2009 Spinach Weed Control Trials

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Summary: Over the past three years we have conducted evaluations of the use of low rates of Lorox 50DF for weed control and safety on spinach. In nine trials conducted from 2008-09, Lorox at 0.1 lb a.i./A was safe on spinach and had higher yield than RoNeet at 0.93 lb a.i./A and Dual Magnum at 0.29 lb a.i./A. Unfortunately, this rate of Lorox does not provide a useful level of weed control. Lorox at 0.2 lb a.i./A provides good level of weed control, but on average had lower yields than RoNeet and Dual Magnum over two years. Reduced yield of spinach at the 0.2 lb a.i./A rate is was observed on Chualar loams on the east side of the Salinas Valley which tend to have coarse sands. Less severe yield reductions were observed on other soil types. In general, the 0.2 lb a.i./A had improved safety along the river on soils with fine sands. For instance, in trial No. 2 in 2009 0.2 lb a.i./A of Lorox yielded less than 30% of the untreated on Chualar loam. However, on other light soils such as the Metz fine sandy loam, the Elder sandy loam and the Mocho silt loam, yield was similar to or only slightly lower than the untreated. Clearly, Lorox can be a useful tool for weed control in spinach, but it will be critical to carefully select appropriate soil types to avoid yield loss with this material. Another aspect of the studies this year looked at preplant applications of Dual Magnum in order to be able to comply with the 50 day preharvest interval; one trial indicated good weed control and acceptable phytotoxicity with 0.75 to 1.0 pint/A applied to shaped beds 21 days before planting.

Methods: ***Trial No. 1:*** The trial was conducted in cooperation with Frank Heffren of Green Valley Farm Supply and Tony Alameda of Top Flavor Farms in Salinas. The trial was planted on March 24 with the variety Grinta. Treatments were applied on the same day and the field was sprinkler irrigated on March 25. The soil type was Metz fine sandy loam. ***Trial No. 2:*** The trial was conducted with Cuco Delgado of Metz Fresh on south east of Salinas. The trial was planted on August 4 with the variety Renegade. Treatments were applied on the same day and the field was sprinkler irrigated on August 5. The soil was Chualar Loam. ***Trial No. 3:*** The trial was conducted with Cuco Delgado of Metz Fresh on south east of Salinas. The trial was planted on August 18 with the variety Bikini. Treatments were applied on the same day and the field was sprinkler irrigated on August 19. The soil was Elder sandy loam. ***Trial No. 4:*** The trial was conducted with Wyatt Duncan of Integrated Crop Management and Rio Farms in San Lucas. The trial was planted on September 24 with the variety Renegade. Treatments were applied on the same day and the field was sprinkler irrigated on August 25. The soil was Mocho silt loam. ***Trial No. 5:*** This trial was conducted to evaluate pre-planting applications of Dual Magnum in order to comply with the 50 day pre harvest interval for Dual Magnum on spinach. The trial was conducted with Bob Riddle of Integrated Crop Management and Fresh Farms in San Ardo. All Dual Treatments were applied on July 1 with a commercial application rig to shaped 80-inch beds. The spinach was planted on July 21 and irrigated on July 22. The soil was Mocho silt loam. ***Details for trials 1-4:*** Each plot was one 80-inch bed wide by 10 feet long and randomized three times in a randomized complete block design. All treatments were applied with a backpack CO_2 applicator with 4 passes of a one-nozzle wand pressurized at 30 psi applying the equivalent of 78 gallons of water per acre.

Results: ***Trial No. 1:*** There were insufficient weeds at this trial site and weed evaluations were not conducted. There were no differences in yield among the treatments (Table 1). ***Trial No. 2:*** There was a low weed population at this site and all materials provided good control of shepherd's purse. Lorox at the 0.2 and 0.4 lb a.i./A rates had unacceptable phytotoxicity and significantly lower yield. ***Trial No. 3:*** There was a low weed population at this site and all materials provided good weed control (Table 2). Lorox at 0.4 lb a.i./A had unacceptable phytotoxicity on September 3 while Lorox at 0.2 lb a.i./A had a moderate phytotoxicity rating. All treatments yielded equivalent to the untreated except Lorox at 0.4 lb a.i./A which had a low yield. ***Trial No. 4:*** There were insufficient weeds at this trial site and weed evaluations were not conducted. Only Lorox at 0.4 lb a.i./A had a high phytotoxicity rating on October 8. All treatments yielded equivalent to the untreated except Lorox at 0.2 lb a.i./A which yielded slightly lower than the untreated and 0.4 lb a.i./A which had a low yield. ***Summary of trials 1-4:*** Overall, there was a yield reduction at the 0.2 lb a.i./A rate in the 2009 trials (Table 3); the reduced overall yield was due to much lower yields in trial no. 2. This trial was on the Chualar loam soil which has a high percent of coarse sands and moderate organic matter (Table 4). ***Trial No. 5:*** Dual magnum at 0.72 and 0.96 lb a.i./A applied 3 weeks prior to planting to shaped beds provided good weed control and moderate phytotoxicity ratings (Table 5).

Trial No. 2 (Chualar loam soil). Photos taken on August 18

Plot overview

RoNeet 0.93 lb a.i./A

Dual Magnum 0.29 lb a.i./A

Lorox at 0.1 lb a.i./A

Lorox at 0.2 lb a.i./A

Lorox at 0.4 lb a.i./A foreground, untreated in back

Table 1. Trials 1 & 2. Weed, phytotoxicity and yield evaluations

Treatment	Material/A	Lbs a.i./A	Trial No. 1		Trial No. 2			
			Yield Fresh kg/m^2 May 6	Yield Dry $grams/m^2$ May 6	Phyto[1] Aug 18	Shepherd's purse Per 3 ft^2 Aug 18	Yield Fresh kg/m^2 Sept 1	Yield Dry $grams/m^2$ Sept 1
RoNeet 6E	1.25 pt	0.93	3.0	183.7	0.0	0.7	2.1	160
Dual Magnum 7.63	0.3 pt	0.29	2.8	208.6	0.3	0.0	1.6	127
Dual Magnum 7.63	0.5 pt	0.48	3.0	198.1	NA	NA	NA	NA
Lorox 50	0.2 lb	0.1	3.2	225.4	0.3	0.0	2.3	176
Lorox 50	0.4 lb	0.2	3.2	208.6	6.3	0.0	0.7	65
Lorox 50	0.8 lb	0.4	3.1	225.9	9.8	0.0	0.2	18
Untreated	----	----	3.3	208.1	0.0	3.3	2.5	182
Pr>Treat			0.215	0.351	<0.001	0.016	<0.001	<0.001
Pr>Block			0.133	0.097	0.525	0.861	0.201	0.138
$LSD_{0.05}$			NS	NS	2.3	1.9	0.8	51

1 – Scale: 0 = no crop damage to 10 crop completely dead

Table 2. Trials 3 & 4. Weed, phytotoxicity and yield evaluations

Treatment	Material/A	Lbs a.i./A	Trial No. 3						Trial No. 4	
			Shepherd's purse 10 ft^2 Sept 3	Groundsel 10 ft^2 Sept 3	Sow thistle 10 ft^2 Sept 3	Total weeds 10 ft^2 Sept 3	Phyto Sept 3	Yield Fresh kg/m^2 Sept 14	Phyto Oct 8	Yield Fresh kg/m^2 Oct 20
RoNeet 6E	1.25 pt	0.93	0.0	0.0	0.0	0.0	0.7	2.9	0.0	1.7
Dual Magnum 7.63	0.3 pt	0.29	0.0	0.0	0.0	0.0	0.0	2.8	0.0	1.6
Dual Magnum 7.63	0.5 pt	0.48	NA	NA	NA	NA	NA	NA	NA	NA
Lorox 50	0.2 lb	0.1	0.0	0.0	0.0	0.0	0.0	3.3	0.0	1.7
Lorox 50	0.4 lb	0.2	0.0	0.0	0.0	0.0	2.3	3.0	0.0	1.6
Lorox 50	0.8 lb	0.4	0.0	0.0	0.0	0.0	4.7	1.6	3.0	0.7
Untreated	----	----	1.7	0.7	0.7	3.0	0.0	3.3	0.0	1.8
Pr>Treat			0.041	0.030	0.465	0.002	<0.001	<0.001	<0.001	<0.001
Pr>Block			0.402	0.402	0.402	0.402	0.751	0.009	NA	0.051
$LSD_{0.05}$			1.1	0.4	NS	1.3	0.8	0.4	NA	0.3

Table 3. Yield summary of 2009 trials (tons/A) and overall averages for 2008 and 2009

Treatment	Material Per Acre	Lbs a.i./A	Trial 1 2009	Trial 2 2009	Trial 3 2009	Trial 4 2009	average 2009	average 2008	average 2008&09
RoNeet 6E	1.25 pt	0.93	10.1	7.0	9.6	5.6	8.1	8.0	8.05
Dual Magnum 7.63	0.3 pt	0.29	9.2	5.5	9.3	5.3	7.3	8.9	8.10
Dual Magnum 7.63	0.5 pt	0.48	9.9	NA	NA	NA	NA	7.4	7.40
Lorox 50	0.2 lb	0.1	10.8	7.6	11.0	5.8	8.8	8.5	8.64
Lorox 50	0.4 lb	0.2	10.7	2.5	10.0	5.4	7.2	6.9	7.05
Lorox 50	0.8 lb	0.4	10.3	0.5	5.4	2.2	4.6	1.7	3.15
Untreated	----	----	10.9	8.3	10.9	5.9	9.0	9.8	9.40
Pr>Treat			0.215	<0.001	<0.001	<0.001			
Pr>Block			0.133	0.201	0.009	0.051			
$LSD_{0.05}$			NS	2.7	1.3	0.3			

Table 4. Soil analyses spinach trials

Trial	Soil Type	Significant yield reduction with Lorox at 0.2 lb a.i./A[1]	Organic matter	Sand %	Silt %	Clay %
2008 No. 2	Arnold Loamy	No	1.16	62	18	20
2008 No. 4	Greenfield fine sandy loam	Yes	0.84	47	28	25
2008 No. 5	Chualar loam	Yes	0.82	68	16	16
2009 No. 1	Metz fine sandy loam	No	0.87	55	29	16
2009 No. 2	Chualar Loam	Yes	0.89	73	18	9

1 – Significantly less than the untreated control

Table 5. Trial No. 5. Weed rating on August 6. Sixteen days after planting

Treatment	Material Per Acre	Lbs a.i./A	Purslane	Malva	Other weeds	Total weeds	Phyto
Dual Magnum	0.50 pint	0.48	41.3	0.8	1.3	43.3	0.0
Dual Magnum	0.75 pint	0.72	4.0	1.8	2.3	8.0	0.8
Dual Magnum	1.00 pint	0.96	1.0	2.8	4.3	8.0	1.3
Untreated	----	----	3.0	11.8	21.8	36.5	0.0
Pr>Treat			<0.001	<0.001	<0.001	0.002	0.005
LSD 0.05			16.4	3.7	5.7	17.0	0.7