Alfalfa

WEED CONTROL
2007
TRIAL RESULTS

SAN JOAQUIN COUNTY

Cooperative Extension University of California
2101 East Earhart Avenue—Stockton—California—95206

2007 ALFALFA

WEED CONTROL RESEARCH PROGRESS REPORT

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San Joaquin County

ACKNOWLEDGEMENTS

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CONTRIBUTING AUTHOR

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Caution

This report is a summary of alfalfa weed control studies conducted in San Joaquin County. **It should not in any way be interpreted as a recommendation of the University of California.**

Herbicide trade names are used in this report, as well as the less familiar common names to familiarize the reader with the various products tested. No endorsement of products mentioned or criticism of similar products is intended.

Herbicide rates in this report are always expressed as **active ingredient (a.i.) of material per treated acre.**

Trade Name	**Common Name**	**Company**
BB5 Natural	acidifier; buffer	NutriAg Ltd.
Chateau	flumioxazin	Bayer
Gramoxone	paraquat	Syngenta
No Foam A	non ionic surfactant	Western Farm Service
Prow H_2O	pendimethalin	BASF
Roundup	glyphosate	Monsanto
Sandea	Halosulfuron-methyl	Gowan

2007 Alfalfa Weed Control Trial Results

During the 2007 season, two weed control trials were established in San Joaquin County.

Trials were established to evaluate the effectiveness of candidate herbicides for controlling annual and perennial weeds in established alfalfa. Complete trial descriptions and weed control/crop phytotoxicity ratings for each trial follow.

Trial 1 - **Yellow Nutsedge Control in Roundup Ready Alfalfa**. Mick Canevari, Don Colbert, Scott Whiteley and Randall Wittie. (Cooperative Extension, University of California, Stockton, CA 95205).

OBJECTIVE: A field study was established to evaluate glyphosate applications for controlling yellow nutsedge (*Cyperus esculentus*) in glyphosate resistant alfalfa.

MATERIALS & METHODS: Alfalfa was seeded February 26, 2006. Plots were 10 by 25 ft arranged in a randomized complete block design with four replications. All herbicide treatments were applied with a CO_2 pressurized backpack sprayer calibrated to deliver 20 gpa. Treatments were applied after the first cutting June 15, 2006, after the second cutting July 17, 2006 and after the third cutting on August 10, 2006 (Table 1). In 2007 treatments were applied after the third cutting June 18, 2007, fourth cutting July 17, 2007, fifth cutting August 16, 2007 and after the sixth cutting September 17, 2007 (Table2). Visual evaluations and yellow nutsedge plant counts were taken at various times throughout the growing season.

Table 1. Application information 2006.

	June 15, 2006	July 17, 2006	August 10, 2006
Timing	First cutting	Second cutting	Third cutting
Crop stage	7-12 inch	6-18 inch	3-8 inch
Yellow nutsedge stage	3 to 4 lf, 3 to 10 inch	3 to 5 lf, 6 to 8 inch	3-5 lf, 3 to 8 inch
Air temperature (F)	68	76	81
Relative humidity (%)	58	55	47
Wind (mph)	5	5	1
Cloud cover (%)	0	0	0

Table 2. Application information 2007.

	June 18, 2007	July17, 2007	August 16, 2007	September 17, 2007
Timing	Third cutting	Fourth cutting	Fifth cutting	Sixth cutting
Crop stage	6 to 9 inch	4 to 12 inch	4-10 inch	5 to 8 inch
Yellow nutsedge stage	2 to 6 lf 3 to 7 inch	3 to 7 lf, 3 to 11 inch	2 to 12 lf, 1 to 10 inch	2 to 8 lf, 2 to 7 inch
Air temperature (F)	66	74	68	76
Relative humidity (%)	54	66	71	47
Wind (mph)	1	5	4	4
Cloud cover (%)	0	10	0	0

RESULTS & DISCUSSIONS:

All treatments showed no alfalfa injury except for Sandea which caused some early moderate growth reduction and chlorosis. Alfalfa recovered five weeks after application (data not shown). Multiple applications of Roundup significantly reduced the nutsedge population compared to the untreated control (Table 3). A single 1.5 or 2.0 lb ai/A Roundup treatment applied after a cutting in July or August gave similar nutsedge control from multiple applications of Roundup.. Roundup is most effective when applied after irrigation. Roundup plus BB5 gave similar nutsedge control as Roundup alone. Sandea gave 60% nutsedge control early but later evaluations showed poor control.

Table 3. Yellow nutsedge control in glyphosate resistant alfalfa.

				Yellow Nutsedge Control					
		Application Timing[1]		...%.....	……..Plant Count/Plot……...				
Treatment	lb ai/A	2006	2007	9/18/06	6/18/07	7/10/07	8/13/07	9/17/07	10/22/07
Glyphosate	1.0	1st,2nd,3rd	3rd,4th,5th	98	35	35(0)[2]	9(74)	1(97)	1(97)
Glyphosate	1.5	1st	3rd	85	28	22(21)	11(61)	12(57)	18(36)
Glyphosate + glyphosate	2.0 1.0	1st 2nd,3rd	3rd,4th,5th	97	23	22(4)	7(70)	1(96)	1(96)
Glyphosate + glyphosate + glyphosate	1.5 1.0 1.5	1st 2nd,3rd	3rd,4th,5th	98	22	14(36)	6(73)	0(100)	2(91)
Glyphosate + BB5 natural + glyphosate	1.5 .25% 1.5	1st 1st	6th	87	42	70	45	28	5(82)
Glyphosate	2.0		5th	0	79	120	99	4(96)	5(95)
Glyphosate	1.5	2nd	4th	96	24	46	9(80)	9(80)	7(85)
Halosulfuron-methyl + No foam A	0.047 .25%		3rd	0	59	24(59)	53(10)	42(29)	38(36)
Untreated	-	-	-	0	68	93	82	52	27
LSD (05)				4	26	37	16	11	13

[1]Application after cutting
[2](0) % control

Trial 2 – **Prowl H_2O Application Timings and Chateau Herbicide for Weed Control and Tolerance in Established Alfalfa.** Mick Canevari, Don Colbert, Randall Wittie & Scott Whiteley.

OBJECTIVE: Evaluate herbicide applications for controlling winter annual weeds and crop tolerance in an established alfalfa field.

MATERIALS & METHODS: A field study was established to evaluate Prowl H_2O and Chateau applications for weed control and tolerance in an established alfalfa field. Plots were 10 by 20 ft arranged in a randomized complete block design with three replications. All herbicide treatments except for the Chateau fertilizer formulation were applied with a CO_2 pressurized backpack sprayer calibrated to deliver 22 gpa. Chateau fertilizer formulation applied with a hand fertilizer spreader. Treatments were applied January 17, February 14 and 9 days after the first cutting March 29, 2007 (Table 1).

Table 1. Application information 2007

	January 17, 2007	February 14, 2007	March 29, 2007
Timing	61 days before 1st cutting	33 days before 1st cutting	9 days after 1st cutting
Crop stage	Semi-dormant, green foliage, 2-4 inch height	Semi-dormant, green foliage, 2-5 inch height	Green foliage, actively growing, 3-6 inch height
Common chickweed stage	3-6 inch diameter	10 % early flowering	Flowering to seed set
Annual bluegrass	Fully tillered, 2-4 inch ht.	10% fully tillered, 90% seed set, 1-3 inch height	Flowering to seed set
Shepherd's purse	6-8 leaf, few flowering 2-3 inch diameter	4 leaf-seed set, 1-3 inch height	Flowering to seed set
Common groundsel	8-10 leaf, 1 inch height	>16 leaf, 4-6 inch height	Flowering to seed set
Henbit	6 leaf, 1 inch height	2-10 leaf, 0.25-1.5 inch ht.	Flowering to seed set
Air temperature (F)	47	60	69
Relative humidity (%)	52	63	32
Wind (mph)	1.5	5	2
Cloud cover (%)	0	5	0

RESULTS & DISCUSSIONS:

Alfalfa injury (Table 3 & 4)
Gramoxone was applied to all herbicide treatments, as expected 90% initial burndown of the alfalfa. Prowl H_2O treatments applied on 1/17/07 or 2/14/07 showed very little to no injury 0-5%. The 3/29/07 between cutting applications showed some initial 7-15% growth reduction and leaf cupping with complete recovery before the second cutting. Chateau WG treatments gave some initial 10-28% growth reduction. The lower rates recovered before the first cutting, however the high rate of 0.25 lb ai/A was still showing some growth reduction when comparing plant heights. Alfalfa yield from this treatment was 1103 lb/A compared to 1305 lb/A from the 0.0625 lb ai/A rate and 0.125 lb ai/A = 1232 lb/A. The Chateau fertilizer formulation treatment showed good alfalfa tolerance. All Chateau treatments showed no alfalfa injury prior to the second cutting. All herbicide treatment alfalfa yields were higher than the untreated control. Alfalfa yields were lower than normal because the grower green chopped the field for his dairy operations. This required us to take yields earlier than normal.

Weed control (Table 2 & 4)
Overall, the best treatments were Gramoxone tank mixed with Chateau. The 0.0625 lb ai/A rate gave poor control of groundsel. Chateau WG formulation gave better weed control than the fertilizer formulation. The Prowl H_2O treatments gave fair to excellent overall weed control. Prowl H_2O applied between cuttings gave no control of henbit. Treatments with the lowest weed yields for the first cutting were; (1) Gramoxone 0.5 lb ai/A + Chateau WG 0.25 lb ai/A = 32 lb/A, (2) Gramoxone 0.5 lb ai/A + Prowl H_2O 2.0 lb ai/A = 76 lb/A and (3) Gramoxone + Chateau WG 0.125 lb ai/A = 83 lb/A.

Table 2. % burndown and % weed control in established alfalfa.

			Rating Date 1/24/07		% Control[1] – 3/13/07				
Treatment	Rate lb ai/A	App Date	% Burndown[2]	% Control Henbit	Henbit	Shepherd's Purse	Annual Bluegrass	Common Groundsel	Common Chickweed
Gramoxone[3] + Prowl H_2O + No Foam A	0.5 + 2.0 + 0.25%	1/17/07	92	80	83	81	96	75	90
Gramoxone + Prowl H_2O + No Foam A	0.5 + 3.0 + 0.25%	1/17/07	92	80	90	87	94	67	92
Gramoxone + Prowl H_2O + No Foam A	0.5 + 3.8 + 0.25%	1/17/07	92	80	86	78	94	73	86
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 2.0	1/17/07 2/14/07	92	80	68	87	97	77	85
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.0	1/17/07 2/14/07	92	80	72	88	96	83	87
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.8	1/17/07 2/14/07	92	80	80	90	98	85	87
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 2.0	1/17/07 3/29/07	92	80	0	83	94	63	77
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.0	1/17/07 3/29/07	92	80	0	79	96	93	82
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.8	1/17/07 3/29/07	92	80	3	88	93	88	85
Gramoxone + Chateau WG + No Foam A	0.5 + 0.0625 + 0.25%	1/17/07	92	80	100	87	100	17	87
Gramoxone + Chateau WG+ No Foam A	0.5 + 0.125 + 0.25%	1/17/07	92	80	100	91	99	87	94
Gramoxone + Chateau WG+ No Foam A	0.5 + 0.25 + 0.25%	1/17/07	92	80	100	98	100	83	98
Gramoxone + No Foam A Chateau Fert[4]	0.5 + 0.25% 0.125	1/17/07 1/17/07	92	80	83	92	100	70	91
Untreated	-	-	0	0	0	0	0	0	0

[1]0 = No weed control, 100 = Complete weed control

[2] % burndown of common chickweed, common groundsel, annual bluegrass & shepherd's purse

[3]Gramoxone Inteon 2EC formulation used to burndown existing weeds

[4]Chateau herbicide formulated on fertilizer granules

Table 3. Crop injury and alfalfa plant height.

			……..% Alfalfa Injury[1]…….						
		App	Necrosis	Growth Reduction				Alfalfa Height-CM	
Treatment	Rate lb ai/A	Date	1/24	2/15	3/13	4/6	4/18	3/20	4/25
Gramoxone[2]+ Prowl H_2O + No Foam A	0.5 + 2.0 + 0.25%	1/17/07	90	0	0	0	0	35.2	34.3
Gramoxone + Prowl H_2O + No Foam A	0.5 + 3.0 + 0.25%	1/17/07	90	0	0	0	0	34.7	34.8
Gramoxone + Prowl H_2O + No Foam A	0.5 + 3.8 + 0.25%	1/17/07	90	0	0	0	0	35.2	34.8
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 2.0	1/17/07 2/14/07	90	0	2	0	0	36.2	34.7
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.0	1/17/07 2/14/07	90	0	2	0	0	34.8	34.7
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.8	1/17/07 2/14/07	90	0	5	0	0	36.1	34.4
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 2.0	1/17/07 3/29/07	90	0	0	7	0	35.5	34.7
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.0	1/17/07 3/29/07	90	0	0	13	0	34.8	34.5
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.8	1/17/07 3/29/07	90	0	0	15	0	36.3	35.0
Gramoxone + ChateauWG+ No Foam A	0.5 + 0.0625+ 0.25%	1/17/07	90	10	3	0	0	35.8	34.7
Gramoxone + ChateauWG+ No Foam A	0.5 + 0.125 + 0.25%	1/17/07	90	20	13	0	0	33.7	35.5
Gramoxone + ChateauWG+ No Foam A	0.5 + 0.25 + 0.25%	1/17/07	90	28	17	0	0	30.2	34.3
Gramoxone + No Foam A Chateau Fert[3]	0.5 + 0.25% 0.125	1/17/07 1/17/07	90	8	0	0	0	35.5	35.3
Untreated	-	-	0	0	0	0	0	35.7	34.7
LSD (05)				2	5	2	NS	2.5	1.3

[1]0 = No crop injury, 100 = Crop dead

[2]Gramonone Inteon 2EC formulation used to burndown existing weeds

[3]Chateau herbicide formulated on fertilizer granules

Table 4. Alfalfa and weed yields for the first cutting

Treatment	Rate lb ai/A	Application Date	Yield Lb/A-90% DM[1] Alfalfa	Weeds
Gramoxone[2] + Prowl H_2O + No Foam A	0.5 + 2.0 + 0.25%	1/17/07	1296	76
Gramoxone + Prowl H_2O + No Foam A	0.5 + 3.0 + 0.25%	1/17/07	1262	97
Gramoxone + Prowl H_2O + No Foam A	0.5 + 3.8 + 0.25%	1/17/07	1127	154
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 2.0	1/17/07 2/14/07	1073	146
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.0	1/17/07 2/14/07	1167	99
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.8	1/17/07 2/14/07	1336	101
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 2.0	1/17/07 3/29/07	1155	217
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.0	1/17/07 3/29/07	1441	240
Gramoxone + No Foam A Prowl H_2O	0.5 + 0.25% 3.8	1/17/07 3/29/07	1153	163
Gramoxone + Chateau WG + No Foam A	0.5 + 0.0625 + 0.25%	1/17/07	1305	117
Gramoxone + Chateau WG + No Foam A	0.5 + 0.125 + 0.25%	1/17/07	1232	83
Gramoxone + Chateau WG + No Foam A	0.5 + 0.25 + 0.25%	1/17/07	1103	32
Gramoxone + No Foam A Chateau Fert[3]	0.5 + 0.25% 0.125	1/17/07 1/17/07	1204	142
Untreated	-	-	971	748
LSD (05)			183	62

[1]First cutting yield taken on 3/30/07
[2]Gramonone Inteon 2EC formulation used to burndown existing weeds
[3]Chateau herbicide formulated on fertilizer granules

This is a work in progress only. The chemicals and uses contained in this publication are experimental data and should not be considered as recommendations for use.

Until the products and their uses given in this report appear on a registered pesticide label or other legal, supplementary direction for use, it is illegal to use the chemicals as described.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in their original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets and livestock.

Recommendations are based on the best information currently available, and treatments based on them should not leave exceeding the tolerance established for any particular chemical. Confine chemicals to the area being treated. **THE GROWER IS LEGALLY RESPONSIBLE** for residues on his crops as well as for problems caused by drift from his property to other properties or crops.

Consult your County Agricultural Commissioner for correct methods of disposing of leftover spray material and empty containers. Never burn pesticide containers.

PHYTOTOXICITY

Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high or when overcast conditions occur. Injury may also result from excessive amounts or the wrong formulation or mixing incompatible materials. Inert ingredients such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.

No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

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