

Project No: 13C-3419-8228

Title: Weed Control in Strawberries

Reporting Period: FY 2006-07

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Accomplishments: Two studies were completed in 2006-07: an established strawberry trial and a newly-planted strawberry trial. Thirteen herbicides were tested for crop safety and weed control and a total of 47 treatments were applied. In addition, Spartan (sulfentrazone, FMC) was again granted a Section 18 exemption by EPA for use in newly-planted and established strawberry, and Chateau (flumioxazin, Valent) was granted a new label for use in strawberry.

Results: ‘Hood’ was used for the established strawberry trial and ‘Honeoye’ was used in the newly-planted trial. Plant material was generously donated by Sakuma Brothers Farms.

Newly-planted strawberry: Strawberries were transplanted June 6 at WSU NWREC. Herbicides were applied to newly-planted strawberries immediately PRETR or POSTR and again approx. 30 days after transplanting. PRETR products were applied June 6, early POSTR products June 7, and late POSTR July 7. Crop injury and weed control were estimated July 22. Strawberry plants were counted September 8 and three were destructively harvested September 8-9. Leaves, runners, and daughter plants were counted and leaf area determined on the three harvested plants. The experimental design was a randomized complete block with four replicates.

Only three treatment combinations gave acceptable weed control (85% or greater) through mid-July (Table 1). These were Goal + Outlook, Spartan + Outlook, and Prowl + Chateau. Vegetative growth parameters showed that herbicide treatments were generally quite safe, as none statistically reduced these parameters compared to hand weeded strawberries (Table 1). The only appreciable crop injury occurred due to mixing error with Chateau + Spartan (Spartan applied at 10x rate in that treatment).

Established strawberry: Third-year strawberries were treated with one of three herbicides during dormancy (February 10) followed by herbicides applied shortly after new growth had begun (March 11). Crop injury and weed control were estimated March 23 and May 4. Berries were picked twice (June 19 and June 27) and marketable berries were counted and weighed. The experimental design was a split-block, randomized complete block with three replicates. Products applied in February did not result in statistical differences in crop injury, weed control, or berry yield, so data were pooled across those three herbicides.

Several products resulted in moderate to severe crop injury in this trial (Table 2). This is likely partly due to the age of the planting and the relatively uneven stand, but herbicides may have caused larger than expected injury. Weed control was almost good to excellent with most herbicide combinations by May (Table 2). Chateau appears to be safe for dormant-season applications at 1.3 oz rate, compared to previous season results at 2.2 oz. Fruit yield and berry size were uniformly poor and quite variable due to the uneven stand, and did not statistically differ by treatment (Table 2).

Table 1. Weed control, runner, daughter plant, and leaf production, and leaf area after application of several herbicides in newly-planted strawberry.

Treatment ^a	Rate product/a	Timing	Crop injury ^b %	Weed control ^b %	Number of plants ^c plants/pl ot	Leaf area ^c cm ² /leaf	Runners ^c no./plant	Daughters ^c no./plant	Leaves ^c no./plant
Spartan	8 fl.oz	PRE	1	66	28	650	3.8	4.3	10.3
Chateau	2.2 oz	PRE	0	71	30	853	5.9	6.3	11.9
Prowl + Spartan	3.2 pt + 5 fl.oz	PRE + PRE	4	79	27	723	4.0	4.3	11.5
Prowl + Chateau	3.2 pt + 2.2 oz	PRE + PRE	0	86	29	836	5.4	6.3	12.5
Spartan + Goal	8 fl.oz + 10 fl.oz	PRE + PRE	0	71	28	574	3.7	3.3	10.0
Spartan + Outlook	8 fl.oz + 13 fl.oz	PRE + PRE	0	88	29	999	6.6	6.4	12.8
Spartan + Dual Magnum	8 fl.oz + 13 fl.oz	PRE + PRE	0	79	28	1003	5.3	5.5	13.8
Spartan + Devrinol	8 fl.oz + 4 lbs	PRE + PRE	1	81	29	710	4.8	4.2	12.1
Goal + Outlook	10 fl.oz + 13 fl.oz	PRE + PRE	0	89	29	997	6.4	9.6	11.3
Goal + Dual Magnum	10 fl.oz + 13 fl.oz	PRE + PRE	0	75	29	529	3.7	3.4	9.8
Spartan + Prowl	8 fl.oz + 2.1 pt	PRE + POST	1	80	27	794	5.4	5.4	12.4
Spartan + Devrinol	8 fl.oz + 4 lbs	PRE + POST	0	78	30	783	5.8	6.0	11.2
Chateau + Prowl	2.2 oz + 2.1 pt	PRE + POST	0	80	30	700	5.1	5.1	12.0
Chateau + Spartan ^d	2.2 oz + 4 pt	PRE + POST	31	99	27	751	3.3	1.8	13.1
Chateau + Devrinol	2.2 oz + 4 lbs	PRE + POST	0	71	29	673	5.3	4.3	11.3
V1	0.6 oz	PRE	0	16	25	451	2.8	2.7	9.2
V2	2 oz	PRE	0	56	30	757	4.3	3.9	12.8
Granite	2.1 oz	PRE	5	78	25	443	2.5	2.3	9.5
Hand weeded	---	---	0	100	28	603	3.4	2.4	11.1
LSD _{0.05}	---	---	4	13	3	257	2.1	3.1	ns

^aStrawberries transplanted June 6; PRE = immediately following transplanting, June 6-7; POST = one month after transplanting, July 7.

^bCrop injury and weed control evaluated July 22.

^cStrawberry plant parameters measured September 8-9.

^dSpartan mistakenly applied at 10x rate (2.0 lb ai/a instead of 0.2 lb ai/a).

Table 2. Crop injury, weed control, and berry yield after dormant-season applications of various herbicides in established strawberry.

Treatment ^a	Rate	Crop injury		Weed control		Total fruit weight ^b	Average berry weight ^b
		3/23/06	5/4/06	3/23/06	5/4/06		
	product/a	%	%	%	%	lbs/a	g/berry
Prowl + Spartan	2.1 pt + 8 fl.oz	15	22	91	81	672	11.9
Prowl + Chateau	2.1 pt + 1.3 oz	15	30	92	86	431	10.6
Prowl + Goal	2.1 pt + 9.6 fl.oz	17	26	92	85	791	11.4
Prowl + Outlook	2.1 pt + 13 fl.oz	10	23	83	73	894	11.7
Prowl + Dual Magnum	2.1 pt + 13 fl.oz	5	15	90	87	864	11.3
Prowl + Devrinol	2.1 pt + 8 lbs	8	26	91	82	589	10.5
Prowl + simazine	2.1 pt + 1.1 lbs	0	11	92	85	1655	13.4
Prowl + Stinger	2.1 pt + 10.7 fl.oz	0	17	92	95	1587	12.9
Spartan	8 fl.oz	16	25	94	84	881	11.0
Spartan + Goal	8 fl.oz + 9.6 fl.oz	24	22	96	86	887	10.5
Spartan + Outlook	8 fl.oz + 13 fl.oz	18	14	97	90	1026	11.4
Spartan + Dual Magnum	8 fl.oz + 13 fl.oz	8	15	96	91	1271	12.9
Spartan + Devrinol	8 fl.oz + 8 lbs	8	22	97	84	1523	14.1
Spartan + simazine	8 fl.oz + 1.1 lbs	7	2	96	92	1701	14.4
Spartan + Stinger	8 fl.oz + 10.7 fl.oz	8	16	96	97	1324	11.3
Goal	9.6 fl.oz	22	19	90	78	723	9.8
Goal + Chateau	9.6 fl.oz + 1.3 oz	10	11	94	94	1747	14.7
Goal + Outlook	9.6 fl.oz + 13 fl.oz	9	13	94	90	1006	12.0
Goal + Dual Magnum	9.6 fl.oz + 13 fl.oz	7	7	97	91	1770	13.8
Goal + Devrinol	9.6 fl.oz + 8 lbs	8	15	94	89	1433	12.7
Goal + simazine	9.6 fl.oz + 1.1 lbs	2	2	96	93	2002	15.9
Goal + Stinger	9.6 fl.oz + 10.7 fl.oz	8	17	97	96	1738	14.3
Chateau	1.3 oz	13	12	94	89	1170	12.5
Chateau + Outlook	1.3 oz + 13 fl.oz	21	14	97	88	1395	11.3
Chateau + Dual Magnum	1.3 oz + 13 fl.oz	24	11	98	95	1459	13.2
Chateau + Devrinol	1.3 oz + 8 lbs	10	10	97	93	1430	12.3
Chateau + simazine	1.3 oz + 1.1 lbs	13	15	94	83	1906	15.4
Chateau + Stinger	1.3 oz + 10.7 fl.oz	22	40	93	95	1047	10.5
Hand weed	---	0	0	91	85	1879	13.9
LSD _{0.05}	---	9	15	6	11	ns	ns

^aDormant season herbicides applied February 10 (Prowl at 2.1 pt/a, simazine at 1.1 lb/a, and Sinbar at 6 oz/a). Late-dormancy products applied March 11 at the listed rates. Data are averaged across the three dormant herbicides.

^bStrawberries picked twice in June.