Weed Control in Horticultural Crops

Foramsulfuron overlap tolerance on sweet corn at Waseca, MN - 2005. Becker, Roger L., Vincent A. Fritz, James B. Hebel, Douglas W. Miller, and Bradley D. Kinkaid. The objective of this experiment was to determine if an acceptable margin of safety exists in processing sweet corn where sprayer boom overlap occurs, in essence two applications of postemergence sulfonylurea graminicides. Plots were sprayed with labeled (nicosulfuron) and proposed labeled (foramsulfuron) herbicide rates, and another set of plots were sprayed two times, each time with the 1X rate. Jubilee (putative sulfonylurea susceptible) and GH 2547 (putative sulfonylurea tolerant) sweet corn lines were split in each plot. This study was conducted on a Webster clay loam soil. The plot area was fertilized with 140 lb/A nitrogen. A randomized complete block design with three reps was utilized. Plots were 10 feet by 25 feet (4 rows). 'Jubilee' and 'GH 2547' sweet corn were seeded (two row subplots per plot) at 23,000 plants/A on May 23, 2005. Herbicide application data are provided below. Corn was harvested from a 20 foot row within each plot/subplot. Yields (ear plus husk) were determined. Weed control, injury, and yield data are provided in the tables below.

Application Data	
Date	June 12, 2005
Air Temp (˚F)	81
Wind (mph)	8 NE
Sky	Partly Cloudy
Relative Humidity (%)	51
Sweet Corn Stage	3+ leaf collars
Rainfall before Application	
Week 1 (inch)	1.73
Rainfall after Application	
Week 1 (inch)	0.32
Week 2 (inch)	1.92

Jubilee (putative sulfonylurea susceptible) and GH 2547 (putative sulfonylurea tolerant) sweet corn lines were split in each plot. Sweet corn injury 9 DAT (June 21 rating) showed low level crop injury with no obvious increase where overlap would occur (two passes compared to one), and minor differences between the putative sensitive (Jubilee) and tolerant (GH 2547) sweet corn hybrids. Both varieties showed sulfonylurea injury though Jubilee was slightly more susceptible. Typical sulfonylurea crop injury expressed as minor chlorosis and as minor growth reduction via leaf crinkling where leaves were at the whorl when herbicides were applied. Slight chlorosis was visible with most treatments with both varieties at 9 DAT and was not present thereafter. At 9 DAT, there was a statistically significant increase in chlorosis with 2 passes of nicosulfuron compared to two passes of the foramsulfuron treatments and the untreated check (P = 0.05) with GH 2547, though still minor and this chlorosis did not persist. Leaf crinkling at the whorl was more pronounced with Jubilee than with GH 2547 at 9 DAT. The level of crinkling on Jubilee was higher with two passes of foramsulfuron and foramsulfuron plus mesotrione compared to two passes of nicosulfuron if P=0.10 instead of 0.05 or lower. Though marginally significant, it makes no biological sense when considering the relatively high level of leaf crinkle present with one pass of nicosulfuron û thus we would consider the two sulfonylurea herbicides show similar potential to injure susceptible varieties. There was no visible injury by 18 and 31 DAT (31 DAT data not shown, June 30 and July 13 ratings respectively). Notable levels of green snap occurred with Jubilee by the 18 DAT ratings, but did not correlate to herbicide use. The site had weed pressure that was sporadic and at low population densities since efficacy was not the objective of this study. There were no differences in control of the weeds that were present among herbicide treatments. Common purslane was the most prevalent weed and though variability was high, foramsulfuron and nicosulfuron both offer suppression if not control of this troublesome weed. More locations and environments are required to determine crop tolerance, but this study indicates an adequate margin of safety exists where sprayer overlap may occur with the use of either nicosulfuron, foramsulfuron or foramsulfuron plus mesotrione on sweet corn. (Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul).

Table 1. Option overlap tolerance on sweet corn at Waseca, MN - 2005. Weed control results. (Becker et al.).

		Weed Control			
		AMARE	CHEAL	POROL	
Treatment	Rate	(7/13)	(7/13)	(6/30)	(7/13)
	(lb ai/A)	(%)	(%)	(%)	(%)
(One pass application)					
Foramsulfuron + MSO[1] + 28%N[2]	0.0328 + 0.94% + 1.88%	99	99	9	97
Foramsulfuron + mesotrione + MSO	0.0328 + 0.94% + 1.88%	100	100	94	99
Nicosulfuron + COC[3] + 28%N	0.031 + 1.0% + 2.5%	98	99	91	98
(Two pass application)					
Foramsulfuron + MSO + 28%N	0.0328 + 0.94% + 1.88% (twice)	99	99	72	76
Foramsulfuron + mesotrione + MSO	0.0328 + 0.94% + 1.88% (twice)	100	100	97	98
Nicosulfuron + COC + 28%N	0.031 + 1.0% + 2.5% (twice)	100	100	95	98
Check		–	–	–	--
LSD (0.05)		ns	ns	ns	ns

[1] MSO = Methylated soy oil.
[2] 28%N = 28% UAN fertilizer solution.
[3] COC = Class Crop Oil Concentrate.

Table 2. Option overlap tolerance on sweet corn at Waseca, MN - 2005. GH 2547 sweet corn injury and yield. (Becker et al.).

		GH 2547							
		Chlorosis			Crinkle[1]			Green Snap	Green Husk
Treatment	Rate	6/21	6/30	7/13	6/21	6/30	7/13	6/30	Yield (8/19)
	(lb ai/A)	(%)	(%)	(%)	(%)	(%)	(%)	(#/A)	(lbs/A)
(One pass application)									
Foramsulfuron + MSO[2] + 28%N[3]	0.0328 + 0.94% + 1.88%	0	0	0	1	0	0	0	19850
Foramsulfuron + mesotrione + MSO	0.0328 + 0.94% + 1.88%	0	0	0	0	0	0	0	19028
Nicosulfuron + COC[4] + 28%N	0.031 + 1.0% + 2.5%	2	0	0	4	0	0	0	19022
(Two pass application)									
Foramsulfuron + MSO + 28%N	0.0328 + 0.94% + 1.88% (twice)	2	0	0	3	0	0	0	18676
Foramsulfuron + mesotrione + MSO	0.0328 + 0.94% + 1.88% (twice)	1	0	0	1	0	0	0	19336
Nicosulfuron + COC + 28%N	0.031 + 1.0% + 2.5% (twice)	4	0	0	0	0	0	0	17799
Check		0	0	0	0	0	0	0	17962
LSD (0.05)		2	ns	ns	ns	ns	ns	ns	ns

[1] Crinkle = crinkling where leaf tissue was at the whorl at the time of herbicide application..
[2] MSO = Methylated soy oil.
[3] 28%N = 28% UAN fertilizer solution.
[4] COC = Class Crop Oil Concentrate.

Table 3. Option overlap tolerance on sweet corn at Waseca, MN - 2005. Jubilee sweet corn injury and yield. (Becker et al.).

		Jubilee							
		Chlorosis			Crinkle[1]			Green Snap	Green Husk
Treatment	Rate	6/21	6/30	7/13	6/21	6/30	7/13	6/30	Yield (8/19)
	(lb ai/A)	(%)	(%)	(%)	(%)	(%)	(%)	(#/A)	(lbs/A)
(One pass application)									
Foramsulfuron + MSO[2] + 28%N[3]	0.0328 + 0.94% + 1.88%	2	0	0	14	0	0	2997	13971
Foramsulfuron + mesotrione + MSO	0.0328 + 0.94% + 1.88%	1	0	0	9	0	0	2997	13379
Nicosulfuron + COC[4] + 28%N	0.031 + 1.0% + 2.5%	3	0	0	12	0	0	3973	13092
(Two pass application)									
Foramsulfuron + MSO + 28%N	0.0328 + 0.94% + 1.88% (twice)	0	0	0	17	0	0	1394	13365
Foramsulfuron + mesotrione + MSO	0.0328 + 0.94% + 1.88% (twice)	2	0	0	18	0	0	2091	14520
Nicosulfuron + COC + 28%N	0.031 + 1.0% + 2.5% (twice)	3	0	0	3	0	0	906	13725
Check		0	0	0	0	0	0	906	13754
LSD (0.05)		ns	ns	ns	ns	ns	ns	ns	ns

[1] Crinkle = crinkling where leaf tissue was at the whorl at the time of herbicide application..
[2] MSO = Methylated soy oil.
[3] 28%N = 28% UAN fertilizer solution.
[4] COC = Class Crop Oil Concentrate.