

## California Pepper Commission – Annual Report, 2010

### Title: Preemergence Weed Control Trials in Peppers

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**Timeline:** March 1, 2010 to February 28, 2011

#### Objectives

- 1) Examine layby weed control strategies for late season weed control.
- 2) Conduct the above trials in the Coastal and Central Valley production districts.

#### CENTRAL COAST Summary

Trial No. 1 examined the use of Chateau as a fallow bed application for peppers. The trial showed that this material is injurious at 4 and 8.0 ounces per acre even though the soil had 2.17% organic matter and 34% clay. Trials 2-5 looked at the use of Chateau impregnated on fertilizer applied at layby. These trials provide good evidence that this use pattern is safe to the peppers as little phytotoxicity was observed and there was no impact on yield at the 4.0 ounce rate. The bigger challenge is getting a good pattern of the dry fertilizer material on the surface of the bed in order to provide a uniform application of the active ingredient to effectively control weeds. These trials were only moderately effective in this regard, as weed control was not as good as we would have liked. In addition, the edge of the beds were steep and the Chateau/fertilizer did not stick well which allowed significant weed growth on that part of the bed. This may be a technical issue that can be resolved with further research. Chateau is the only material that effectively controls malva late in the growth cycle of peppers.

#### CENTRAL VALLEY Summary

A field trial evaluated 7 preemergence herbicides applied as layby treatments on furrow irrigated bell peppers. The herbicides included Dacthal 75W, Dual Magnum, Prowl H2O, Dual Magnum + Prowl H2O combined, Outlook, Spartan, and 2 rates of Chateau. The trial showed that Outlook, Dual Magnum, and Dual + Prowl provided excellent weed control. Dacthal, Prowl H2O alone, and Spartan provided very good weed control. Weed control with Chateau was inconsistent with previous efforts possibly due to poor application. Chateau is very injurious to peppers if not applied as a direct or shielded spray. Spartan provided temporary crop phytotoxicity, but symptoms disappeared and there was no reduction in crop stand or yield. No crop phytotoxicity was observed from Outlook. Slight phytotoxicity was noted with Prowl H2O.

#### CENTRAL COAST Methods

**Trial No. 1:** The trial was established in cooperation with Paul Maxwell and Tim Gilleo west of Hollister. The material was applied to fallow beds (drip tape already installed) on March 12 and 0.15” of rain fell on March 13. Each plot was one 40 inch wide bed by 20 feet long and arranged in a randomized complete block design with 4 replications. The materials were applied with one pass of a single nozzle wand with an 8008E tip applying the equivalent of 32 GPA of water. The field was transplanted on June 7 (86 days after application) with a yellow wax chili pepper. Soil type was Sorrento clay loam and had the following characteristics: organic matter = 2.17; sand = 37, silt = 29, clay = 34; pH = 7.0.

**Trial No. 2:** The trial was established with Kevin Vaughn and Jeremy Guidotti south east of Soledad. 4 ounces of Chateau was applied to one ton of 0-0-5 (a mix of potassium sulfate and lime) on June 21. The material was laid out in the equipment yard of Crop Production Services in Greenfield to dry for 8 days. It was spread using a fertilizer application tractor on June 30 to pimento peppers as a layby application in four 40-inch wide bed strips by the length of the field the equivalent of 4.0 ounces of Chateau per acre. A 100 foot long section by four beds wide was treated with the equivalent of 8.0 ounces of Chateau per acre. The material was applied with a tractor and fertilizer was spread on the bed top by use of a scatter plate at the end of the drop hose which was about 15 inches above the bed top. Most of the material fell between the seedlines. 100 foot long sections of the Chateau strips were used for the evaluations, as well as adjacent areas that were treated with the grower layby treatment of Prowl H2O + Dual Magnum. The field was drip irrigated (one drip hose in the middle of the bed) following application of Chateau. Soil at the site was Metz fine sandy loam.

**Trial No. 3:** The trial was established as described for trial No. 2 in the same block but was applied to an adjacent planting of Anaheim chili peppers.

**Trial No. 4:** The trial was conducted in a small area at the same site as trial No. 3. All materials were applied on June 30. Each plot was one 40-inch bed wide by 20 feet long and arranged in a randomized complete block design. Liquid materials were applied with a CO2 backpack sprayer using three passes of a one tip wand with an 8008E nozzle applying the equivalent of 107 gallons of water per acre. The material was directed to the base of the plants. Broadstar was applied by hand and Chateau on fertilizer was applied by the tractor as described above.

**Trial No. 5:** The trial was conducted in cooperation with Paul Maxwell and Tom Obata off of Buena Vista Road in Hollister. The material was applied at layby on July 7 with a tractor. Fertilizer was spread on the bed top by use of a scatter plate at the end of the drop hose was about 15 inches above the bed top. Most of the material fell between the seedlines. It was spread using a fertilizer application tractor four 40-inch wide bed strips by the length of the field the equivalent of 4.0 ounces of Chateau per acre. A 100 foot long section by four beds wide was treated with the equivalent of 8.0 ounces of Chateau per acre. 100 foot long sections of the Chateau strips were used for the evaluations, as well as adjacent areas that was untreated. The field was drip irrigated (one drip hose in the middle of the bed) following application of the material. Soil type was Sorrento silty clay loam and had the following characteristics: organic matter = 3.72; sand = 17, silt = 52, clay = 31; pH = 7.9.

## **CENTRAL COAST Results (Tables 1-9)**

**Trial No. 1:** This trial evaluated the safety of two rates of Chateau applied 86 days prior to transplanting yellow wax chili peppers. Phytotoxicity ratings in July, August and September indicated greater damage on the chili plants from the Chateau treatments (Table 1). This is particularly significant given that the soil at this site had high organic matter and clay contents. The Chateau treatments also reduced the yield of peppers.

**Trial No. 2:** There were no differences in the stand of pimento peppers or phytotoxicity on the July 15 evaluation date (Table 2). Weed pressure at this site was light and there were no differences in weed counts or weeding time on August 10 or September 10 (Tables 2 & 3). Most significantly, there were no differences in phytotoxicity ratings on any dates and no impact on yield on October 7.

**Trial No. 3:** There were no differences in the stand of dehydrator chili peppers or phytotoxicity on the July 15 evaluation date (Table 4). Weed pressure was significant at this site with nightshade and lambsquarter being the dominant species. There was no difference in weeding time on July 15, but on August 10 and September 1 both Chateau at 8.0 ounces and the Dual Magnum + Prowl H2O treatments had lower weeding time than Chateau at 4.0 ounces (Tables 4 & 5). Both Chateau at 4.0 ounces/A and the Prowl H2O + Dual Magnum combination had more red fruit than Chateau at 8.0 ounce in the yield evaluation on October 28.

**Trial No. 4:** There were no differences in weed control on the first evaluation date on July 15, but there was greater phytotoxicity in the Zeus treatment due to necrotic spotting of the leaves where the directed spray touched leaf tissue (Table 6). However, on the second evaluation date on August 10, there were more weeds in the untreated control and weeding time was higher as well. Chateau on fertilizer had more weeds than Broadstar on this evaluation date. Broadstar had many more granules per unit area than Chateau on fertilizer and gave better distribution of the chemical on the soil surface which may have accounted for the difference between the two materials (even though the rate of flumioxazin was the same). Dual Magnum + Prowl H2O and Broadstar had the fewest weeds on September 1 and lower weeding time (Table 7). None of the treatments had phytotoxicity symptoms on this date. There were no differences in yield between the treatments.

**Trial No. 5:** Both rates of Chateau had fewer total weeds and lower weeding times than the untreated control on August 9 and September 9 (Tables 8 & 9). There was moderate phytotoxicity in the 8.0 ounce rate of Chateau on August 9, but no noticeable phytotoxicity on September 9. There were no differences in yield between the treatments.

### **CENTRAL VALLEY Methods**

A field trial was conducted at the UC West Side Research and Extension Center in Five Points in Fresno County. Soil type is a Panoche Clay Loam. On May 18, 2010 the bell pepper variety “Baron” was transplanted in single rows into 40” beds using a commercial transplanter. Within row spacing was 10” between plants and stand establishment was excellent. Weed pressure was great and there was no preemergence herbicide applied at planting. At layby (June 23) the entire field was mechanically cultivated and hand weeded so that the 6 preemergence herbicides could be applied as layby treatments (June 24) to weed free plots. Plot size was one 40-inch bed by 70-feet of row. The sprayer was a CO2 backpack sprayer at 30 psi with a two nozzle wand outfitted with 2 XR Teejet nozzles 8003 evs and a water volume of 30 GPA. The herbicide

application was aimed at the base of the plants (not over the top), but drop nozzles were not used for a directed spray. The layby treatments were applied on June 24, 2010 with weather conditions of 90° F average temperature, clear skies, and wind at 5 mph. The herbicides were set with sprinklers, but the trial was grown under furrow irrigation. Nightshades (hairy, black, and groundcherry), pigweeds (prostrate, redroot, and tumble), common groundsel, lambsquarters, purslane, puncturevine, and jungle rice (very similar to barnyardgrass) were the main weeds. Weed Control and Phytotoxicity ratings were taken 7 and 43 days after the layby application based on a visual scale of 1-10. On August 18 (twelve days before harvest) individual weeds and the crop stand were counted for the full length of the plot on the bed top and sides. On August 23, 97 days after transplanting, 15 feet of row was harvested and sorted by size and quality and weighed.

### **CENTRAL VALLEY Results (Tables 10 & 11)**

Seven days after layby applications all treatments showed 100% weed control. Peppers showed varying degrees of phytotoxicity and the herbicides of main concern were Spartan and Chateau. Both the low and high rates of Chateau caused significant damage to the peppers. On August 6, 43 days after herbicide applications, the Spartan treatment showed no damage symptoms on peppers and there was no affect on crop stand or any yield reduction from its application. Low rates of Chateau (3 ounces/acre) occasionally resulted in crop mortality and significantly reduced pepper yields. High rates of Chateau (6 ounces/acre) significantly reduced crop stand, stunted growth, and caused major yield reduction. Although there was significant crop mortality the surviving peppers showed remarkably little visible sign of herbicide injury at the time of harvest.

Weed control ratings on August 6 averaged 5.5 in untreated plots and ranged from 6.3 to 9.8 for the layby herbicide treatments. Outlook and Dual Magnum were the top performers; they provided excellent broadleaf and grass weed control and virtually no crop phytotoxicity. Prowl H2O, Spartan and Dacthal provided very good weed control; they were just a little weaker in controlling jungle rice. The Dual Magnum and Prowl combination were better than either alone and together equaled the Outlook treatment. Weed control by Chateau was not as consistent as it has been in past trials in both broadleaf and grass weed control, which may be a reflection on application method (see comment below).

**Dacthal** - slight twinge of phytotoxicity was observed on peppers in one replication on July 1 soon after application, but this disappeared and there was no damage to crop stand or yield loss. Weed control was very good, but slightly weak on jungle rice and groundsel.

**Dual Magnum** - No real phytotoxicity on peppers was observed. There was excellent weed control, especially on jungle rice, the nightshades, and common groundsel. No yield loss or reduction in crop stand.

**Prowl H2O** - Weed control was weaker on jungle rice than anticipated and very weak on groundsel. Slight phytotoxicity symptoms were observed on peppers, but did not reduce stand or crop yield, still previous studies have not seen any symptoms on peppers from application of Prowl.

**Prowl H2O+ Dual Magnum** - This is a good combination for excellent weed control but some phytotoxicity and slight yield loss was observed in this treatment, a reflection on the Prowl application.

**Outlook** - Excellent weed control on grasses and broadleaves. No crop phytotoxicity.

**Spartan** - Peppers showed phytotoxicity symptoms after spraying, but soon grew out of it so that there was no yield loss or reduction in crop stand. Very good broadleaf weed control; weak on jungle rice.

**Chateau** - Both rates of Chateau caused too much crop damage and weed control was variable. The high rate of Chateau was the only treatment to significantly reduce crop stand, but both Chateau treatments resulted in pepper yield loss.

**Comment on Application Method:** Chateau needs to be a shielded or directed spray application. My hand held method of application at layby may partly explain damage by Chateau and loss of weed control. Too much herbicide came in contact with the plant foliage and bed coverage was not uniform to the bed top. Future applications will use commercial spray equipment.

#### CENTRAL COAST PHOTOS:



**Trial No. 1.** Untreated on left, Goal Tender 2<sup>nd</sup> from left, Chateau at 4 and 8 ounces two on right.



**Trial No. 1.** Goal Tender (left) Chateau 4 oz (right)

#### Photos from Trials Nos. 2-5:



Applying Chateau to fertilizer in mixer



Scatter shoes on fertilizer drops

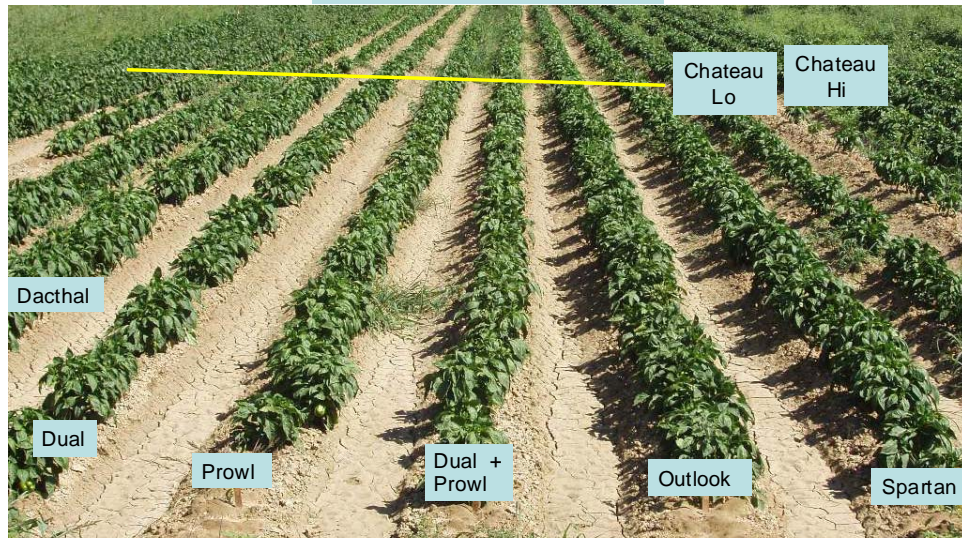
Fertilizer spreader applying Chateau at layby



Fertilizer granules in center of bed

**CENTRAL VALLEY PHOTOS:**

July 15, 2010 - UC WSREC



**OUTLOOK – Excellent weed control and no phytotoxicity**

**Table 1. Central Coast: Trial No. 1 Chili Peppers. Weed count (per m<sup>2</sup>) on July 9, phytotoxicity on three dates and yield on Oct 8.**

Treatment	Material/A	Lbs a.i./A	July 9	July 9	Aug 9	Sept 9	October 8	October 8
			Malva	Phyto <sup>1</sup>	phyto	phyto	Peppers lbs/plant	Pepper lbs/fruit
Untreated	---	---	1.5	0.0	0.0	0.3	21.2	0.114
Goal Tender Roundup PowerMax	1 pint 0.64 gallon	0.50 2.9 a.e.	0.8	0.5	0.0	0.5	20.6	0.110
Chateau 51 WDG Roundup PowerMax	4.0 ounce 0.64 gallon	0.128 2.9 a.e.	0.3	2.5	1.8	1.8	14.7	0.103
Chateau 51 WDG Roundup PowerMax	8.0 ounce 0.64 gallon	0.26 2.9 a.e.	0.0	4.5	3.3	3.0	11.8	0.096
		Pr>Treat	0.003	<0.001	<0.001	0.127	0.020	0.004
		Pr>Block	0.755	0.300	0.364	0.463	0.992	0.388
		<b>LSD<sub>0.05</sub></b>	<b>0.7</b>	<b>1.2</b>	<b>0.8</b>	<b>2.6</b>	<b>6.2</b>	<b>0.008</b>

1 – scale: 0 = no crop damage to 10 = crop dead

**Table 2. Central Coast: Trial No. 2 Pimiento peppers. Stand counts and phytotoxicity on July 15, and weed counts, phytotoxicity and weeding time on August 10.**

Treatments	July 15		August 10				
	Stand (plants/A)	phyto	Night-shade per m <sup>2</sup>	Sow thistle per m <sup>2</sup>	Total weeds per m <sup>2</sup>	phyto	Weed time (hr/A)
Chateau 4.0 oz/A	26,453	0.3	0.00	0.00	0.00	0.0	1.3
Chateau 8.0 oz/A	27,616	0.3	0.02	0.02	0.03	0.0	1.4
Prowl + Dual Mag	27,325	0.0	0.00	0.02	0.02	0.0	1.4
Pr>Treat	0.307	0.422	0.422	0.670	0.615	NA	0.429
Pr>Block	0.129	0.070	0.455	0.654	0.614	NA	0.478
<b>LSD<sub>0.05</sub></b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NA</b>	<b>NS</b>

**Table 3. Central Coast: Trial No. 2 Pimento peppers. Weed counts, phytotoxicity and weeding time on September 10, and yield evaluation on October 7.**

Treatment	phyto	time (hr/A)	Sow thistle	Malva	Lambs-quarter	Purslane	Total weeds	Red fruit T/A	Green T/A	Breaker T/A	Cull T/A
Chateau 4.0 oz/A	0.0	2.2	0.05	0.02	0.02	0.02	0.10	19.2	3.0	4.2	2.6
Chateau 8.0 oz/A	0.0	2.6	0.08	0.02	0.00	0.00	0.10	20.6	3.0	4.6	2.4
Prowl + Dual Mag	0.0	2.9	0.06	0.00	0.00	0.00	0.06	25.4	1.7	6.1	2.1
Pr>Treat	NA	0.082	0.856	0.670	0.422	0.422	0.880	0.056	0.389	0.481	0.522
Pr>Block	NA	0.788	0.369	0.654	0.455	0.455	0.409	0.292	0.565	0.387	0.043
<b>LSD<sub>0.05</sub></b>	<b>NA</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

**Table 4. Central Coast: Trial No. 3. Dehydrated chili peppers. Stand count, weed counts, phytotoxicity and weeding time on July 15 and August 10.**

Treatment	phyto	Stand (plants/A)	Weed time (hr/A)	Night-shade per m <sup>2</sup>	Lambs-quarter per m <sup>2</sup>	Total Weeds per m <sup>2</sup>	phyto	Weed time (hr/A)	Malva per m <sup>2</sup>	Night-shade per m <sup>2</sup>	Lambs-quarter per m <sup>2</sup>	Sow thistle per m <sup>2</sup>	Total weeds per m <sup>2</sup>
Chateau 4.0 oz/A	0.0	28,778	15.5	2.0	2.9	5.0	0.0	10.1	0.1	2.5	0.6	0.2	3.6
Chateau 8.0 oz/A	0.0	28,031	14.5	1.8	2.2	4.1	0.0	5.1	0.1	0.8	0.1	0.1	1.1
Prowl + Dual Mag	0.0	27,844	15.1	1.4	3.3	4.7	0.0	6.3	0.0	2.0	0.2	0.1	2.3
Pr>Treat	NA	0.928	0.946	0.718	0.635	0.858	NA	0.031	0.481	0.203	<0.001	0.142	0.074
Pr>Block	NA	0.957	0.726	0.780	0.632	0.622	NA	0.062	0.869	0.131	0.003	0.053	0.058
<b>LSD<sub>0.05</sub></b>	<b>NA</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NA</b>	<b>3.6</b>	<b>NS</b>	<b>NS</b>	<b>0.1</b>	<b>NS</b>	<b>NS</b>



**Table 5. Central Coast: Trial No. 3 Dehydrated chili peppers. Stand count, weed counts, phytotoxicity and weeding time on September 1 and yield evaluation on October 28.**

Treatment	phyto	Weed time (hr/A)	Malva per m <sup>2</sup>	Night-shade per m <sup>2</sup>	Lambs-quarter per m <sup>2</sup>	Sow thistle per m <sup>2</sup>	Total weeds per m <sup>2</sup>	Red fruit T/A	Green fruit T/A	Cull fruit T/A
Chateau 4.0 oz/A	0.0	8.2	0.3	1.8	1.1	0.0	3.4	18.3	0.9	0.3
Chateau 8.0 oz/A	0.0	5.9	0.2	0.9	0.4	0.0	1.4	11.1	0.7	0.1
Prowl + Dual Mag	0.0	6.2	0.1	0.8	0.2	0.0	1.2	17.9	1.1	0.3
Pr>Treat	NA	0.003	0.218	0.002	0.046	0.422	0.013	0.028	0.577	0.238
Pr>Block	NA	0.002	0.438	0.001	0.389	0.455	0.053	0.906	0.804	0.194
<b>LSD<sub>0.05</sub></b>	<b>NA</b>	<b>1.0</b>	<b>NS</b>	<b>0.4</b>	<b>0.7</b>	<b>NS</b>	<b>1.3</b>	<b>5.3</b>	<b>NS</b>	<b>NS</b>

**Table 6. Central Coast: Trial No. 4 Dehydrated chili peppers. Stand count, weed counts, phytotoxicity and weeding counts on July 15 and weed counts and weed time on August 10.**

Treatment	Rate a.i./A	phyto	Lambs-quarter per m <sup>2</sup>	Night-shade per m <sup>2</sup>	Plants/A	phyto	Lambs-quarter per m <sup>2</sup>	Night-shade per m <sup>2</sup>	Malva per m <sup>2</sup>	Total weeds per m <sup>2</sup>	Weed time (hr/A)
Dual Magnum +Prowl H2O	1.27 0.75	0.0	0.6	0.2	25,639	0.0	0.7	0.2	0.0	1.0	5.3
Broadstar	0.125	0.0	0.4	0.4	28,255	0.0	0.6	0.2	0.0	0.8	4.8
Zeus	0.10	2.8	0.5	0.1	27,732	1.3	1.7	2.3	1.4	5.6	6.9
Chateau on fert	0.125	NA	NA	NA	NA	0.0	1.0	7.9	0.0	9.9	8.6
Untreated	---	0.0	0.6	0.0	26,947	0.0	5.5	7.2	4.3	19.5	16.0
Pr>Treat		<0.001	0.963	0.436	0.360	<0.001	0.192	0.242	0.373	0.035	0.006
Pr>Block		0.436	0.220	0.018	0.095	0.426	0.534	0.587	0.429	0.874	0.698
<b>LSD<sub>0.05</sub></b>		<b>0.4</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>0.3</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>12.4</b>	<b>5.6</b>

**Table 7. Central Coast: Trial No. 4 Dehydrated chili peppers. Phytotoxicity, weed counts on Sept 1 & yield evaluation on Oct 28.**

Treatment	Rate a.i./A	phyto	Night-shade per m <sup>2</sup>	Lambs-quarter per m <sup>2</sup>	Malva per m <sup>2</sup>	Other weeds per m <sup>2</sup>	Total weeds per m <sup>2</sup>	Weed time (hr/A)	Red fruit T/A	Green fruit T/A	Cull fruit T/A
Dual Magnum +Prowl H2O	1.27 0.75	0.0	0.1	0.5	0.0	0.1	0.8	4.9	14.4	1.5	0.2
Broadstar	0.125	0.0	0.1	0.0	0.0	0.1	0.5	4.3	13.8	0.9	0.3
Zeus	0.10	0.0	0.6	0.5	2.9	0.8	4.9	6.3	16.3	0.9	0.2
Chateau on fert	0.125	0.0	1.9	0.0	1.3	0.2	3.6	6.1	17.4	1.1	0.3
Untreated	---	0.0	1.9	1.0	2.7	0.6	6.5	9.2	15.1	1.0	0.3
Pr>Treat		NA	0.035	0.027	0.458	0.114	0.150	0.126	0.322	0.647	0.866
Pr>Block		NA	0.694	0.152	0.508	0.925	0.438	0.213	0.138	0.113	0.482
<b>LSD<sub>0.05</sub></b>		<b>NA</b>	<b>1.5</b>	<b>0.6</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>3.9</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

**Table 8. Central Coast: Trial No. 5 Bell peppers. Hollister weed counts August 9.**

Treatment	Malva per m <sup>2</sup>	Puncture vine per m <sup>2</sup>	Sow thistle per m <sup>2</sup>	Other weeds per m <sup>2</sup>	Total weeds per m <sup>2</sup>	phyto	Weed time (hr/A)
Chateau 4.0 oz/A	0.22	0.05	0.05	0.05	0.40	0.0	3.6
Chateau 8.0 oz/A	0.12	0.05	0.04	0.03	0.25	2.0	2.5
Untreated	0.67	0.23	0.23	0.48	1.95	0.0	7.3
Pr>Treat	0.041	0.012	0.007	0.038	0.003	0.001	<0.001
Pr>Block	0.720	0.634	0.285	0.595	0.645	0.455	0.826
<b>LSD<sub>0.05</sub></b>	<b>0.43</b>	<b>0.11</b>	<b>0.10</b>	<b>0.36</b>	<b>0.79</b>	<b>1.0</b>	<b>0.8</b>

**Table 9. Central Coast: Trial No. 5 Bell peppers. Hollister weed counts on September 9 and Harvest on October 8**

Treatment	Malva per m <sup>2</sup>	Sow thistle per m <sup>2</sup>	Lambs-quarter per m <sup>2</sup>	Night-shade per m <sup>2</sup>	Other weeds per m <sup>2</sup>	Total weeds per m <sup>2</sup>	phyto	Weed time (hr/A)	Red fruit T/A	Green fruit T/A	Breaker fruit T/A	Cull fruit T/A
Chateau 4.0 oz/A	0.04	0.22	0.26	0.04	0.43	0.99	0.0	3.2	8.6	7.6	2.4	1.0
Chateau 8.0 oz/A	0.07	0.22	0.26	0.01	0.50	1.08	0.0	2.6	8.9	8.6	2.2	0.6
Untreated	0.95	0.38	0.76	0.12	0.31	2.80	0.0	6.3	8.7	7.5	0.6	0.3
Pr>Treat	<0.001	0.113	0.108	0.201	0.796	0.008	NA	<0.001	0.955	0.939	0.125	0.596
Pr>Block	0.570	0.477	0.455	0.298	0.928	0.892	NA	0.855	0.277	0.993	0.922	0.451
<b>LSD<sub>0.05</sub></b>	<b>0.25</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>1.05</b>	<b>NA</b>	<b>0.7</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

**Table 10: 2010 Central Valley Bell Peppers x Layby Herbicides: Weed Control, Phytotoxicity, Weed and Crop Stand Counts**

Layby Herbicide	Rate per Acre	Ratings (Scale 1-10)				Counts/70' Row									
		1-Jul-10		6-Aug-10		18-Aug-10									
		*Weed Control	**Phyto-toxicity	Weed Control	Phyto-toxicity	Jungle- rice	Night- shades	Ground- sel	Pig- weeds	Lambs- quarters	Puncture- vine	Purslane	All Brdlvs	Bell Peppers	
Untreated	----	10	0.0 e	5.5	0.0 d	<b>22.3</b>	6.8	18.5	8.3	4.3	3.0	0.8	<b>41.5</b>	<b>52.5 a</b>	
Dacthal 75W	9.3	10	0.5 de	8.6	0.0 d	<b>8.3</b>	1.5	12.0	2.3	1.3	2.3	0.0	<b>19.3</b>	<b>49.0 a</b>	
Dual Magnum 7.62	1.5 pts	10	0.0 e	9.3	0.1 cd	<b>1.8</b>	2.0	3.0	1.8	1.8	1.3	0.0	<b>9.8</b>	<b>49.8 a</b>	
Prowl H2O 3.8EC	3 pts	10	0.3 e	8.9	0.6 c	<b>5.0</b>	2.5	17.3	1.0	0.5	0.8	0.3	<b>22.3</b>	<b>46.3 a</b>	
Dual + Prowl	1.5+3.0 pts	10	1.3 d	9.8	0.3 cd	<b>1.0</b>	1.3	1.3	0.3	0.0	0.0	0.0	<b>2.8</b>	<b>52.5 a</b>	
Outlook 6.0	13 ozs	10	0.0 e	9.8	0.0 d	<b>1.0</b>	1.8	2.8	0.8	0.0	1.3	0.0	<b>6.5</b>	<b>49.0 a</b>	
Spartan	3.2 ozs	10	3.3 c	8.4	0.0 d	<b>13.5</b>	2.3	4.8	1.8	0.0	1.3	0.3	<b>10.3</b>	<b>49.5 a</b>	
Chateau WDG - Lo	3 ozs	10	7.25 ! b	6.3	3 ! b	<b>24.0</b>	0.3	15.5	5.5	1.8	1.8	0.0	<b>24.8</b>	<b>47.0 a</b>	
Chateau WDG - Hi	6 ozs	10	9 ! a	8.4	5.25 ! a	<b>20.8</b>	0.3	14.5	4.8	3.0	2.0	0.0	<b>24.5</b>	<b>34.8 b</b>	
<b>Average</b>		<b>10</b>	<b>2.4</b>	<b>8.3</b>	<b>1.0</b>	<b>10.8</b>	<b>2.1</b>	<b>9.9</b>	<b>2.9</b>	<b>1.4</b>	<b>1.5</b>	<b>0.1</b>	<b>17.9</b>	<b>47.8</b>	
<b>LSD (.05)</b>		<b>NS</b>	<b>0.8</b>	<b>1.3</b>	<b>0.6</b>	<b>8.3</b>	<b>2.4</b>	<b>7.7</b>	<b>3.1</b>	<b>2.4</b>	<b>NS</b>	<b>NS</b>	<b>11.9</b>	<b>7.8</b>	
Pr>Treat			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.706	0.013	0.000	0.004	
Pr>Block			0.163	0.934	0.369	0.124	0.932	0.181	0.307	0.554	0.823	0.311	0.525	0.333	
CV %		0	24.3	11.1	39.0	52.7	18.5	52.9	27.0	19.5	41.7	24.9	45.5	11.2	

\* Weed control scale: 1=no control 10=100% control

\*\* Phytotoxicity scale: 1=no damage 10=crop is dead

! Signifies some dead plants in the row

Transplanted May 18, 2010 - variety Baron 40-inch bed, Single row, 10-in spacing

Machine & hand cultivation prior to layby herbicide cultivation

Layby herbicide application on June 24, 2010; sprinkler incorporated

**Table 11: 2010 Central Valley Bell Peppers X Layby Herbicides: Pepper Yields**

			Harvest 23-Aug-10						
			(lbs/15' row)						
Layby Herbicide	Rate per Acre	lbs ai/A	Small	Med	Large	XL	Market	Culls	TOTAL
Untreated		----	1.8	9.2	10.8	6.4	28.3 ab	4.5	32.8 ab
Dacthal 75W	9.3	7.00	4.3	7.7	22.2	1.1	35.3 a	3.5	38.8 a
Dual Magnum 7.62	1.5 pts	1.43	2.2	8.4	17.2	4.3	32.1 ab	5.3	37.4 a
Prowl H2O 3.8EC	3 pts	1.50	2.9	4.4	12.8	5.4	25.4 bc	3.4	29.0 b
Dual + Prowl	1.5 + 3.0 pts	1.43 + 1.50	3.9	5.4	15.9	5.5	30.8 ab	4.3	35.0 ab
Outlook 6.0	13 ozs	0.60	3.3	5.1	17.6	5.4	31.4 ab	5.9	37.2 a
Spartan	3.2 ozs	0.10	3.9	9.0	16.2	5.8	35.0 a	3.7	38.7 a
Chateau WDG - Lo	3 ozs	0.094	3.5	9.3	6.4	0.0	19.2 c	0.8	20.1 c
Chateau WDG - Hi	6 ozs	0.188	3.7	3.2	3.8	0.0	10.7 d	0.5	11.2 d
<b>Average</b>			<b>3.3</b>	<b>6.9</b>	<b>13.7</b>	<b>3.8</b>	<b>27.6</b>	<b>3.5</b>	<b>31.1</b>
<b>LSD (.05)</b>			<b>NS</b>	<b>NS</b>	<b>9.0</b>	<b>3.6</b>	<b>8.0</b>	<b>NS</b>	<b>8.0</b>
Pr>Treat			0.663	0.149	0.011	0.004	0.000	0.083	0.000
Pr>Block			0.690	0.523	0.995	0.196	0.775	0.855	0.705
CV %			51.4	44.3	37.8	55.4	16.7	59.3	14.8

Transplanted May 18, 2010 - variety Baron  
40-inch bed, single row, 10-in spacing

Machine & hand cultivation prior to layby herbicide cultivation  
Layby herbicide application on June 24, 2010; sprinkler incorporated