2008 Weed Control Studies on Lettuce

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Summary: One of the 2008 studies focused on the use of Prowl H2O as a delayed application. Prowl H2O inhibits root growth of plants. It has been demonstrated to be safe for use on transplanted lettuce. Transplanted lettuce has roots that extend below the zone of soil that is treated with Prowl H2O (i.e. top 0.25-0.5 inch of soil). However, Prowl H2O is not safe for use on direct seeded lettuce because the seed is planted into the treated zone of the soil. This evaluation was designed to test whether Prowl H2O could be applied 4-5 days following the first germination water to allow time for the roots of the lettuce to extend into the soil beyond the treated zone. The bottom line is that Prowl H2O is not safe on direct seeded lettuce even as a delayed application.

The other study evaluated the safety of Kerb and Prefar applied to a light soil at various rates; this study was conducted to better understand the safety of these materials on light soils. The rates of Kerb and Prefar need to be selected based on the texture of the soil. It this study documented symptoms of overdoses of these materials and impacts on yield from rates that are too high.

Methods: ***Trial No. 1:*** Trial was established with John Pattullo of Boutonnet Farms in Castroville on a site with Salinas Clay Loam Soil. At-planting treatments were spray on June 5 and 4-days post planting treatments were sprayed on June 9, 2008. Treatments were applied post plant preemergence and the stand was germinated with drip irrigation; the irrigation water was initiated on the same day as the at-planting application. The tape was buried 2-3" deep. All materials were applied with two passes of a single-tip wand with an 8008E nozzle; the spray was pressurized with CO_2 at 30 psi applying 66 gallons of water per acre. Each plot was one 40 inch bed wide by 20 feet long and replicated 4 times in a randomized complete block design. Kerb soil samples were collected on July 2 from the 2.0 lb a.i./A Kerb and the untreated treatments. Soil samples were collected at 0.5 inch increments down to 2.0 inches. Four subsamples per plot were collected and composited into one sample per soil depth. The trial was harvested on August 8, 2008 by selecting 16 heads per plot at random and harvesting whole, unstripped heads and weighing them. ***Trial No. 2:*** Trial was established with Greg Mirassou of Christensen & Giannini in Salinas on a site with Chualar sandy loam soil. Treatments were spray on August 15, 2008 post planting before the first sprinkler irrigation. The first irrigation water was initiated the day following application. All materials were applied with two passes of a single tip wand (8008E) with a CO_2 backpack sprayer at 30 psi applying 72 gallons of water per acre. Each plot was one 40 inch bed wide by 30 feet long.

Results: ***Trial No. 1:*** There was low weed pressure at this site and there were no significant reductions in weeds from any of the herbicide treatments. There was a strong trend indicating reduced weeds in the Prowl H2O and Prowl H2O + Kerb treatments (Table 1). None of the herbicide treatments reduced the stand count on two dates. The Prowl H2O treatments were highly injurious to the lettuce as indicated by phytotoxicity ratings (Table 2 and Figure 1). Prowl H2O injury included stunting of the plants, yellowing of the cotyledons and twisting and thickening of the leaves. Plots treated with

Prowl H2O alone or in combination with Kerb had significantly lower yield than the other treatments. Prowl H2O whether applied at planting or delayed planting are too phytotoxic for use on direct seeded lettuce. ***Trial No. 2:*** Kerb is registered for use on lettuce at rates up to 2.0 lbs a.i./A on lettuce and Prefar is registered for use up to 6.0 lbs a.i./A. In this trial we used a range of rates to evaluate the impact of high rates of these materials on a light soil. This trial was initiated in response to several complaints that we received from PCA's about herbicide damage that they had seen on fields where routine rates of these materials were used. The soil at the trial site was Chualar loam and half rates of both Kerb and Prefar did not affect phytotoxicity ratings or yield (Table 3). The maximum rate of Kerb (2.0 lbs a.i./A) did not affect the yield, but the maximum rate of Prefar (6.0 lbs a.i./A) reduced the yield of lettuce. High rates of both materials reduce the yield of lettuce (Table 3 andsee Figure 2). Combinations of the high and excessive rates of Kerb + Prefar reduced the yield of lettuce on this soil type. The labels of both materials stipulate rates that are safe for specifics soil textures and it is clear from this study that it is possible to reduce the growth of lettuce with high rates of both of these materials on light soils.

Figure 1. Photos of Prowl H2O injury applied 4 days after the first germination water on direct seeded lettuce

Yellowed cotyledons

Uneven growth (large vs small plants)

Twisting and deformity of lettuce leaves at thinning stage

Figure 2. Photos of phytotoxicity of standard lettuce herbicides used at high rates.

Kerb at 3.0 lbs a.i./A

Kerb at 3.0 lbs a.i./A

Stunting, yellowing of cotyledons and deformity of 1st true leaf

Kerb at 3.0 lbs a.i./A

Reduce lateral root growth along the length of the tap root.

Prefar at 9.0 lbs a.i./A

Prefar at 9.0 lbs a.i./A

Stunting and shiny leaf surface

Prefar at 9.0 lbs a.i./A

Reduced lateral root growth along the length of the tap root.


Untreated
Normal size and vigorous lateral root growth

Table 1. Trial No. 1: Stand count (prethinning) and weed counts (per 33.3 ft^2) on two dates

Material	Material/A	a.i./A	Application Timing	Stand Count Per plot		Nettle		Shepherd's Purse		Total Weeds	
				6/18	6/26	6/18	6/26	6/18	6/26	6/18	6/26
Kerb 3.3SC	2.4 pints	1.0	At planting	218.5	208.8	0.0	0.5	0.0	4.3	0.0	4.8
Kerb 3.3SC	4.8 pints	2.0	At planting	206.0	200.5	0.8	1.3	0.3	4.8	1.0	6.0
Prefar 4E	6.0 quarts	6.0	At planting	212.8	223.5	0.8	2.8	0.8	3.5	1.5	6.3
Prowl 3.8 EC	1.05 pints	0.5	4 days post plant	222.5	226.3	0.0	0.8	0.0	1.0	0.0	1.8
Kerb 3.3SC Prowl 3.8 EC	2.4 pints 1.05 pints	1.0 0.5	4 days post plant	218.5	221.0	1.0	0.8	0.0	0.3	1.0	1.0
Untreated	----	----	----	210.5	201.8	1.3	1.3	0.8	4.3	2.0	5.5
			Pr>F	0.7883	0.2987	0.4156	0.4683	0.2281	0.2191	0.2634	0.1115
			LSD 0.05	ns	ns	ns	ns	ns	ns	ns	ns

Table 2. Trial No. 2: Phytotoxicity rating on two dates and yield evaluation on August 8, 2008

Material	Material/A	a.i./A	Application Timing	Phyto[1]		Mean Head[2] lbs	Yield Tons/A
				6/26	7/1		
Kerb 3.3SC	2.4 pints	1.0	At planting	0.0	0.0	2.35	33.8
Kerb 3.3SC	4.8 pints	2.0	At planting	0.0	0.0	2.45	35.2
Prefar 4E	6.0 quarts	6.0	At planting	0.8	0.5	2.47	35.5
Prowl 3.8 EC	1.05 pints	0.5	4 days post plant	7.8	8.0	2.01	28.8
Kerb 3.3SC Prowl 3.8 EC	2.4 pints 1.05 pints	1.0 0.5	4 days post plant	7.5	7.3	2.02	29.2
Untreated	----	----	----	0.0	0.0	2.45	35.2
			Pr>F	<0.0001	<0.0001	0.0008	0.0008
			LSD 0.05	1.7	0.9	0.08	1.09

1 - Scale: 0 = no crop damage to 10 = crop completely dead; 2 – Untrimmed heads

Table 3. Trial No. 2: Phytotoxicity rating and yield evaluations on October 13.

Material	**Material/A**	**a.i./A**	**Phtyo[1] Sept 16**	**Plants/A**	**Yield Tons/A**	**Yield lbs/head**
Kerb 3.3SC	2.4 pints	1.0	0.0	28,425.7	24.153	1.69
Kerb 3.3SC	4.8 pints	2.0	0.5	28,589.1	22.090	1.50
Kerb 3.3SC	7.2 pints	4.0	2.5	26,138.6	16.938	1.31
Prefar 4E	3.0 quarts	3.0	0.0	27,118.8	21.272	1.56
Prefar 4E	6.0 quarts	6.0	0.3	28,262.4	19.273	1.37
Prefar 4E	9.0 quarts	9.0	1.5	27,445.5	19.745	1.44
Kerb 3.3SC Prefar 4E	4.8 pints 6.0 quarts	2.0 6.0	2.3	26,628.7	18.821	1.44
Kerb 3.3SC Prefar 4E	4.8 pints 6.0 quarts	3.0 9.0	3.3	24,178.2	13.033	1.08
Untreated	----	----	0.0	28,425.7	22.321	1.64
P value			0.0001	0.0936	0.0001	0.0022
LSD (0.05)			0.7	n.s.	3.151	0.23