

**Project Number:** 13K 3419 6228

**Title:** Weed control in cucumbers.

**Personnel:** Tim Miller, Carl Libbey, Bob Peterson, Brian Maupin, WSU  
Mount Vernon REU

**Reporting Period:** 2002-03

**Accomplishments:** Five cucumber studies were conducted in 2002: three studies monitoring rotational crop sensitivity to Sandea (halosulfuron), and two testing Sandea in combination with other products on cucumber, squash, and pumpkin. Weed control and/or crop injury was measured in each study.

**Results:**

*Cucurbit trial.* Nine varieties of three cucurbit types (cucumber, squash, and pumpkin) were planted June 12-14, 2002 at WSU Mount Vernon. Herbicides were applied June 15 (PRE) and July 2 (POST). Weed control and crop injury were evaluated July 13 and August 8. Stand counts were made August 22. Crops are being taken to harvest, at which time fruit number and weight will be tallied. Results are in Tables 1 and 2.

Crop injury was light (< 10%) for all treatments. Using Command with the tested herbicide combinations improved weed control by some 7% by August 8. Weed control > 85% by August 8 was achieved under four conditions: 1. Strategy applied PRE with or without Command (PRE); 2. Sandea + Dual Magnum or Outlook applied PRE with or without Command (PRE); 3. Sandea or Basagran (POST) alone or in sequence with Command (PRE); 4. Dual Magnum or Sandea applied PRE with Command; or 5. by all tested PRE + POST treatments with or without Command (PRE). Stand counts did not vary by herbicide treatment, but did by variety\*Command, ranging from 3.7 plants/plot for Table Ace with Command to 14.7 for Calypso with Command.

*Sandea herbicide trial.* Three cucurbit types (cucumber, squash, and pumpkin) were planted June 14, 2002 at WSU Mount Vernon. Sandea was then applied June 15 (PRE) and July 2 (POST). Weed control and crop injury were evaluated July 2 and July 13. Five crop plants of each type were then harvested August 16 and dry weight recorded. Results are in Table 3.

Early season weed control was excellent with all Sandea rates and timings, ranging from 94 to 100% through mid-July. Weed control began to fall off in August, however, with common lambsquarters becoming predominant in POST treatments and smartweed in PRE treatments. Biomass did not vary significantly in regard to PRE or POST Sandea, but cucurbit growth tended to be slightly heavier when Sandea was applied POST than PRE.

*Sandea carryover trials.* Two iterations have been/are being conducted at WSU Mount Vernon. The first iteration of this trial was sprayed with four rates of Sandea July 10, 2001 and the herbicide incorporated with a roto-tiller. The first planting was July 12, 2001, the second planting September 11, 2001, the third planting June 3, 2002, and the fourth planting October 9, 2002. The second iteration was sprayed May 30, 2002, the first planting June 3, 2002, and the second planting July 19, 2002. Plants were harvested approx. six weeks after planting, and dry weight recorded. Results are included in Table 4.

Thus far, spinach, beet, and cauliflower are most sensitive to Sandea carryover, still showing significantly poorer growth even 11 months after treatment. Pea and potato biomass was reduced by Sandea through about 3 months after treatment, while growth was nearly unaffected by 11 months. Cucumbers were relatively unaffected by Sandea, even when seeded into residuals at 2 times the use rate.

*Cucumber plant back trial.* Pickling cucumbers (cv. 'Calypso') were planted June 4 at WSU Mount Vernon. Herbicides were applied preemergence June 8. Weed control and crop injury were estimated June 25 and July 24. Two meters of four rows of cucumber plants were counted and marketable fruit removed from vines. Number and weight of fruit was noted. Rotational crops were then planted at right angles to the herbicide treatments: cabbage seed September 6, winter wheat September 10, and tulip October 15; spinach, beets, peas, cauliflower, and potatoes will be planted spring, 2003. Results are included in Table 5.

Weed control from all treatments was excellent by June 25, but only the higher Sandea rates + Command were still adequately controlling weeds by July 24. Cucumber growth and yield was not significantly affected by Sandea + Command treatment, although the trend was for lower yield with increasing Sandea rate, with Command alone showing higher yield. Initial rotational plantings of cabbage and wheat are not yet showing symptoms consistent with injury from differential Sandea applications.

Table 1. Crop injury and weed control from several herbicide combinations in cucumber, squash, and pumpkin.

Treatment	Timing <sup>a</sup>	Rate	Crop injury <sup>b</sup>		Weed control		
			No Command		No Command	Command	
			7/13	8/8	7/13	8/8	8/8
		product/a	-----	%	-----	%	-----
Curbit	PRE	2 pts	4	3	69	62	76
Outlook	PRE	0.25 pt	4	2	75	66	82
Dual Magnum	PRE	0.3 pt	5	1	79	72	85
Sandea	PRE	0.75 oz	3	2	82	80	85
Strategy	PRE	4 pts	4	1	86	88	93
Sandea + Outlook	PRE	0.5 oz + 0.3 pt	5	2	92	92	94
Sandea + Dual Magnum	PRE	0.5 oz + 0.25 pt	5	1	88	86	91
Sandea	POST	0.5 oz	6	2	94	93	96
Basagran	POST	0.5 pt	3	1	93	85	92
Outlook	POST	0.25 pt	4	1	78	68	79
Dual Magnum	POST	0.3 pt	4	1	81	72	82
Sandea + Sandea	PRE + POST	0.75 oz + 0.5 oz	6	2	95	93	94
Sandea + Basagran	PRE + POST	0.75 oz + 0.5 pt	6	1	93	91	96
Sandea + Outlook	PRE + POST	0.5 oz + 0.3 pt	7	2	92	91	94
Sandea + Dual Magnum	PRE + POST	0.5 oz + 0.25 pt	5	1	90	87	90
Handweeded	—	—	3	1	81	100	100

<sup>a</sup>PRE = preemergence; POST = postemergence.

<sup>b</sup>Averaged across varieties. The only crop injury ratings at 10% or higher occurred prior to July 13: 10% for ‘Calypso’ cucumber with Sandea + Outlook (PRE) or Sandea + Dual Magnum (PRE + POST), 11% for ‘Howden’ pumpkin with Sandea + Sandea (PRE + POST), and 11% for ‘Hubbard Blue’ with Sandea + Outlook (PRE + POST).

Table 2. Stand counts of cucumber, squash, and pumpkin after treatment with several herbicide combinations.

Type	Variety	Stand counts (August 22)		
		Command	No Command	
		-----	no./plot	-----
Cucumber, pickling	Calypso	13.2	14.7	
Cucumber, slicing	Turbo	13.7	10.7	
Squash, buttercup	Delicata	7.0	7.4	
Squash, butternut	Early Butternut	5.7	6.3	
Squash, processing	Hubbard Blue	9.4	9.0	
Squash, acorn	Table Ace	4.5	3.7	
Pumpkin, Jack o’lantern	Howden	5.4	5.7	
Pumpkin, processing	Small Sugar	7.4	8.5	
Pumpkin, mini	Wee-B-Little	6.7	4.6	

Table 3. Crop injury, weed control, and biomass of cucumber, squash, and pumpkin following Sandea application.

Treatment	Timing	Rate	Weed control		Biomass		
			7/2/02		Cucumber	Squash	Pumpkin
			7/13/02	7/13/02	g/5 plants	g/5 plants	g/5 plants
		product/a	-----	%	-----	%	-----
Sandea	PRE	0.5 oz	100	96	6.0	19.8	27.8
Sandea	PRE	0.67 oz	99	94	8.3	16.5	22.8
Sandea	PRE	1 oz	100	97	7.0	17.3	22.5
Sandea	POST	0.5 oz	—	96	6.3	20.8	35.5
Sandea	POST	0.67 oz	—	95	6.8	24.3	48.0
Sandea	POST	1 oz	—	97	6.5	21.5	36.8
Sandea + Sandea	PRE + POST	0.67 oz + 0.67 oz	100	99	5.0	15.0	22.8
Untreated check	—	—	0	0	2.0	7.5	15.0
LSD <sub>0.05</sub>	—	—	1	3	3.3	7.7	16.0

<sup>a</sup>PRE = preemergence (6/15/02); POST = postemergence (7/2/02).

NOTE: No significant crop injury was seen in ‘Turbo’ cucumber, ‘Delicata’ squash, or ‘Wee-B-Little’ pumpkin at either evaluation date.

Table 4. Rotational crop injury and biomass after planting in soil treated with Sandea.

Rate	Crop injury (%) and biomass (g)													
	Beet (seed)		Beet (root)		Spinach		Cauliflower		Peas		Cucumbers		Potatoes	
product/a	%	g	%	g	%	g	%	g	%	g	%	g	%	g
<b>1<sup>st</sup> Planting</b>														
0.5 oz	94	0.3	—	—	80	0.4	94	0.2	35	14.7	3	36.3	30	11.1
1 oz	95	0.1	—	—	81	0.6	95	0.1	43	11.6	3	37.2	59	7.6
1.5 oz	97	0.5	—	—	89	0.3	98	0.0	50	10.0	6	32.8	83	4.2
2 oz	97	0.1	—	—	89	0.2	97	0.0	63	7.0	8	31.1	89	3.2
Untreated	0	7.6	—	—	0	25.1	0	5.5	0	20.5	3	41.2	0	21.6
<b>2<sup>nd</sup> Planting</b>														
0.5 oz	78	5.5	46	0.5	43	1.4	58	0.5	0	5.5	—	—	0	7.2
1 oz	78	4.0	55	0.5	58	0.9	68	0.4	0	6.1	—	—	0	6.4
1.5 oz	81	3.6	54	0.4	66	0.7	68	0.3	0	9.9	—	—	0	5.5
2 oz	84	3.1	66	0.3	76	0.8	75	0.3	0	11.7	—	—	0	4.0
Untreated	0	15.5	0	3.1	0	8.3	0	3.0	0	7.2	—	—	0	8.1
<b>3<sup>rd</sup> Planting</b>														
0.5 oz	15	0.8	92	0.0	5	10.7	0	0.8	0	21.1	—	—	0	34.5
1 oz	30	0.5	75	1.4	8	6.8	5	0.9	0	20.9	—	—	1	20.1
1.5 oz	48	0.6	92	0.1	25	4.0	17	0.8	0	23.4	—	—	9	17.2
2 oz	50	0.3	100	0.0	43	2.0	23	0.9	0	29.5	—	—	0	17.0
Untreated	0	3.5	75	5.9	0	13.6	0	1.9	0	26.8	—	—	4	20.0

1<sup>st</sup> Planting (two years of data; planted 7/12/01 and 6/3/02, shortly after treatment), 2<sup>nd</sup> Planting (one year of data; planted 9/11/01, approx. 2 months after treatment), and 3<sup>rd</sup> Planting (one year of data; planted 6/3/02, approx. 11 months after treatment). Plants harvested approx. six weeks after planting.

Table 5. Preemergence weed control in cucumbers.

Treatment <sup>a</sup>	Rate	Weed control		Plant yield	Cucumber fruits			
		6/25/02	7/24/02		stand	number	avg. wt.	productivity
	product/a	----- % -----		no./plot	kg/plot	no./plot	g/fruit	fruits/plant
Sandea + Command	0.34 oz + 0.67 pt	97	69	103	8.2	124	68	1.2
Sandea + Command	0.68 oz + 0.67 pt	98	84	102	8.5	129	67	1.3
Sandea + Command	1 oz + 0.67 pt	99	91	99	7.6	122	63	1.2
Sandea + Command	1.34 oz + 0.67 pt	98	90	108	7.4	149	51	1.4
Command	0.67 pt	93	50	107	9.6	129	76	1.2
LSD <sub>0.05</sub>	—	3	16	ns	ns	ns	ns	ns

<sup>a</sup>All treatments applied June 8. June 8.