

2010 Pepper Weed Control

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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.

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.

Results: 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.



Trial No. 1. Untreated on left, Goal Tender 2nd 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



Fertilizer spreader applying Chateau at layby



Scatter shoes on fertilizer drops



Fertilizer granules in center of bed

Table 1. Trial No. 1 Chili Peppers. Weed count (per m²) on July 9, phytotoxicity on three dates and yield on October 8.

Treatment	Material/A	Lbs a.i./A	July 9	July 9	Aug 9	Sept 9	October 8	October 8
			Malva	Phyto ¹	phyto	phyto	Peppers lbs/plant	Pepper lbs/fruit
Untreated	---	---	1.5	0.0	0.0	0.3	21.2	0.114
Goal Tender	1 pint	0.50	0.8	0.5	0.0	0.5	20.6	0.110
Roundup PowerMax	0.64 gallon	2.9 a.e.						
Chateau 51 WDG	4.0 ounce	0.128	0.3	2.5	1.8	1.8	14.7	0.103
Roundup PowerMax	0.64 gallon	2.9 a.e.						
Chateau 51 WDG	8.0 ounce	0.26	0.0	4.5	3.3	3.0	11.8	0.096
Roundup PowerMax	0.64 gallon	2.9 a.e.						
		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
		LSD _{0.05}	0.7	1.2	0.8	2.6	6.2	0.008

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

Table 2. 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 ²	Sow thistle per m ²	Total weeds per m ²	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
LSD _{0.05}	NS	NS	NS	NS	NS	NA	NS

Table 3. 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
LSD _{0.05}	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

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

Treatment	phyto	Stand (plants/A)	Weed time (hr/A)	Night-shade per m ²	Lambs-quarter per m ²	Total Weeds per m ²	phyto	Weed time (hr/A)	Malva per m ²	Night-shade per m ²	Lambs-quarter per m ²	Sow thistle per m ²	Total weeds per m ²
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
LSD _{0.05}	NA	NS	NS	NS	NS	NS	NA	3.6	NS	NS	0.1	NS	NS

Table 5. 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 ²	Night-shade per m ²	Lambs-quarter per m ²	Sow thistle per m ²	Total weeds per m ²	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
LSD _{0.05}	NA	1.0	NS	0.4	0.7	NS	1.3	5.3	NS	NS

Table 6. 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 ²	Night-shade per m ²	Plants/A	phyto	Lambs-quarter per m ²	Night-shade per m ²	Malva per m ²	Total weeds per m ²	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
LSD _{0.05}		0.4	NS	NS	NS	0.3	NS	NS	NS	12.4	5.6

Table 7. Trial No. 4 Dehydrated chili peppers. Phytotoxicity, weed counts on September 1 and yield evaluation on October 28.

Treatment	Rate a.i./A	phyto	Night- shade per m ²	Lambs- quarter per m ²	Malva per m ²	Other weeds per m ²	Total weeds per m ²	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
LSD _{0.05}		NA	1.5	0.6	NS	NS	NS	3.9	NS	NS	NS

Table 8. Trial No. 5 Bell peppers. Hollister weed counts August 9

Treatment	Malva per m ²	Puncture vine per m ²	Sow thistle per m ²	Other weeds per m ²	Total weeds per m ²	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
LSD _{0.05}	0.43	0.11	0.10	0.36	0.79	1.0	0.8

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

Treatment	Malva per m ²	Sow thistle per m ²	Lambs- quarter per m ²	Night- shade per m ²	Other weeds per m ²	Total weeds per m ²	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
LSD _{0.05}	0.25	NS	NS	NS	NS	1.05	NA	0.7	NS	NS	NS	NS