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Title: Weed control in cucumbers.

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Accomplishments: Three cucumber studies were conducted in 2003: two studies monitoring rotational crop sensitivity to Sandea (halosulfuron), and one testing Sandea in combination with other products on cucumber, squash, and pumpkin. Weed control and/or crop injury was measured in each study.

Results: All results will be presented at the Western Washington Horticultural Association meeting in January, 2004. Initial results are as follows:

Cucurbit trial. Nine varieties of three cucurbit types (cucumber, squash, and pumpkin) were planted May 12-13, 2003 at WSU Mount Vernon. Herbicides were applied May 13 (PRE) and June 4 (POST). Weed control and crop injury were evaluated June 4 and 30 and July 11. Crops were harvested when mature through October 15, at which time fruit number and weight was tallied. Results are in Tables 1 and 2.

Crop injury was light (< 10%) for all treatments except Strategy, Sandea PRE + POST, Sandea POST alone, Sandea + Basagran POST, or Basagran alone. Injury from Strategy was due to inadvertent over-application of the two constituents of the product: Curbit at 2x and Command at 6x use rate. Most of the injury from Basagran was on squash and pumpkin (10-40%), while cucumber injury from Basagran was 3% or less. Sandea POST caused similar injury to all cucurbits (10-11%). Using Command with the tested herbicide combinations improved weed control by 29% by June 4; improvement was still 2% by July 11. Weed control > 90% by July 11 was achieved by Strategy (higher rate as noted earlier), Sandea alone PRE at 0.75 oz, and by Sandea PRE + Outlook or Dual Magnum PRE. Fruit counts did not vary by herbicide treatment, but fruit weights did (weights ranged from 14 to 25 kg/plot and from 1.9 to 2.8 kg/fruit).

Sandea carryover trials. Two iterations were conducted at WSU Mount Vernon from 2001 through 2003. 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, the second planting July 19, 2002, third planting June 11, 2003, and the fourth planting August 1, 2003. Plants were harvested approx. six weeks after planting, and dry weight recorded.

Spinach, beet, and cauliflower are most sensitive to Sandea carryover, 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 July 7, 2003 at WSU Mount Vernon. Herbicides were applied preemergence July 8. Weed control and crop injury were estimated July 23 and September 3. Two meters of four rows of cucumber plants were counted and marketable fruit removed from vines. Number and weight of fruit was noted. Fall rotational crops cabbage seed, winter wheat, and tulip were planted at right angles to the herbicide treatments, and spinach seed, beet seed, Swiss chard seed, peas, cauliflower, and potatoes will be planted spring, 2004.

Weed control from all treatments was good to excellent (76 to 91%) by July 23, but none of the treatments were providing adequate control by September 3 (0 to 69%). Poor weed control in 2003 may be an indication of poor incorporation of product (no rainfall was received during the 2003 crop year). Cucumber growth and yield was not significantly affected by Sandea rate. 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	Rate product/a	Timing ^a	Crop injury ^b			Weed control ^b	
			June 4 ^c %	June 30 %	July 11 %	June 4 ^c %	July 11 %
Curbit	2 pt	PRE	0	0	0	89	87
Outlook	4.3 fl.oz	PRE	0	0	0	78	85
Dual Magnum	5.0 fl.oz	PRE	1	0	1	81	88
Sandea	0.75 oz	PRE	0	0	0	80	93
Sandea	1.0 oz	PRE	0	1	0	74	88
Strategy ^d	see footnote ^d	PRE	17	1	1	99	97
Sandea + Outlook	0.5 oz + 5.3 fl.oz	PRE + PRE	1	0	0	86	92
Sandea + Dual Magnum	0.5 oz + 4.2 fl.oz	PRE + PRE	1	0	0	79	92
Sandea	0.5 oz	POST	1	11	0	42	85
Basagran	8 fl.oz	POST	1	14	13	41	78
Outlook	4.3 fl.oz	POST	0	1	0	41	88
Dual Magnum	5.0 fl.oz	POST	0	1	1	39	85
Sandea + Sandea	0.75 oz + 0.5 oz	PRE + POST	0	10	1	71	88
Sandea + Basagran	0.5 oz + 8 fl.oz	PRE + POST	1	14	9	75	85
Sandea + Outlook	0.5 oz + 5.3 fl.oz	PRE + POST	1	1	0	78	89
Sandea + Dual Magnum	0.5 oz + 4.2 fl.oz	PRE + POST	0	0	0	66	84
Hand weeded	---	---	0	0	0	33	77
LSD _{0.05}	---	---	1	1	2	3	2

^aPRE = preemergence; POST = postemergence.

^bAveraged across varieties and Command treatments.

^cOnly PRE treatments applied at this evaluation (averaged across Command treatments).

^dStrategy mixture inadvertently applied at rates of 4 pts each for Curbit and Command (2x and 6x target rate, respectively).

Table 2. Cucurbit injury and fruit production following application of several herbicide combinations^a.

Variety	Crop injury						Harvested fruit			
	With Command			Without Command			With Command		Without Command	
	June 4 %	June 30 %	July 11 %	June 4 %	June 30 %	July 11 %	fruit no. no./plot	fruit wt. kg/plot	fruit no. no./plot	fruit wt. kg/plot
Calypso	3	2	0	2	2	1	42.0	3.7	29.5	2.6
Turbo	1	2	2	1	2	1	22.6	3.7	20.3	3.0
Wee Be Little	1	3	1	1	3	1	33.9	10.6	30.3	9.3
Small Sugar	5	3	0	2	3	0	13.6	22.6	13.3	22.4
Howden	2	3	0	1	3	0	4.7	39.8	5.1	43.2
Delicata	2	3	1	2	3	2	28.9	13.3	30.2	14.3
Early Butternut	1	4	2	1	4	2	13.9	20.5	9.8	15.1
Hubbard Blue	0	5	6	0	5	6	5.4	38.3	5.0	31.2
Table Ace	1	5	2	1	3	1	18.5	17.0	17.4	15.4
LSD _{0.05}	ns	ns	ns	ns	ns	ns				

^aAveraged across herbicide treatments.