

## 2008 Wine Grape Weed Control Trial

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**Summary:** This trial provided evaluations over 6 months. The main weeds at this site were groundsel and sow thistle. Summer annuals did not have large populations at this site. All treatments in combination with Goal Tender at 3.0 pints/A provided over 89% weed control 162 days after treatment. The combination of Chateau + Surflan, and Gallery alone provided 98% and 88%, respectively at 162 DAT. Two applications of glyphosate provided 86% weed control. Matrix alone was weak on the spectrum of weeds present at this site. A separate trial evaluating penoxulam alone showed that 2.0 – 8.0 ounces of this experimental material were needed to provide acceptable weed control.

**Methods:** Conducted in cooperation with Bernie Borges with Monterey Pacific Vineyards north of King City. The trial was located in a non-bearing block of Chardonnay. Vines spacing was 6 feet and rows were 8 feet apart. The weed control program prior to the initiation of the trial was as follows: in 2007 1.5 quart of Roundup Original Max and 2 quarts of Prowl H<sub>2</sub>O were applied in March; three pints of Gramaxone were applied 2-3 times on an as needed basis after that until the end of the 2007 growing season.

Each plot was 36 feet long, included 6 vines and was replicated four times in a randomized complete block design. Spray materials were applied to a four foot wide area (2 feet on either side of the vine row) by the length of the plot. The first applications were made on December 13, 2007; treatment 19 received a follow up treatment of glyphosate on March 17, 2008. Applications were made with the equivalent of 34 gallons of water per acre using a CO<sub>2</sub> backpack sprayer at 30 psi using two passes of a one nozzle wand with an 8005 flat fan tip. Approximately 0.25 inch of rain fell on December 18 which incorporated the preemergence materials. Evaluations were conducted 4, 8, and 12 16, 20 and 24 weeks after the first application by counting all weeds in a 48 ft<sup>2</sup> area (4 feet wide by 12 feet long) in the middle of the plot. The soil at the site was Lockwood shaly loam.

A separate crop tolerance trial was also conducted; it was not intended for weed evaluations, but it provided an opportunity to evaluate the efficacy of penoxulam without Goal Tender as a tank mix. This trial was treated as described above (see details in Table 7).

**Results:** This site was recently converted from row crop production to a vineyard. The trial was run from December 2007 to June 2008. As a result, the main weeds at this site were typical cool-season, row crop weeds: groundsel, sow thistle, shepherd's purse, malva and London rocket. Pepper weed (*Lepidium pinnatifidum*) was an unusual weed with spotty distribution in the field, in addition, some cover crop plants spilled into the evaluation area from the row middles. In the tables, each cell has two numbers, the upper number is percent weed control and the lower number is weed counts per 48 ft<sup>2</sup>. There are some normal rounding errors in the percent weed control data.

On the first evaluation date, January 9 (27 days after treatment), the weather was cold and the main weed emerging was groundsel. All penoxulam + Goal Tender treatments provided nearly complete control of this weed; Chateau + Surflan and Gallery alone provided 100% and 90% control of total weeds, respectively (Table 1). Matrix was weak in controlling groundsel. On the second evaluation date, February 1 (50 DAT), groundsel was the dominant weed. Combinations of penoxulam + Goal

Tender treatments provided good control (Table 2). Chateau + Surflan and Gallery alone provided 100% and 92% control of total weeds, respectively. Significant groundsel emerged following the glyphosate treatments in December and weed control in the postemergence applications of glyphosate (treatments 18 & 19) had declined on this evaluation from the previous month. Matrix also had significant numbers of groundsel. On the third evaluation date, March 6 (83 DAT), the emergence of the cool season weeds reached its maximum, 462 weeds per 48 ft<sup>2</sup> in the untreated, with groundsel comprising, 361 of the weeds. All of the penoxulam + Goal Tender treatments controlled over 92% of total weeds (Table 3). Chateau + Surflan and Goal Tender + Matrix (4 oz) controlled 100% of weeds. Matrix alone was weak on groundsel and controlled only 65% of total weeds. On the fourth evaluation date, April 4 (112 DAT), the total number of weeds in the untreated control declined to 291 weeds per 48 ft<sup>2</sup> due to interspecies competition. There was a general trend indicating that penoxulam + Goal Tender treatments were more effective with the higher rates of Goal Tender (Table 4). Chateau + Surflan continued to have 100% control. Matrix alone was weak controlling groundsel and Gallery provided good control of weeds but was weak on volunteer cover crop. On the fifth evaluation date, May 7 (138 DAT), total number of weeds in the untreated control was 87 per 48 ft<sup>2</sup>. Larger differences in weed control were evident as the effectiveness of some of the treatments began to decline after 138 days after treatment. All penoxulam at 2.0 oz/A + Goal Tender had over 91% control of weeds (Table 5). Chateau + Surflan had 100% control of weeds. The glyphosate treatment that was reapplied on March 17 had 96% control of weeds. On the sixth evaluation date, June 4 (162 DAT), the longevity of the treatments was evident. All penoxulam + Goal Tender at 3.0 pints/A had over 89% weed control (Table 6). Chateau + Surflan had 98% weed control Gallery had 88%.

The crop tolerance trial had penoxulam applied without Goal Tender as a tank mix. It was evaluated on March 17 only (after this date additional weed control was carried out and no further weed control evaluations were possible). No weed control was observed at 1.0 oz/A. The 2.0 and 4.0 oz rates provided 75 and 71% control, respectively (Table 7). The 8.0 oz rate had 91% control of total weeds.

**Table 1.** Weed counts January 9, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup>.

Treat	Treatment <sup>y</sup>	Rate/A	Groundsel	Sow Thistle	Shepherd's Purse	Malva	Cover Crop	Pepper weed	Others	Total
1	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	100.0	50.0	100.0	96.4
	Goal Tender	1.0 pt	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.8
2	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	100.0	75.0	100.0	98.0
	Goal Tender	1.0 pt	0.0	0.0	0.0	0.0	0.0	1.3	0.0	1.3
5	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	100.0	75.0	100.0	97.2
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
6	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	75.0	100.0	95.0
	Goal Tender	2.0 pt	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.5
10	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfan	3.0 qt								
12	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goaltender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfan	3.0 qt								
13	Goal Tender	1.5 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	Chateau	12 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Surflan	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Matrix	2.0 oz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Matrix	4.0 oz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Glyphomax	3.0 pt	87.1	100.0	100.0	100.0	100.0	100.0	100.0	92.1
	Agr-Dex coc	1.25%	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
19	Glyphomax	3.0 pt	95.8	100.0	100.0	100.0	100.0	100.0	100.0	97.2
	Agr-Dex coc	1.25%	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Glyphomax	3.0 pt								
	Agr-Dex coc	1.25%								
20	Matrix	4.0 oz	75.0	100.0	100.0	100.0	100.0	75.0	100.0	78.0
			2.0	0.0	0.0	0.0	0.0	1.3	0.0	3.3
21	Gallery 75 DF	0.5 lb	87.5	100.0	100.0	100.0	75.0	100.0	100.0	90.0
			0.8	0.0	0.0	0.0	0.3	0.0	0.0	1.0
22	Untreated	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			38.3	4.5	0.0	0.0	0.0	0.0	0.0	42.8
LSD 0.05 percent control			17.919	0	0	0	0	0	0	13.728
LSD 0.05 weed count			11.546	0.9367	0	0	0.1506	1.1259	0	12.092
Pr>F percent control			<0.0001	<0.0001	NWF	NWF	<0.0001	<0.0001	NWF	<0.0001
Pr>F weed count			<0.0001	<0.0001	NWF	NWF	0.4762	0.4966	NWF	<0.0001

<sup>x</sup> This weed distribution was spotty and was not found in the untreated

<sup>y</sup> Glyphomax xrt at 3 pt/A and Agri-dexcoc at 1.25 % V/V were applied to all treatments (treatments 18 and 19 were treated as listed)

NWF = no weeds found

**Table 2.** Weed counts February 1, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup>.

Treat #	Treatment <sup>y</sup>	Rate/A	Groundsel	Sow Thistle	Shepherd's Purse	Malva	Cover Crop	Pepper weed	Others	Total
1	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	97.2	75.0	100.0	99.4
	Goal Tender	1.0 pt	0.0	0.0	0.0	0.0	0.5	0.5	0.0	1.0
2	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	95.0	75.0	100.0	99.8
	Goal Tender	1.0 pt	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.8
5	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	86.1	100.0	100.0	99.7
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5
7	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	86.1	100.0	100.0	99.7
	Goal Tender	1.0 pt	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5
8	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	2.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfan	3.0 qt								
12	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goaltender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfan	3.0 qt								
13	Goal Tender	1.5 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	Chateau	12 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Surflan	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Matrix	2.0 oz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Matrix	4.0 oz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Glyphomax	3.0 pt	48.9	51.6	75.0	56.3	45.8	100.0	100.0	48.0
	Agr-Dex coc	1.25%	126.8	11.0	0.3	1.5	7.5	0.0	0.0	147.0
19	Glyphomax	3.0 pt	66.2	49.5	100.0	75.0	34.4	100.0	100.0	60.7
	Agr-Dex coc	1.25%	83.8	24.0	0.0	0.8	16.5	0.0	0.0	125.0
	Glyphomax	3.0 pt								
	Agr-Dex coc	1.25%								
20	Matrix	4.0 oz	64.2	89.8	100.0	100.0	59.7	100.0	100.0	64.9
			78.5	1.5	0.0	0.0	3.8	0.0	0.0	83.8
21	Gallery 75 DF	0.5 lb	100.0	100.0	100.0	75.0	20.6	100.0	100.0	92.9
			0.0	0.0	0.0	3.0	8.5	0.0	0.0	11.5
22	Untreated	---	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0
			265.3	23.0	0.0	2.3	10.5	0.3	0.0	301.3
LSD 0.05 percent control			23.756	22.438	NWF	26.43	27.978	22.789	NWF	23.082
LSD 0.05 weed count			92.355	13.361	NWF	2.112	7.2408	0.4323	NWF	94.615
Pr>F percent control			<0.0001	<0.0001	NWF	<0.0001	<0.0001	<0.0001	NWF	<0.0001
Pr>F weed count			<0.0001	0.0064	NWF	0.266	0.0003	0.4762	NWF	<0.0001

<sup>x</sup> This weed distribution was spotty and was not found in the untreated; NWF = no weeds found

<sup>y</sup> Glyphomax xrt at 3 pt/A and Agri-dexcoc at 1.25 % V/V were applied to all treatments (treatments 18 and 19 were treated as listed)

**Table 3.** Weed counts March 6, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup>.

Treat#	Treatment <sup>y</sup>	Rate/A	Groundsel	Sow Thistle	Shepherd's Purse	Malva	Cover Crop	Pepper weed	London Rocket	Total
1	Penoxsulam	0.5 oz	99.4	100.0	100.0	75.0	80.0	75.0	100.0	98.1
	Goal Tender	1.0 pt	1.0	0.0	0.0	0.5	3.0	0.8	0.0	5.3
2	Penoxsulam	0.5 oz	92.5	99.6	100.0	100.0	72.6	75.0	100.0	96.1
	Goal Tender	1.5 pt	7.3	0.3	0.0	0.0	2.8	0.5	0.0	10.8
3	Penoxsulam	0.5 oz	100.0	100.0	100.0	100.0	96.7	75.0	100.0	99.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.5	1.8	0.0	2.3
4	Penoxsulam	1.0 oz	96.6	91.3	100.0	100.0	84.2	50.0	100.0	93.2
	Goal Tender	1.0 pt	9.0	7.3	0.0	0.0	1.3	5.0	0.0	22.5
5	Penoxsulam	1.0 oz	99.6	98.7	75.0	100.0	85.8	75.0	100.0	98.7
	Goal Tender	1.5 pt	2.3	1.5	1.3	0.0	1.0	0.3	0.0	6.3
6	Penoxsulam	1.0 oz	99.9	99.8	100.0	100.0	70.5	100.0	100.0	98.3
	Goal Tender	3.0 pt	0.5	0.3	0.0	0.0	4.3	0.0	0.0	5.0
7	Penoxsulam	2.0 oz	99.4	98.9	100.0	100.0	93.8	100.0	100.0	99.0
	Goal Tender	1.0 pt	0.5	1.3	0.0	0.0	0.8	0.0	0.0	2.5
8	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	90.0	100.0	100.0	99.2
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0
9	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	96.1	50.0	100.0	99.3
	Goal Tender	2.0 pt	0.0	0.0	0.0	0.0	0.5	1.3	0.0	1.8
10	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	90.0	100.0	100.0	99.8
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8
11	Penoxsulam	1.0 oz	100.0	100.0	100.0	100.0	97.6	100.0	100.0	99.8
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5
	Sulfan	3.0 qt								
12	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	75.0	100.0	99.6
	Goaltender	3.0 pt	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
	Sulfan	3.0 qt								
13	Goal Tender	1.5 pt	99.8	98.8	100.0	100.0	94.8	100.0	100.0	99.3
			1.3	0.5	0.0	0.0	1.0	0.0	0.0	2.8
14	Goal Tender	3.0 pt	99.1	100.0	100.0	100.0	98.8	100.0	100.0	99.6
			0.8	0.0	0.0	0.0	0.3	0.0	0.0	1.0
15	Chateau	12 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Surflan	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	88.6	100.0	100.0	99.8
	Matrix	2.0 oz	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3
17	Goal Tender	3.0 pt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Matrix	4.0 oz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Glyphomax	3.0 pt	53.3	41.9	50.0	50.0	22.1	50.0	100.0	47.2
	Agr-Dex coc	1.25%	132.0	69.0	1.0	2.3	15.0	3.0	0.0	222.5
19	Glyphomax	3.0 pt	55.2	30.5	75.0	50.0	23.3	75.0	100.0	40.3
	Agr-Dex coc	1.25%	126.5	84.8	0.3	1.8	12.8	0.3	0.0	226.3
	Glyphomax	3.0 pt								
	Agr-Dex coc	1.25%								
20	Matrix	4.0 oz	51.8	94.6	100.0	75.0	55.0	50.0	100.0	65.3
			111.0	2.0	0.0	0.3	6.8	2.0	0.0	122.0
21	Gallery 75 DF	0.5 lb	99.9	100.0	100.0	75.0	42.0	75.0	100.0	94.9
			0.5	0.0	0.0	1.0	12.0	0.5	0.0	14.0
22	Untreated	---	0.0	0.0	100.0	75.0	0.0	100.0	75.0	0.0
			361.8	85.3	0.0	0.5	13.3	0.0	1.5	462.5
LSD 0.05 percent control			20.096	18.516	NWF	39.44	33.853	52.421	15.063	15.744
LSD 0.05 weed count			98.289	28.567	0.8385	1.4205	6.3812	2.7647	0.2147	101.01
Pr>F percent control			<0.0001	<0.0001	NS	NS	<0.0001	NS	NS	<0.0001
Pr>F weed count			<0.0001	<0.0001	NS	NS	<0.0001	NS	NS	<0.0001

<sup>x</sup>This weed distribution was spotty and was not found in the untreated; NFW = no weeds found

<sup>y</sup> Glyphomax xrt at 3 pt/A and Agri-dexcoc at 1.25 % V/V were applied to all treatments (treatments 18 and 19 were treated as listed)

**Table 4.** Weed counts April 4, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup> .

Treat#	Treatment <sup>y</sup>	Rate	Groundsel	Sow thistle	Shepherd's Purse	Malva	Cover Crop	Pepper weed	London Rocket	Total
1	Penoxsulam	0.5 oz	97.6	99.0	75.0	100.0	96.0	75.0	100.0	97.7
	Goal Tender	1.0 pt	2.8	0.8	0.3	0.0	1.5	0.8	0.0	6.0
2	Penoxsulam	0.5 oz	84.0	94.4	100.0	100.0	86.1	75.0	100.0	91.1
	Goal Tender	1.5 pt	15.3	3.0	0.0	0.0	2.5	1.0	0.0	21.8
3	Penoxsulam	0.5 oz	99.7	100.0	100.0	100.0	96.6	75.0	100.0	97.6
	Goal Tender	3.0 pt	0.8	0.0	0.0	0.0	1.0	1.5	0.0	8.0
4	Penoxsulam	1.0 oz	85.5	67.8	100.0	100.0	95.4	75.0	75.0	83.7
	Goal Tender	1.0 pt	18.0	18.8	0.0	0.0	1.3	2.3	1.8	42.0
5	Penoxsulam	1.0 oz	97.8	91.0	75.0	100.0	93.1	100.0	100.0	94.3
	Goal Tender	1.5 pt	5.8	7.0	4.3	0.0	2.3	0.0	0.0	19.3
6	Penoxsulam	1.0 oz	95.4	98.5	100.0	100.0	97.6	100.0	100.0	95.4
	Goal Tender	3.0 pt	12.3	1.3	0.0	0.0	1.3	0.0	0.0	14.8
7	Penoxsulam	2.0 oz	87.9	96.7	100.0	100.0	91.7	100.0	100.0	92.6
	Goal Tender	1.0 pt	13.5	2.5	0.0	0.0	1.5	0.0	0.0	17.5
8	Penoxsulam	2.0 oz	99.5	95.8	100.0	100.0	88.8	100.0	100.0	97.2
	Goal Tender	1.5 pt	1.3	3.0	0.0	0.0	2.8	0.0	0.0	7.0
9	Penoxsulam	2.0 oz	100.0	99.8	100.0	100.0	100.0	75.0	100.0	99.6
	Goal Tender	2.0 pt	0.0	0.3	0.0	0.0	0.0	0.8	0.0	1.0
10	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Goal Tender	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Penoxsulam	1.0 oz	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	Goal Tender	1.5 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sulfan	3.0 qt								
12	Penoxsulam	2.0 oz	93.2	100.0	100.0	100.0	99.1	75.0	100.0	94.9
	Goaltender	3.0 pt	7.5	0.0	0.0	0.0	0.3	2.3	0.0	10.0
	Sulfan	3.0 qt								
13	Goal Tender	1.5 pt	98.9	96.4	100.0	100.0	97.5	100.0	100.0	98.4
			2.3	1.8	0.0	0.0	0.8	0.0	0.0	4.8
14	Goal Tender	3.0 pt	98.7	99.8	100.0	100.0	99.1	75.0	100.0	99.1
			1.8	0.3	0.0	0.0	0.3	0.3	0.0	2.5
15	Chateau	12 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Surflan	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Goal Tender	3.0 pt	99.2	100.0	100.0	100.0	96.9	75.0	100.0	99.4
	Matrix	2.0 oz	0.8	0.0	0.0	0.0	0.5	0.3	0.0	1.5
17	Goal Tender	3.0 pt	98.5	100.0	100.0	100.0	99.5	100.0	100.0	99.3
	Matrix	4.0 oz	1.3	0.0	0.0	0.0	0.3	0.0	0.0	1.5
18	Glyphomax	3.0 pt	47.6	14.9	37.5	50.0	41.6	100.0	83.3	37.7
	Agr-Dex coc	1.25%	94.3	66.8	1.8	2.3	16.3	0.0	0.5	181.8
19	Glyphomax	3.0 pt	92.1	93.9	100.0	50.0	100.0	100.0	100.0	92.6
	Agr-Dex coc	1.25%	12.8	3.8	0.0	1.0	0.0	0.0	0.0	17.5
	Glyphomax	3.0 pt								
	Agr-Dex coc	1.25%								
20	Matrix	4.0 oz	51.8	99.1	100.0	100.0	83.2	50.0	100.0	67.8
			85.3	0.8	0.0	0.0	4.3	3.5	0.0	93.8
21	Gallery 75 DF	0.5 lb	99.0	100.0	100.0	75.0	72.1	75.0	100.0	95.9
			1.5	0.0	0.0	0.3	7.3	1.0	0.0	10.0
22	Untreated	---	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			185.5	75.8	0.5	0.5	28.0	0.0	1.0	291.3
LSD 0.05 percent control			19.803	11.418	25.725	29.339	17.926	46.756	18.239	12.373
LSD 0.05 weed count			47.631	12.956	NS	0.9397	6.8413	NS	NS	50.137
Pr>F percent control			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0156	<0.0001	<0.0001
Pr>F weed count			<0.0001	<0.0001	0.4338	0.0035	<0.0001	0.4165	0.4338	<0.0001

<sup>x</sup>This weed distribution was spotty and was not found in the untreated; NFW = no weeds found

<sup>y</sup> Glyphomax xrt at 3 pt/A and Agri-dexcoc at 1.25 % V/V were applied to all treatments (treatments 18 and 19 were treated as listed)

**Table 5.** Weed counts May 7, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup>.

Treatme nt #	Treatment name	Rate	Groundsel	Sow Thistle	Shepherd's Purse	Malva	Pepper weed	Cover crop	London rocket	Total
1	Penoxsulam	0.5 oz	73.9	97.4	75.0	100.0	75.0	97.9	100.0	91.7
	Goal Tender	1.0 pt	5.0	1.5	0.3	0.0	0.5	0.3	0.0	7.5
2	Penoxsulam	0.5 oz	53.5	92.1	100.0	100.0	75.0	72.5	100.0	74.4
	Goal Tender	1.5 pt	16.0	2.8	0.0	0.0	0.8	1.8	0.0	21.3
3	Penoxsulam	0.5 oz	95.9	98.7	100.0	100.0	75.0	96.5	100.0	95.5
	Goal Tender	3.0 pt	1.5	0.5	0.0	0.0	1.3	0.5	0.0	3.8
4	Penoxsulam	1.0 oz	74.6	69.7	100.0	100.0	75.0	83.3	75.0	70.2
	Goal Tender	1.0 pt	9.8	12.8	0.0	0.0	1.5	1.0	0.8	25.8
5	Penoxsulam	1.0 oz	91.6	85.9	75.0	100.0	75.0	92.3	87.5	85.7
	Goal Tender	1.5 pt	3.3	7.0	2.5	0.0	0.3	0.5	0.3	13.8
6	Penoxsulam	1.0 oz	68.3	96.7	100.0	100.0	100.0	91.7	100.0	76.1
	Goal Tender	3.0 pt	16.0	1.3	0.0	0.0	0.0	1.0	0.0	18.3
7	Penoxsulam	2.0 oz	42.8	93.7	100.0	100.0	100.0	87.5	100.0	72.8
	Goal Tender	1.0 pt	16.7	3.3	0.0	0.0	0.0	0.8	0.0	20.8
8	Penoxsulam	2.0 oz	80.3	91.8	100.0	100.0	100.0	93.8	100.0	91.1
	Goal Tender	1.5 pt	3.5	3.8	0.0	0.0	0.0	0.3	0.0	7.5
9	Penoxsulam	2.0 oz	91.5	95.9	100.0	100.0	50.0	100.0	100.0	94.7
	Goal Tender	2.0 pt	1.3	1.5	0.0	0.0	1.8	0.0	0.0	4.5
10	Penoxsulam	2.0 oz	92.2	98.3	100.0	100.0	100.0	100.0	100.0	97.9
	Goal Tender	3.0 pt	1.0	0.8	0.0	0.0	0.0	0.0	0.0	1.8
11	Penoxsulam	1.0 oz	73.5	75.0	75.0	75.0	75.0	75.0	75.0	74.5
	Goal Tender	1.5 pt	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	Sulfan	3.0 qt								
12	Penoxsulam	2.0 oz	100.0	100.0	100.0	100.0	75.0	100.0	100.0	97.9
	Goaltender	3.0 pt	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0
	Sulfan	3.0 qt								
13	Goal Tender	1.5 pt	70.7	93.1	100.0	100.0	100.0	92.3	100.0	89.0
			5.3	2.5	0.0	0.0	0.0	1.0	0.0	8.8
14	Goal Tender	3.0 pt	68.1	99.6	100.0	100.0	75.0	93.8	100.0	93.1
			5.3	0.3	0.0	0.0	0.3	0.3	0.0	6.0
15	Chateau	12 oz	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Surflan	3.0 pt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Goal Tender	3.0 pt	88.9	98.3	100.0	100.0	75.0	100.0	100.0	95.2
	Matrix	2.0 oz	3.8	1.0	0.0	0.0	0.3	0.0	0.0	5.0
17	Goal Tender	3.0 pt	100.0	99.2	100.0	100.0	100.0	100.0	100.0	99.7
	Matrix	4.0 oz	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
18	Glyphomax	3.0 pt	47.7	19.5	75.0	75.0	75.0	35.4	100.0	32.3
	Agr-Dex coc	1.25%	11.8	38.3	0.3	0.5	1.3	6.5	0.0	58.5
19	Glyphomax	3.0 pt								
	Agr-Dex coc	1.25%	83.5	99.4	100.00	75.0	100.0	93.8	100.0	96.1
	Glyphomax	3.0 pt	2.3	0.3	0.00	0.3	0.0	0.3	0.0	3.0
	Agr-Dex coc	1.25%								
20	Matrix	4.0 oz	46.4	95.4	100.00	100.0	50.0	86.5	100.0	68.9
			20.5	1.8	0.00	0.0	3.0	1.5	0.0	26.8
21	Gallery 75 DF	0.5 lb	91.3	100.0	100.00	75.0	75.0	51.2	100.0	89.6
			2.8	0.0	0.00	0.3	1.3	4.0	0.0	8.3
22	Untreated	---	0.0	0.0	-----	-----	-----	0.0	0.0	0.0
			29.5	47.3	0.00	0.0	0.0	10.3	0.8	87.8
LSD 0.05 percent control			34.539	9.036	26.501	25.952	52.042	21.816	16.948	16.354
LSD 0.05 weed count			13.198	6.2539	NS	NS	NS	2.5469	0.5614	13.966
Pr>F percent control			<0.0001	<0.0001	<0.0001	<0.0001	0.0566	<0.0001	<0.0001	<0.0001
Pr>F weed count			0.0005	<0.0001	0.5054	0.5498	0.4807	<0.0001	0.2334	<0.0001

<sup>x</sup> This weed distribution was spotty and was not found in the untreated; NFW = no weeds found

<sup>y</sup> Glyphomax xrt at 3 pt/A and Agri-dexcoc at 1.25 % V/V were applied to all treatments (treatments 18 and 19 were treated as listed)

**Table 6.** Weed counts June 4, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup>.

Treat#	Treatment name	Rate	Groundsel	Sow Thistle	Peppers weed	Malva	Morning glory	Cover crop	Others	Total
1	Penoxsulam	0.5 oz	65.8	97.0	75.0	100.0	100.0	87.5	75.0	89.8
	Goal Tender	1.0 pt	3.0	1.5	1.8	0.0	0.0	0.3	0.3	6.8
2	Penoxsulam	0.5 oz	35.7	63.9	50.0	75.0	75.0	70.7	75.0	64.0
	Goal Tender	1.5 pt	16.5	3.5	1.0	0.0	0.0	0.8	0.0	21.8
3	Penoxsulam	0.5 oz	81.0	96.7	75.0	100.0	100.0	91.5	100.0	91.2
	Goal Tender	3.0 pt	2.8	1.3	0.8	0.0	0.0	0.8	0.0	5.5
4	Penoxsulam	1.0 oz	47.7	68.5	75.0	100.0	100.0	95.8	75.0	68.0
	Goal Tender	1.0 pt	8.3	10.5	1.8	0.0	0.0	0.3	0.3	21.0
5	Penoxsulam	1.0 oz	57.9	89.2	50.0	100.0	100.0	98.4	100.0	84.9
	Goal Tender	1.5 pt	4.3	4.8	0.5	0.0	0.0	0.3	0.0	9.8
6	Penoxsulam	1.0 oz	50.0	73.8	75.0	75.0	75.0	50.0	75.0	89.8
	Goal Tender	3.0 pt	4.5	1.3	0.0	0.0	0.0	0.8	0.0	6.5
7	Penoxsulam	2.0 oz	31.7	48.6	50.5	50.8	51.0	42.9	51.5	74.1
	Goal Tender	1.0 pt	12.0	2.0	0.0	0.0	0.0	1.0	0.0	15.0
8	Penoxsulam	2.0 oz	50.7	89.6	100.0	100.0	100.0	89.6	100.0	85.6
	Goal Tender	1.5 pt	4.0	4.0	0.0	0.0	0.0	1.3	0.0	9.3
9	Penoxsulam	2.0 oz	79.2	94.4	50.0	100.0	100.0	100.0	100.0	92.9
	Goal Tender	2.0 pt	1.5	1.8	1.3	0.0	0.0	0.0	0.0	4.5
10	Penoxsulam	2.0 oz	78.4	98.4	100.0	100.0	75.0	100.0	100.0	95.6
	Goal Tender	3.0 pt	1.5	0.8	0.0	0.0	0.5	0.0	0.0	2.8
11	Penoxsulam	1.0 oz	67.5	74.2	75.0	75.0	50.0	75.0	75.0	71.1
	Goal Tender	1.5 pt	1.5	0.3	0.0	0.0	0.8	0.0	0.0	2.5
	Sulfan	3.0 qt								
12	Penoxsulam	2.0 oz	90.0	100.0	75.0	100.0	75.0	100.0	100.0	96.0
	Goaltender	3.0 pt	0.5	0.0	1.8	0.0	0.3	0.0	0.0	2.5
	Sulfan	3.0 qt								
13	Goal Tender	1.5 pt	48.0	91.5	100.0	100.0	100.0	85.9	100.0	86.1
			5.8	2.8	0.0	0.0	0.0	0.5	0.0	9.0
14	Goal Tender	3.0 pt	51.8	74.7	50.0	75.0	75.0	70.8	75.0	93.9
			3.3	0.3	0.3	0.0	0.0	0.3	0.0	4.0
15	Chateau	12 oz	100.0	98.3	100.0	100.0	75.0	100.0	100.0	98.1
	Surflan	3.0 pt	0.0	0.8	0.0	0.0	0.3	0.0	0.0	1.0
16	Goal Tender	3.0 pt	75.0	98.8	75.0	100.0	100.0	95.7	100.0	95.5
	Matrix	2.0 oz	1.8	0.5	0.3	0.0	0.0	0.5	0.0	3.0
17	Goal Tender	3.0 pt	95.8	99.1	100.0	100.0	100.0	100.0	100.0	99.3
	Matrix	4.0 oz	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.5
18	Glyphomax	3.0 pt	10.9	6.9	75.5	25.8	76.0	26.3	76.5	8.6
	Agr-Dex coc	1.25%	16.8	42.3	1.5	1.5	0.0	6.3	0.0	68.3
19	Glyphomax	3.0 pt	82.9	96.9	100.0	50.0	100.0	100.0	100.0	86.6
	Agr-Dex coc	1.25%	2.0	1.3	0.0	5.3	0.0	0.0	0.0	8.5
	Glyphomax	3.0 pt								
	Agr-Dex coc	1.25%								
20	Matrix	4.0 oz	18.1	67.1	25.0	75.0	75.0	62.5	75.0	60.5
			20.5	2.5	1.8	0.0	0.0	1.5	0.0	26.3
21	Gallery 75 DF	0.5 lb	86.8	100.0	75.0	100.0	100.0	67.9	75.0	88.5
			2.8	0.0	0.8	0.0	0.0	2.5	0.8	6.8
22	Untreated	---	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			13.0	44.8	0.0	0.3	0.0	8.3	0.0	66.3
LSD <sub>0.05</sub> for percent control			39.143	32.292	56.928	39.659	44.581	36.848	44.653	12.903
LSD <sub>0.05</sub> for the weed count			8.526	7.621	2.379	3.042	0.551	2.673	0.496	10.079
Pr>F <sub>0.05</sub> for percent control			<0.0001	<0.0001	0.0380	<0.0001	0.0076	<0.0001	0.0070	<0.0001
Pr>F <sub>0.05</sub> for the weed count			<0.0001	<0.0001	0.8057	0.3377	0.4762	<0.0001	0.5293	<0.0001

\* This weed distribution was spotty and was not found in the untreated; NFW = no weeds found; Others includes shepherd's purse, lambsquarters & London rocket.

<sup>y</sup> Glyphomax xrt at 3 pt/A and Agri-dexcoc at 1.25 % V/V were applied to all treatments (treatments 18 and 19 were treated as listed)

**Table 7.** Crop tolerance trial. Weed counts March 6, 2008. In each cell: top number = % control and bottom number = weeds/48 ft<sup>2</sup>.

Trt Num	Appl Code	Treat Name	Rate fl oz pr/a	Appl Timing	Groundsel	Sow Thistle	Shepherd's Purse	Malva	Cover Crop	London Rocket	Night-shade	Total
1	A	Penoxsulam	1	Dec 13, 07	57.52	20.15	20.00	0.00	0.00	100.00	0.00	0.00
	B	Penoxsulam	1	FALL 08	2.50	54.50	1.25	1.25	7.75	0.00	5.25 <sup>x</sup>	72.75
	C	Penoxsulam	1	FALL 09								
2	A	Penoxsulam	2	Dec 13, 07	100.00	59.67	30.00	0.00	11.11	100.00	100.00	75.00
	B	Penoxsulam	2	FALL 08	0.00	7.50	4.25	0.75	5.50	0.00	0.00	18.00
	C	Penoxsulam	2	FALL 09								
3	A	Penoxsulam	4	Dec 13, 07	100.00	90.88	0.00	0.00	13.33	100.00	100.00	71.52
	B	Penoxsulam	4	FALL 08	0.00	1.25	12.75	1.00	5.50	0.00	0.00	20.50
	C	Penoxsulam	4	FALL 09								
4	A	Penoxsulam	8	Dec 13, 07	100.00	93.62	100.00	100.00	0.00	100.00	100.00	91.04
	B	Penoxsulam	8	FALL 08	0.00	0.75	0.00	0.00	5.75	0.00	0.00	6.75
	C	Penoxsulam	8	FALL 09								
5	A	Penoxsulam	2	Dec 13, 07								
	B	Penoxsulam	1	March 17, 08	98.08	62.05	0.00	0.00	16.67	100.00	100.00	64.23
	C	Penoxsulam	2	FALL 08	0.25	4.00	1.50	12.50	7.50	0.00	0.00	25.75
	D	Penoxsulam	1	FEB 09								
	E	Penoxsulam	2	FALL 09								
	F	Penoxsulam	1	FEB 2010								
6	A	Penoxsulam	4	Dec 13, 07								
	B	Penoxsulam	2	March 17, 08	100.00	84.84	80.00	100.00	20.00	100.00	0.00	87.74
	C	Penoxsulam	4	FALL 08	0.00	3.25	0.25	0.00	5.00	0.00	0.25 <sup>x</sup>	8.75
	D	Penoxsulam	2	FEB 09								
	E	Penoxsulam	4	FALL 09								
	F	Penoxsulam	2	FEB 2010								
7	A	Penoxsulam	8	Dec 13, 07								
	B	Penoxsulam	4	March 17, 08	99.00	72.14	13.33	100.00	10.00	100.00	100.00	83.33
	C	Penoxsulam	2	FALL 08	0.25	5.00	2.00	0.00	4.75	0.00	0.00	12.00
	D	Penoxsulam	4	FEB 09								
	E	Penoxsulam	8	FALL 09								
	F	Penoxsulam	4	FEB 2010								
8	A	Penoxsulam	8	Dec 13, 07	75.00	95.74	100.00	0.00	5.00	100.00	100.00	81.94
	B	Penoxsulam	4	March 08	3.25	0.50	0.00	0.75	8.50	0.00	0.00	13.00
9		Untreated			0.00	0.00	0.00	----	0.00	0.00	----	0.00
					41.50	23.75	2.25	0.00	4.00	0.50	0.00	72.00
LSD 0.05 percent control					33.515	34.915	56.469	59.231	54.43	27.922	34.197	39.459
LSD 0.05 weed count					21.915	44.72	10.383	11.257	6.8863	0.2792	5.0838	50.752
LSD 0.01 weed count					18.192	37.124	8.6191	9.3444	5.7165	0.2318	4.2202	42.131
Pr>F percent control					0.0008	<0.0001	NS	NS	NS	0.0153	NS	0.0014
Pr>F weed count					0.01	NS	NS	NS	NS	0.0153	NS	0.0593

<sup>x</sup>This weed distribution was spotty and was not found in the untreated