJECT. **Evaluating preplant and post plant herbicide programs for weed management in transplanted LSL melons.**

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Summary: Trials were conducted at the UC Desert Research and Extension Center (DREC in Imperial County) and West Side Research and Extension Center (WSREC in Fresno County) evaluating weed management and crop safety from various pre and post plant herbicides in transplanted long shelf life (LSL) cantaloupes. Cultivar "Fiji" was used at both locations, and the seed of various annual broadleaf and grassy weeds were broadcast throughout the plot area prior to transplanting. Both locations used subsurface drip irrigation. At DREC, Sandea (halosulfuron) 1 oz/A, Curbit (ethalfluralin) 4 pts/A, and Prefar (bensulide) 6 qts/A herbicides were evaluated with and without sprinkler incorporation. Post plant treatments of Sandea 1 oz/A and clethodim 8 oz/A herbicides were made 4 weeks after transplanting (WAT). At WSREC, Sandea 1 oz/A, Curbit 4 pts/A, Prefar 6 qts/A, and Curbit+Prefar tank-mix were either sprinkler or mechanically incorporated. Post-plant applications of Sandea 1 oz/A, clethodim 8 oz/A, and Poast (sethoxydim) 24 oz/A were made 4 WAT. An untreated weedy check treatment was included at both locations. Treatment design was a randomized complete block with 4 replications; plot size was one bed (6.67 ft) by 30 feet long. At DREC, weed control and fruit yields were significantly ($p \leq 0.05$) improved where sprinklers were used to incorporate the pre-emergent herbicides as compared to post applications of Sandea or clethodim. At 5 WAT, average weed control (grasses + broadleaf) was 91.5%, 75.5%, and 70.5% for Sandea, Curbit, and Prefar, respectively with sprinkler incorporation, but 47.7%, 67.2%, and 59.8% without. No crop phytotoxicity was observed in any of the treatments. All herbicide treatments with the exception of clethodim significantly increased fruit yield; pre-plant Sandea had 74% yield increase as compared to the untreated control. In contrast, at WSREC sprinkler incorporation did not provide adequate weed control, and in fact appeared to increase weed germination as compared to the mechanically incorporation. Pre plant Curbit, Sandea, and the Curbit+Prefar tankmix had significantly ($p \leq 0.05$) better broadleaf weed control at the end of the growing season with mechanical incorporation of 50.0%, 90.0%, and 90.0%, respectively, as compared to sprinkler irrigation (1.3%, 6.3%, and 1.3%). Some temporary crop injury was noted in the Sandea and Curbit pre treatments regardless of incorporation method. Nonetheless, best marketable yield occurred in those plots where weeds were suppressed – yields were decreased more than 50% in the untreated check plot as compared to the hand weeded control. Best yields of 1700 boxes per acre occurred in the Sandea PRE + POST treatment. The results from these trials show that pre-emergent applications of registered herbicides can

be safe and effective in transplanted melons provided they are properly incorporated. The lack of control in the sprinkler-irrigated treatments at WSREC was likely due to insufficient water being applied.

Introduction

Harper melons, also known as LSL (Long Shelf Life) melons, are part of an emerging trend in the melon-growing regions of California. Purported benefits include less labor at harvest and prolonged superior quality at the grocery store. Examples of Harper-type melons are the Infinite Gold, Fiji, Caribbean King and Caribbean Gold. Due to grower and buyer interest, seed companies are rapidly expanding the number of varieties with this trait.

However, LSL varieties are expensive hybrids relative to older, open pollinated cultivars, and seed costs can become a significant portion of the total cost of production. In the San Joaquin Valley, typical production practices are 1 row per 80" bed and a target plant population of about 5000 plants per acre (final in-row spacing of 16"). Siegers Seed Company currently lists Caribbean Gold RZ, a LSL Harper type, for $582 per 5000 seeds. Harris lists Shockwave for $70 per 1000 seeds. Thus, one potential method to reduce seeding costs would be to use transplants at much wider spacing.

Switching to transplants for cantaloupes and honeydews can result in changes to the weed management program for these crops. For example, the use of pre-plant herbicides, such as Treflan (trifluralin), Sandea (halosulfuron), or Curbit (ethalfluralin) should be safe to use, since the transplant could be planted at a depth as to avoid contact with the herbicides. This is the similar tactic that it used for processing tomatoes in the state, where a Treflan + Dual tankmix is typically applied before transplanting. However, due to the different size of melon transplants, this needs to be evaluated for crop safety. In the melon herbicide trial I conducted in 2017, a Sandea application made over-the-top at 3 true leaves and incorporated with water was safe and effective on direct-seeded melons (cv 'Durango').

The objective of this trial was to evaluate the use of several common pre and post-emergent herbicides on weed control and crop safety in drip irrigated Harper-type LSL transplanted melons using mechanical and sprinkler irrigation methods.

Methods

Two trials were established: an early season trial at the Desert Research and Education Center (DREC) in Imperial County, CA, and a mid season trial at the West Side Research and Education Center (WSREC) in Fresno County. LSL cultivar 'Fiji' was grown by Transplant Services Group at the Huron greenhouse location to provide transplants for both locations.

At WSREC, drip tape (Jain Typhoon, 15 mil, 7/8", 0.26 gph per emitter, 12" emitter spacing) was shanked into the center of 80" beds in the spring at a depth of ~10" and all beds were amended with 200 lbs/A of 10-52-0. Weed seed (redroot pigweed, Jimsonweed, Venice mallow, lambsquarters, large crabgrass, buffalobur, California watergrass, green foxtail, groundcherry, horsenettle, and purslane) was broadcast and lightly incorporated on 23-May, 2018.

Herbicide applications were made by hand using a backpack sprayer with 60 gpa of water equivalent on 31-May, 2018. Plots were one bed (80 inches) by 30 feet long, using a RCB design with 4 replications. Sandea (75% halosulfuron) at 1.0 oz/A, Curbit (35.4% ethalfluralin) at 4 pts/A, and Prefar 4-E (46% bensulide) at 6 qts/A were applied to clean, cultivated beds and mechanically incorporated to a depth of about 2" where appropriate. Plants were then set in the beds using a Mechanical Transplanter model 5000 WD and 150 gpa water on a 24" spacing and a planting depth of approximately 3". Sprinklers were used to incorporate the herbicides in the appropriate plots the following day with a 4-hour set. In total, there were 20 treatments: 10 with sprinkler incorporation and 10 with mechanical incorporation of the herbicides. At 4 weeks after transplanting (WAT), Sandea 1 oz/A, clethodim 4E at 8 oz/A, and Poast

(sethoxydim) treatments were applied as an over-the-top application to select plots. No adjuvants were used for any of the POST treatments, and they were not sprinkler incorporated. A summary of the treatments is listed in Table 1.

Table 1. Herbicide trial treatments for WSREC and DREC locations.

	Cantaloupes	cantaloupes		
Location	WSREC, near Five Points	DREC, Imperial County		
P.I.	Scott Stoddard, UCCE	Travis Bean, UCR, Pratat Devkota, UCCE		
Variety and plant date	Fiji, May 31, 2018	Fiji, April 4, 2018		
Plot size and plant spacing	1 bed (80") by 30 ft,4 reps, 24" spacing	1 bed (80") by 30 ft, 24" spacing		
Irrigation	buried drip	buried drip		
Herbicide incorporation	mechanical and sprinklers	drip and sprinklers		
Weed evaluation	1, 3, 4, 6, 8, 10 WAT	2, 3, 4, 5, 6, 8 WAT		
Harvest	17-Aug (79 days)	21-Jun (78 days)		
Treatments WSREC	Herbicide	Timing	Application dates	
1	UTC - weedy	---	---	
2	Sandea 1 oz/A PRE	pre plant	31-May	
3	Curbit 4 pts/A PPI	pre plant	31-May	
4	Prefar 6 qts/A PPI	pre plant	31-May	
5	Sandea 1 oz/A POST	post plant 28 days	26-Jun	
6	Clethodim 8 oz/A POST	post plant 28 days	26-Jun	
7	Curbit + Prefar PPI	pre plant	31-May	
8	Poast 1.5 pts/A POST	post plant 28 days	26-Jun	
9	Sandea PRE + POST	pre plant and post 28 days	31-May	26-Jun
10	Hand weeded check	---	every 2 weeks	
	All treatments either mechanically incorporated or with sprinklers			
	Sprinklers ran for about 4 hours 1 day after transplanting			
Treatments, DREC	Treatment Name	Application timing	Inc. method	Application date
1	Weedy Check	-	Sprinkler	
2	Sandea @ 1 OZ/A	PRE	Sprinkler	3-Apr
3	Curbit @ 4 PT/A	PRE	Sprinkler	3-Apr
4	Prefar @ 6 QT/A	PRE	Sprinkler	3-Apr
5	Sandea @ 1 OZ/A	POST	Sprinkler	3-May
6	Clethodim @ 8 OZ/A	POST	Sprinkler	3-May
7	Weedy Check	-	Drip	
8	Sandea @ 1 OZ/A	PRE	Drip	3-Apr
9	Curbit @ 4 PT/A	PRE	Drip	3-Apr
10	Prefar @ 6 QT/A	PRE	Drip	3-Apr
11	Sandea @ 1 OZ/A	POST	Drip	3-May
12	Clethodim @ 8 OZ/A	POST	Drip	3-May
	Sprinkler and drip irrigation ran for 12 hours on day after transplanting, drip thereafter.			

After transplanting, the field was irrigated via buried drip to match ETc + 10% leaching fraction, using ET estimates from the CIMIS weather station located on the field station. Wrangler (imidacloprid) insecticide was applied at 1 and 4 WAT for aphid control; a foliar application of abamectin and Quadris Top was made for leaf miners and powdery mildew at 6 WAT. 100 lbs N/A was applied using UAN30 through the drip system on 6 application events. No cultivation occurred after transplanting, except in the hand weeded plots.

Weed and crop phytotoxicity ratings were done using a subjective scale, where 0 = no weeds/no phyto, 1 = 1 - 7%, 2 = 7 - 25%, 3 = 25 - 50%, 4 = 50 - 75%, 5 = 75 - 93%, and 6 = 93 - 100% weeds or phyto. Ratings were made at 2-week intervals throughout the growing season. A once-over harvest was performed on 17-Aug 2018 by counting all fruit by size in each plot. Brix readings were done on 1 sample fruit from each plot using a hand held refractometer at room temperature.

At DREC, Sandea (halosulfuron) 1 oz/A, Curbit (ethalfluralin) 4 pts/A, and Prefar (bensulide) 6 qts/A herbicides were evaluated with and without sprinkler incorporation. Mechanical incorporation was not evaluated. Pre-emergent herbicides were applied 3-April-2018 to clean cultivated beds using a backpack sprayer, then transplanted the next day and sprinkler or drip irrigated. A 12 hour set was used on the day of transplanting; drip irrigation was used thereafter. Post plant treatments of Sandea 1 oz/A and clethodim 8 oz/A herbicides were made 4 WAT. Sandea and clethodim were used without an adjuvant. All POST applications were made over-the-top and were not incorporated with sprinklers.

Plot size was 1 bed (80") x 30 feet long, with 4 replications using a randomized block design. Irrigation, fertilizers, and insect pests were managed by DREC staff. Weed evaluations were performed at 2, 3, 4, 5, 6, and 8 weeks after transplanting, and are shown as % control. Harvest occurred on June 21. Fruit sizes were counted and weighed and Brix measured. In total, 12 treatments were evaluated (Table 1).

Results: WSREC

Weed pressure at WSREC was extremely high, with many plots nearly 100% covered by weeds. The main weeds at the WSREC location were nightshades (especially groundcherry, *Physalis* spp.), puncturevine, field bindweed, purslane, venice mallow, and redroot pigweed. Many of the plots had no grassy weeds, however, and there was little grass pressure in any plot. Weed control was strongly impacted by incorporation method, with significantly ($p \leq 0.05$) fewer weeds in the mechanically incorporated plots on all evaluation dates (Table 2). Pre-plant applications of Sandea, Curbit, Curbit+Prefar, and Sandea both PRE and POST had 50 to 90% weed control by the end of the season. This was significantly better than Prefar alone, or the POST applications of Sandea, Poast, or clethodim, which had end-of-season weed control of less than 5%. The poor performance of the grass herbicides is not surprising given the low grass weed pressure in this test. In the sprinkler incorporated plots, however, weed control was very poor, with end-of-season control less than 11% for all treatments except the hand weeded control (Table 3).

Regardless of incorporation method, significant crop injury occurred in the Sandea and Curbit plots (Figure 1). Plants were stunted and slightly chlorotic. This phytotoxicity peaked at 4 WAT and faded quickly, and had no significant impact on yield. Average yields in the Sandea PRE, Sandea PRE+POST, Curbit PRE, and Curbit + Prefar PRE were over 1900 boxes per acre in the mechanically incorporated plots (Figure 2).

Size 6 and larger ("Jumbos", average 6.1 lbs) fruit dominated this trial for all treatments (Table 4). Sprinkler incorporation resulted in significantly less size 6, 9, and total marketable yield than mechanical incorporation, a direct result of poor weed control. Relatively few weeds, less than 1 per square ft at 3

WAT, resulted in more than 50% loss of yield as compared to the weed-free check plots (Figure 3). Culls, soluble solids, and the "jumbo"% were not significantly affected by any of the treatments. Average yield for this trial was 1418 boxes/A at 12.2 Brix.

Results: DREC

The main weeds at the DREC location were goosefoot (lambsquarters), Brassicas (mustards, sowthistles), purslane, tumble pigweed, and various grasses. As at WSREC, weed control was significantly impacted by incorporation method. At this location, sprinkler incorporation, as compared to no incorporation, resulted in significant improvement in weed control at all evaluation dates (Table 5). Furthermore, there was a strong herbicide x incorporation interaction on most evaluation dates, which indicates that some of the herbicides performed differently depending on how they were incorporated. Sandea, for example, had 94% broadleaf weed control at 5 WAT in the sprinkler incorporation plots, but only 49% control where sprinklers were not used, whereas Curbit had about 70% control for either method (Figure 4).

Very little crop injury was noted for any of the treatments. Only the POST application of Sandea and PPI Sandea, Curbit, and Prefar at 4 WAT showed any crop impact, and was no longer visible 6 WAT.

Probably due to the lateness of the season (for the desert production area), yields were very low across all treatments in this test. Highest yield occurred with pre-plant Sandea at 380 boxes/A. Nonetheless, all herbicide treatments with the exception of clethodim significantly increased fruit yield -- pre-plant Sandea had 74% yield increase as compared to the untreated control (Figure 5). Size 12 and total marketable yield were significantly increased as compared to the untreated control and POST clethodim treatment (Table 6). The herbicide treatments also had significantly fewer culls than the untreated control. When averaged across all herbicide treatments, sprinkler incorporation resulted in significantly higher total marketable yield and fewer culls. Soluble solids and the size 9% were not affected by incorporation method. Average Brix for this trial was 11.7%.

At both locations, the use of pre-plant applications of Curbit and Sandea significantly improved weed control as compared to the other treatments and the untreated control plots. Crop phytotoxicity was also noted from these two herbicides, but the effect was temporary and these plots resulted in the highest yield and both locations. However, the affect of incorporation was not consistent. Using sprinklers to incorporate the pre-plant herbicides improved weed control at the DREC location, but reduced weed control at WSREC. This may have occurred because the irrigation set at WSREC was too short (only about 4 hours) to properly activate the herbicides, and instead increased weed seed germination.

Acknowledgements

Many thanks to the staff at UC WSREC and DREC for their help and cooperation in these trials. This research was made possible through the financial support of the California Melon Research Board.

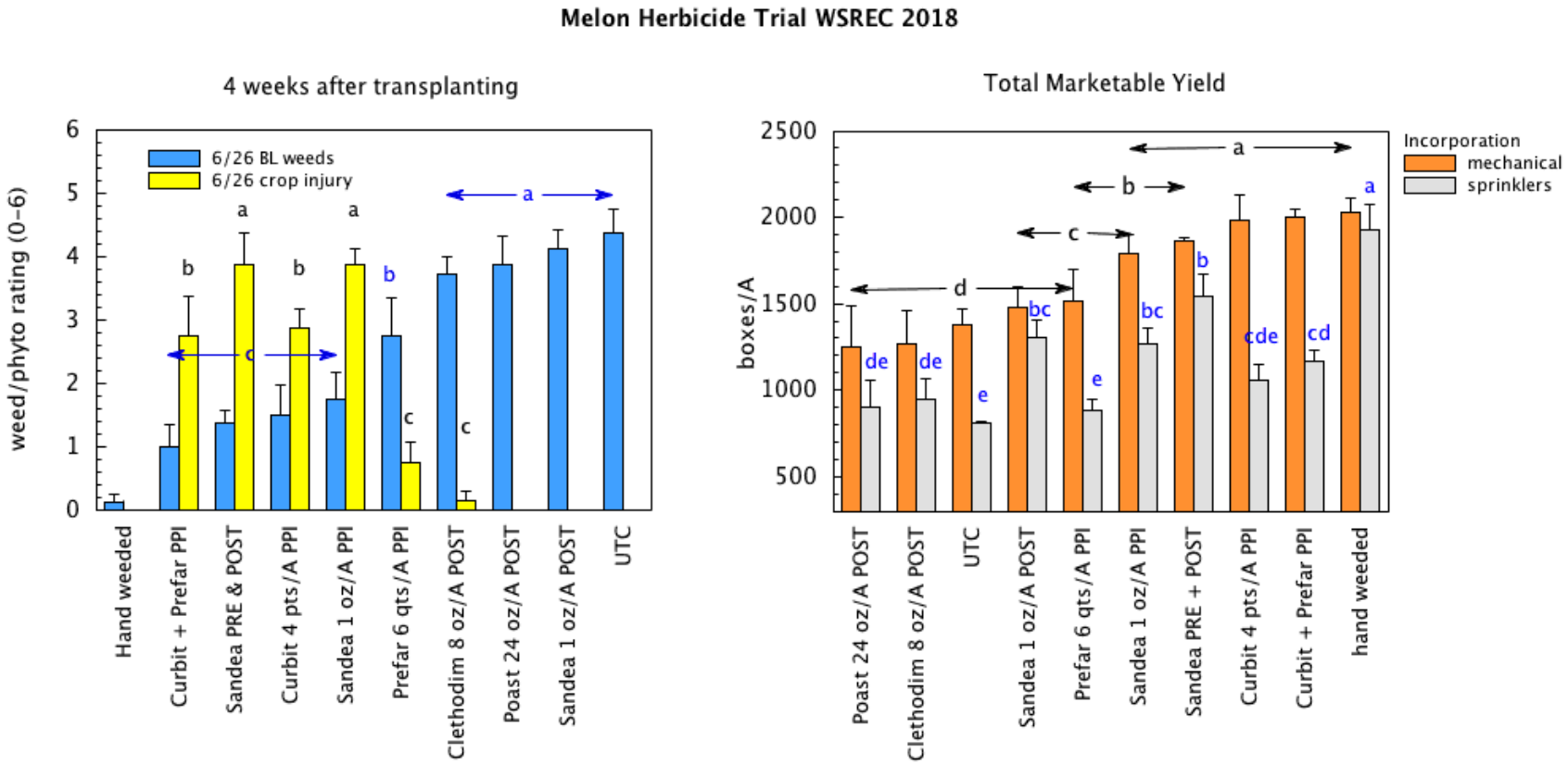
Table 2. Weed control as affected by herbicide treatments at WSREC, mechanical incorporation.

	Treatment	Incorporation	6/8/18 stand #/plot	6/8/18 1 week # weeds/plot	6/21/18 3 weeks # weeds	6/26/18 4 weeks BL	G	crop phyto	10-Jul 2 and 6 weeks BL	G	crop phyto	24-Jul 4 and 8 weeks BL	G	crop phyto	8-Aug 6 and 10 weeks BL	G	season end % control
1	UTC - weedy	mechanical	12.3	7.3	93.8	4.3	0.3	0.0	4.8	0.3	0.0	5.8	0.5	0.0	6.0	0.0	0.0
2	Sandea 1 oz/A PRE	mechanical	11.8	2.0	14.5	1.3	1.0	3.5	1.8	0.5	0.8	2.0	1.0	0.0	3.0	1.0	50.0
3	Curbit 4 pts/A PPI	mechanical	11.8	0.3	2.5	0.5	1.0	2.5	1.5	0.0	0.3	0.8	0.0	0.0	1.3	0.0	90.0
4	Prefar 6 qts/A PPI	mechanical	12.3	3.5	40.0	1.5	0.3	1.5	3.0	0.0	0.0	5.3	0.0	0.0	5.8	0.0	5.0
5	Sandea 1 oz/A POST	mechanical	11.8	24.5	82.3	3.8	0.5	0.0	4.5	0.5	0.0	5.3	0.8	0.0	5.8	1.0	5.0
6	Clethodim 8 oz/A POST	mechanical	11.8	13.0	77.5	3.3	0.7	0.0	5.3	0.3	0.0	5.8	0.3	0.0	6.0	0.3	3.8
7	Curbit + Prefar PPI	mechanical	12.5	0.3	2.0	0.3	0.8	2.5	2.3	0.0	0.5	1.0	0.0	0.0	1.3	0.0	90.0
8	Poast 1.5 pts/A POST	mechanical	11.5	9.0	90.0	3.3	0.0	0.0	5.5	0.0	0.3	6.0	0.0	0.0	6.0	0.0	2.5
9	Sandea PRE + POST	mechanical	11.5	1.5	11.5	1.0	1.3	3.8	3.5	0.0	1.8	1.5	1.0	0.5	2.3	1.3	68.8
10	Hand weeded check	mechanical	11.8	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
		Average	11.9	6.8	46.0	2.1	0.6	1.5	3.6	0.2	0.4	3.7	0.4	0.1	4.1	0.4	35.0
		LSD 0.05	ns	ns	59.3	1.2	ns	1.2	2.0	ns	ns	0.8	0.7	---	0.7	0.7	14.3
		CV, %	6.1	175	88.3	35.4	152	43.8	39.1	218	211	14.0	120	---	11.0	129	28.0

Table 3. Weed control as affected by herbicide treatments at WSREC, sprinkler incorporation.

	Treatment	Incorporation	6/8/18 stand #/plot	6/8/18 1 week # weeds/plot	6/21/18 3 weeks # weeds	6/26/18 4 weeks BL	G	crop phyto	10-Jul 2 and 6 weeks BL	G	crop phyto	24-Jul 4 and 8 weeks BL	G	crop phyto	8-Aug 6 and 10 weeks BL	G	season end % control
1	UTC - weedy	sprinklers	12.3	80.0	147.5	4.5	0.3	0.0	6.0	0.3	0.0	6.0	0.5	0.0	6.0	0.3	0.0
2	Sandea 1 oz/A PRE	sprinklers	11.8	6.5	53.8	2.3	0.3	4.3	3.5	1.0	0.3	4.5	0.8	0.0	6.0	1.0	1.3
3	Curbit 4 pts/A PPI	sprinklers	12.5	12.3	86.3	2.5	0.0	3.3	4.5	0.0	0.3	5.0	0.0	0.0	5.5	0.0	6.3
4	Prefar 6 qts/A PPI	sprinklers	12.5	59.5	128.8	4.0	0.0	0.0	5.8	0.0	0.0	6.0	0.0	0.0	6.0	0.0	1.3
5	Sandea 1 oz/A POST	sprinklers	12.5	47.8	125.0	4.5	0.8	0.0	4.5	0.8	0.0	5.3	0.5	0.0	6.0	1.0	1.3
6	Clethodim 8 oz/A POST	sprinklers	12.0	51.3	130.0	4.0	0.3	0.3	6.0	0.0	0.0	6.0	0.0	0.0	5.8	0.0	3.8
7	Curbit + Prefar PPI	sprinklers	12.0	5.5	70.0	1.8	0.3	3.0	4.5	0.0	0.8	5.8	0.3	0.0	5.8	0.3	3.8
8	Poast 1.5 pts/A POST	sprinklers	12.0	52.5	142.5	4.3	0.5	0.0	6.0	0.0	0.0	6.0	0.0	0.0	6.0	0.0	1.3
9	Sandea PRE + POST	sprinklers	12.3	11.3	57.5	1.8	0.3	4.0	2.5	0.8	0.5	2.8	1.3	0.0	5.0	0.8	11.3
10	Hand weeded check	sprinklers	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
		Average	12.2	36.3	104.6	3.3	0.3	1.6	4.8	0.3	0.2	5.3	0.4	0.0	5.8	0.4	3.3
		LSD 0.05	ns	25.4	40.4	1.2	ns	1.5	1.2	0.6	ns	1.0	0.8	---	0.5	0.8	6.3
		CV, %	4.7	47.9	26.2	25	200	62.3	17.6	140	302	13.2	145	---	6.5	145.3	129.9

Ratings scale: 0 = no weeds/no phyto, 1 = <10%, 2 = <25%, 3 = < 50%, 4 = <75%, 5 < 90%, 6 = >90% weeds or phyto
BL = broadleaf weeds, G = grassy weeds. Primary weeds nightshade, puncturevine, bindweed, purslane, venice mallow, pigweed, and junglerice.
LSD 0.05 = Least significant difference at the 95% confidence level. NS = not significant. --- = not enough data to perform statistical analysis. Treatment 10 not included in analysis.
CV = coefficient of variation
f-test, *, **, *** significant at 0.05, 0.01, and 0.001 respectively



Figures 1 and 2. Crop phytotoxicity and weed pressure at 4 WAT (left), and total marketable yield for each herbicide and incorporation treatment

Table 4. Cantaloupe yield and size as effected by herbicide program and method of incorporation, WSREC 2018.

		boxes/A by fruit size				Jumbo			soluble	
	Treatment	15	12	9	6	5	TMY	Culls %	solids %	Jumbos %
1	UTC - weedy	10.9	38.6	142.2	435.6	479.2	1095.5	7.8%	10.6	41.1%
2	Sandea 1 oz/A PRE	1.8	49.9	169.4	635.3	675.2	1529.7	6.0%	13.7	43.1%
3	Curbit 4 pts/A PPI	7.3	61.3	157.3	440.1	860.3	1519.0	6.4%	12.7	53.4%
4	Prefar 6 qts/A PPI	9.1	97.6	130.1	440.1	528.2	1195.9	5.7%	12.7	41.4%
5	Sandea 1 oz/A POST	16.3	38.6	226.9	558.1	571.7	1395.3	8.3%	10.0	39.5%
6	Clethodim 8 oz/A POST 28 days	5.4	47.6	127.1	358.5	571.7	1104.9	6.1%	12.0	49.4%
7	Curbit + Prefar PPI	10.9	61.3	148.2	553.6	822.2	1585.3	5.3%	12.2	49.6%
8	Poast 1.5 pts/A POST 28 days	12.7	34.0	124.0	394.8	522.7	1075.5	6.7%	11.3	47.4%
9	Sandea PRE + POST 28 days	10.9	68.1	178.5	571.7	882.1	1700.4	7.0%	13.4	50.6%
10	Hand weeded check	7.3	61.3	226.9	716.9	974.7	1979.7	6.2%	13.4	48.3%
	Herbicide LSD 0.05	ns	ns	ns	171.3	221.7	225.9	ns	2.1	ns
	Incorporation									
1	Mechanical incorporation	8.3	42.3	160.9	553.6	898.4	1655.6	7.2	12.5	53.4
2	Sprinklers	10.1	69	165.2	467.4	479.2	1180.6	5.9	11.9	39.4
	Incorporation LSD 0.05	ns	21.1	ns	76.6	99.2	101	ns	ns	4.7
	Inc. x Herbicides f-test	ns	ns	*	ns	*	**	ns	ns	ns
	Average	9.2	55.8	163.1	510.5	699.8	1418.1	6.6	12.2	46.4
	CV, %	165	84	47.2	33.5	32.2	15.9	77.2	17.2	22.8

boxes/A fruit size = number of mature fruit in a 30 lb box. Jumbo = any fruit larger than a size 6 (average 6.1 lbs)

TMY = total marketable yield of 12, 9, 6, and Jumbo combined

LSD 0.05 = Least significant difference at the 95% confidence level. NS = not significant. --- = not enough data to perform statistical analysis

CV = coefficient of variation

f-test, *, **, *** significant at 0.05, 0.01, and 0.001 respectively

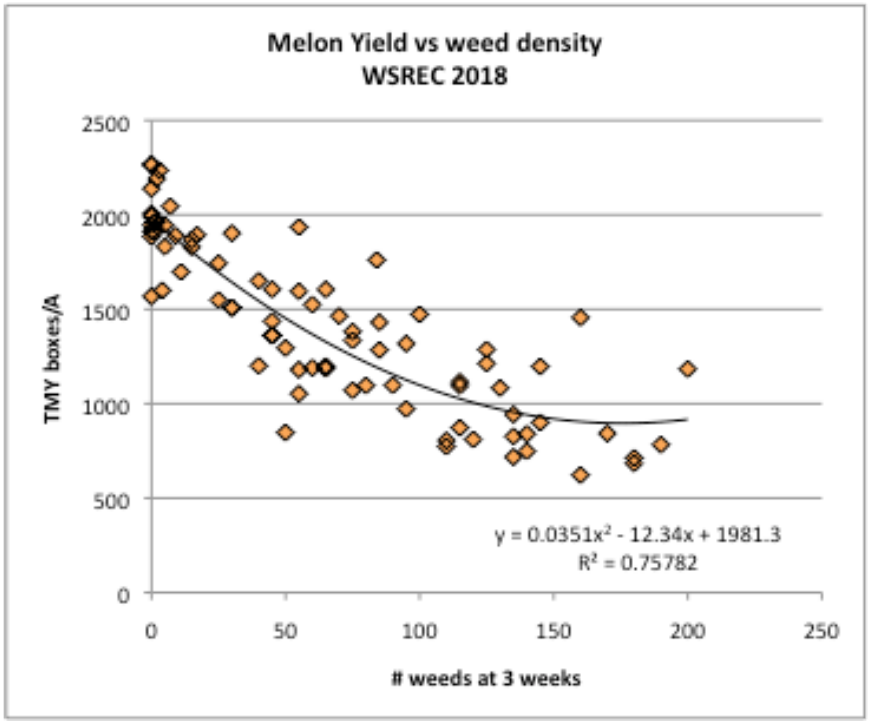


Figure 3. Relationship between total marketable yield (TMY) and the number of weeds per plot 3 WAT.

Table 5. Weed control as affected by herbicide treatments at DREC.

	Treatment		4/17/2018 (2 wk after treatment)						4/24/2018 (3 wk after treatment)					
			Phyto	Goosefoot	Brassica	Grass	Purslane	Tumble pigweed	Phyto	Goosefoot	Brassica	Grass	Purslane	Tumble pigweed
1	-	Weedy Check	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0	0.0	0.0	0.0	0.0
2	PRE	Sandea @ 1 OZ/A	0.0	96.3	93.8	96.3	96.9	---	0.0	92.5	90.0	90.6	90.6	99.4
3	PRE	Curbit @ 4 PT/A	0.0	100.0	78.1	100.0	98.1	---	0.0	98.1	69.4	93.1	96.3	99.4
4	PRE	Prefar @ 6 QT/A	0.0	96.9	79.4	98.8	94.4	---	0.0	93.8	73.1	89.4	85.6	97.5
5	POST	Sandea @ 1 OZ/A	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0	0.0	0.0	0.0	0.0
6	POST	Clethodim @ 8 OZ/A	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0	0.0	0.0	0.0	0.0
	Herbicide LSD 0.05		---	2.8	11.5	3.8	3.3	---	---	4.4	17.3	4.2	3.7	2.2
	Incorporation													
1	Sprinkler incorporation		0	59.3	46.3	59.0	59.8	---	0	58.8	41.8	55.5	58.0	60.0
2	drip		0	58.0	54.3	59.0	56.0	---	0	55.0	51.3	53.4	51.0	59.0
	Incorporation LSD 0.05		---	ns	7.2	ns	2.1	---	---	2.8	ns	ns	2.4	ns
	Inc. x Herbicides f-test		---	ns	*	ns	*	---	---	ns	ns	**	***	ns
		Average	0	58.6	50.3	59.0	57.9	---	0	56.9	46.5	54.6	54.5	59.3
		CV, %	---	4.7	22.3	6.2	5.5	---	---	7.6	36.2	7.4	6.7	3.6

	Treatment		5/2/2018 (4 wk after treatment)						5/9/2018 (5 wk after treatment)					
			Phyto	Goosefoot	Brassica	Grass	Purslane	Tumble pigweed	Phyto	Goosefoot	Brassica	Grass	Purslane	Tumble pigweed
1	-	Weedy Check	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0	0.0	0.0	0.0	0.0
2	PRE	Sandea @ 1 OZ/A	83.8	69.4	81.3	65.0	79.4	---	0.0	80.6	68.8	65.6	58.8	78.1
3	PRE	Curbit @ 4 PT/A	85.0	48.8	86.3	80.6	86.9	---	0.0	79.4	43.1	74.4	74.4	76.3
4	PRE	Prefar @ 6 QT/A	83.1	51.3	81.9	53.1	71.3	---	0.0	75.6	44.4	71.9	45.6	68.1
5	POST	Sandea @ 1 OZ/A	0.0	0.0	0.0	0.0	0.0	---	7.5	0.0	87.5	0.0	0.0	0.0
6	POST	Clethodim @ 8 OZ/A	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0	0.0	61.3	0.0	0.0
	Herbicide LSD 0.05		7.6	18.6	6.4	7.6	10.3	---	---	7.6	19.4	22.3	8.3	10.9
	Incorporation													
1	Sprinkler incorporation		57.3	37.0	53.5	50.3	54.8	---	1.8	55.0	52.3	59.0	46.8	52.0
2	drip		43.5	30.8	46.3	29.3	40.3	---	1.3	39.2	45.3	50.2	24.8	37.0
	Incorporation LSD 0.05		4.8	ns	4.1	4.8	6.5	---	---	4.8	ns	ns	5.3	6.9
	Inc. x Herbicides f-test		**	**	**	***	**	---	---	***	**	ns	***	**
		Average	50.4	33.9	49.9	39.8	47.5	---	1.5	47.1	48.8	54.6	35.8	44.5
		CV, %	14.7	53.5	12.6	18.7	21.1	---	---	15.7	38.9	39.9	22.7	23.9

	Treatment		5/15/2018 (6 wk after treatment)						5/29/18					
			Phyto	Goosefoot	Brassica	Grass	Purslane	Tumble pigweed	Phyto	Goosefoot	Brassica	Grass	Purslane	Tumble pigweed
1	-	Weedy Check	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0
2	PRE	Sandea @ 1 OZ/A	0.0	61.9	59.4	57.5	45.0	62.5	0.0	46.9	40.0	40.6	38.8	44.4
3	PRE	Curbit @ 4 PT/A	0.0	66.9	46.9	72.5	63.1	52.5	0.0	47.5	40.0	72.5	54.4	46.9
4	PRE	Prefar @ 6 QT/A	0.0	58.1	37.5	50.6	33.1	45.0	0.0	46.9	20.0	63.1	21.9	30.6
5	POST	Sandea @ 1 OZ/A	0.0	16.9	100.0	8.8	6.9	13.8	0.0	0.0	100.0	0.0	0.0	0.0
6	POST	Clethodim @ 8 OZ/A	0.0	8.8	3.8	83.1	2.5	5.0	0.0	0.0	0.0	51.9	0.0	0.0
	Herbicide LSD 0.05		---	15.6	15.7	14.6	8.8	18.9	---	10.2	22.6	14.7	6.6	15.5
	Incorporation													
1	Sprinkler incorporation		0.0	59.8	55.5	62.0	42.0	49.3	0.0	47.3	49.0	56.8	39.0	39.5
2	drip		0.0	25.3	43.5	47.0	18.3	22.3	0.0	9.3	31.0	34.5	7.0	9.3
	Incorporation LSD 0.05		---	9.9	9.9	9.2	5.6	12.0	---	6.5	14.3	9.3	4.2	9.8
	Inc. x Herbicides f-test		---	**	***	*	***	*	---	***	**	**	***	***
		Average	0.0	42.5	49.5	54.5	30.1	35.8	0.0	28.3	40.0	45.6	23.0	24.4
		CV, %	---	35.8	30.9	26.1	28.4	51.5	---	35.2	55.1	31.4	27.8	61.9

Ratings scale: % weed control or crop phyto as compared to UTC plots.

LSD 0.05 = Least significant difference at the 95% confidence level. NS = not significant. --- = not enough data to perform statistical analysis. Treatment 1 not included in analysis.

CV = coefficient of variation

f-test, *, **, *** significant at 0.05, 0.01, and 0.001 respectively

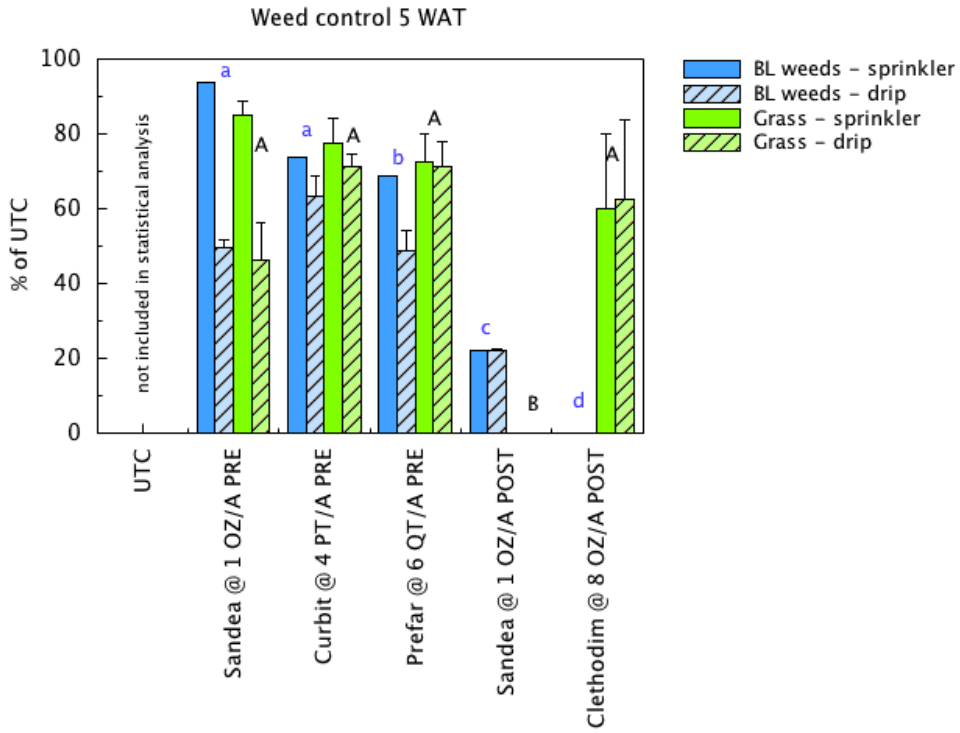


Figure 4. Weed control at the DREC location as affected by herbicide treatment and incorporation method.

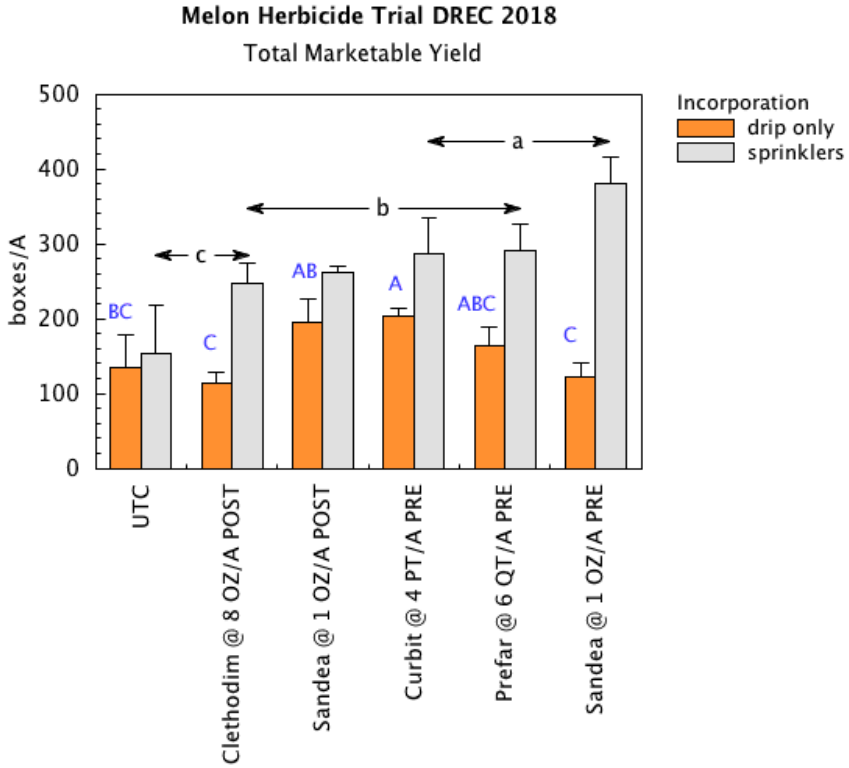


Figure 5. Melon yield at the DREC by herbicide treatments and incorporation method.

Table 6. Cantaloupe yield and size as effected by herbicide program and method of incorporation, DREC 2018.

Treatment			boxes/A by fruit size						Soluble		
			23	18	15	12	9	TMY	Culls, %	Soliids, %	Size 9, %
1	-	Weedy Check	21.3	52.9	65.3	22.7	3.0	144.0	26.4%	10.9	0.9%
2	PRE	Sandea @ 1 OZ/A	14.2	56.0	94.4	86.2	15.1	251.7	15.6%	11.1	3.6%
3	PRE	Curbit @ 4 PT/A	11.8	56.0	103.5	70.3	15.1	244.9	9.4%	12.5	4.6%
4	PRE	Prefar @ 6 QT/A	21.3	62.0	110.7	45.4	9.1	227.2	6.8%	11.2	3.3%
5	POST	Sandea @ 1 OZ/A	14.2	71.1	96.2	52.2	9.1	228.5	6.9%	12.2	3.5%
6	POST	Clethodim @ 8 OZ/A	24.9	48.4	108.9	20.4	3.0	180.7	14.5%	12.4	1.5%
	Herbicide LSD 0.05		ns	ns	ns	34	ns	54.9	13.3	1.2	ns
	Incorporation										
1	Sprinkler incorporation		14.2	58.5	118.0	77.2	16.1	269.7	17.0	11.6	5.0
2	drip		21.7	57.0	75.0	22.0	2.0	155.9	9.5	11.8	0.8
	Incorporation LSD 0.05		7.4	ns	23.9	19.6	9.4	31.7	7.3	ns	ns
	Inc. x Herbicides f-test		ns	ns	ns	**	ns	**	ns	ns	ns
		Average	17.9	57.7	96.5	49.6	9.1	212.8	13.3	11.7	2.9
		CV, %	70.1	51.0	42.1	67.4	177.2	25.4	92.7	10.1	171.0

boxes/A fruit size = number of mature fruit in a 30 lb box.

TMY = total marketable yield of 18,15, 12, and 9, combined

LSD 0.05 = Least significant difference at the 95% confidence level. NS = not significant. --- = not enough data to perform statistical analysis

CV = coefficient of variation

f-test, *, **, *** significant at 0.05, 0.01, and 0.001 respectively