

# CONTROL STRATEGIES FOR SOME DIFFICULT TO CONTROL WEEDS

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## Abstract

Common Groundsel *Senecio vulgaris* and Field Dodder, *Cuscuta sp* have long been serious weed pest of alfalfa and at times becoming more difficult to control. Groundsel is especially problematic due to its toxicity when fed to horses and other livestock. Dodder is a parasitic plant that twines around alfalfa plants imbedding haustoria (suction caps) into alfalfa stems for nutrients, weakening the plant until it becomes unproductive. Hairy Fleabane *Conyza bonariensis* is a widespread weed pest plaguing orchards and vineyards of the central valley's of California. More recently this weed is beginning to invade alfalfa hay fields, and proving difficult to control. Research efforts have demonstrated some new information with more effective ways to minimize the spread and improve control of these three weeds.

**Key Works: pre emergent, post emergent, velpar, paraquat, chateau, axial branching.**

## Introduction

### Common Groundsel

The 2008 fall/winter weed control programs that were used in many central valley alfalfa fields failed to effectively control common groundsel. Groundsel has long been a problem weed of alfalfa and is of particular importance since it contains toxic alkaloids poisonous to livestock.

Research trials were initiated in 2008 evaluating several herbicide programs efficacy for post and pre emergent control. The study evaluated different herbicide application timings, and post control at various groundsel growth stages with paraquat. Figure 1. Results indicated that the best control was before or at very early germination using a combination of post and pre emergent herbicides, Gramoxone, Chateau and Velpar. As groundsel plants began to mature and initiate axial budding (branching) they became increasingly tolerant to post herbicide treatments. Figure2.

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## Dodder

Dodder is an annual parasitic weed that grows only by penetrating tissues of host plants to obtain water and nutrients. Seedlings must attach to a suitable host within a few days of germination or they die. Threadlike, yellow leafless stems twine around host plants, eventually creating a tangled mat. Each plant produces thousands of hard seeds that can remain dormant in the soil for years. Flowering begins in June through August.

Currently, there are two effective management options using preemergent herbicides Prowl H20 *pedimethalin*, and Treflan TR-10 *trifluralin*. They must be applied well in advance of the spring germination period and receive adequate rainfall or irrigation to activate. However, there are cases where pre emergent herbicides are not used or late germination weed escapes occur during the season. In these situations control options are limited. Dodder colonies grow rapidly and invade large areas of the field once established. There are few post treatment methods effective and at best are only marginally successful. The post methods include using high rates of acid based phosphoric fertilizers to thoroughly wet the foliage, or using a propane flamer and burn individual areas. Both methods are costly or may not be allowed for use in certain counties and states. Glyphosate use in Roundup Ready alfalfa has been demonstrated to be very effective post emergent in controlling dodder.

In 2009, research trials were established on an alfalfa field that was 80% covered with dodder by June. Several post herbicides were applied using high volumes of water (40 gpa @ 40 psi) with different adjuvant combinations to improve spray coverage and penetration into the dense canopy and to burn the dodder from the alfalfa stems. To enhance maximum spray coverage, the research plots were first mowed using a commercial 15' flail chopper set at a height of 2-4" above the soil surface. Initially, some treatments showed excellent burn down and control for approximately 50 days. After 60 days, even the best treatments became re-infested with dodder that was not initially killed. However, the temporary elimination of dodder for two months allowed much of the alfalfa to recover and may have saved the stand. Figure 3

## Hairy Fleabane

Hairy Fleabane *Conyza bonariensis* also called flax-leaf fleabane, is a summer annual that reproduces by seed. It begins to germinate in November with rains and continues into midsummer. If emergence occurs in late summer, it can act as a biennial. Each plant can produce over 40,000 seeds, which are disseminated by wind and with harvest equipment. Frequent tillage or soil disturbance can significantly reduce the population but in undisturbed landscapes such as alfalfa will often germinate and be present year around. Fleabane is a large woody robust plant that is not compatible with alfalfa hay harvesting and curing. Contamination of fleabane reduces hay quality, and unpalatable to horses and some livestock.

Research trials in 2009 were conducted to monitor fleabane germination and evaluate different herbicide treatments. A pre emergent application of Chateau was made on 10/29/2008 and post emergent treatments of Chateau, Velpar and Paraquat were applied on 12/10/2008. Figure 4.

Chateau and Velpar were both effective on preventing fleabane germination and provided 90% control for three months (Jan, Feb, Mar) at which time treatments began to break. A

sequential application of Chateau plus Chateau was applied in February (3 months apart) and provided 90% control to May. The combination of Chateau and Velpar together showed a slight improvement than each individually and may prove to be a good combination. Paraquat was effective controlling seedling fleabane at the December timing.

## Summary

All three weeds cited in this paper are difficult to control but can be managed by using the best cultural practices for alfalfa growth and early preventative measures before weeds establish a foot hold. Proper herbicide selection, maximum spray coverage and pre emergent applications will achieve the best results. Early herbicide applications were always more effective than later timings when weeds became large, and harden and relying on post emergent control methods. This is especially true for all three of these weeds; Dodder, Groundsel and Fleabane.

**Figure 1 – Winter Weed Control in Established Alfalfa**

Treatment <sup>2</sup>	Rate lb ai/A	Application Date	% - Weed Control <sup>1</sup> – Evaluation on 1/6 & 3/5/09											
			Shepherd purse		<b>Common Groundsel</b>		Common Chickweed		Swinecress		Annual Bluegrass		Henbit	
			1/6	3/5	<b>1/6</b>	<b>3/5</b>	1/6	3/5	1/6	3/5	1/6	3/5	1/6	3/5
Velpar L	0.5	12/11/08	50	52	<b>73</b>	<b>100</b>	65	94	88	95	18	13	70	90
Velpar L + Chateau SW	0.25 + 0.0625	12/11/08	90	97	<b>100</b>	<b>100</b>	98	99	94	100	45	65	100	100
Velpar L + Chateau SW	0.25 + 0.094	12/11/08	97	99	<b>100</b>	<b>100</b>	99	100	98	100	55	86	100	100
Velpar L + Chateau SW	0.5 + 0.125	12/11/08	95	100	<b>98</b>	<b>100</b>	98	100	99	100	75	95	100	100
Velpar L + Sandea WG	0.5 + 0.031	12/11/08	45	74	<b>88</b>	<b>100</b>	63	91	78	99	10	38	65	86
Gramoxone <sup>3</sup>	0.5	12/11/08	91	58	<b>98</b>	<b>94</b>	99	84	97	40	93	78	80	50
Gramoxone <sup>3</sup> + Chateau SW	0.25 + 0.0625	12/11/08	96	95	<b>95</b>	<b>97</b>	100	99	98	97	100	95	100	100
Gramoxone <sup>3</sup> + Chateau SW	0.5 + 0.125	12/11/08	100	100	<b>99</b>	<b>97</b>	100	100	99	98	100	97	100	100
Chateau SW	0.125	12/11/08	82	96	<b>45</b>	<b>37</b>	94	100	63	30	35	69	100	100
ChateauSW+ Sandea WG	0.125 + 0.031	12/11/08	73	99	<b>80</b>	<b>84</b>	88	95	80	100	20	73	100	100
Sencor DF	0.5	12/11/08	80	95	<b>60</b>	<b>72</b>	85	97	75	96	43	68	88	100
Gramoxone <sup>3</sup> + Velpar L	0.5 + 0.5	12/11/08	100	100	<b>100</b>	<b>100</b>	99	96	100	100	99	100	100	99
Check	-	-	0	0	<b>0</b>	<b>0</b>	0	0	0	0	0	0	0	0

<sup>1</sup>0 = No weed control; 100 = Complete weed control

<sup>2</sup>Ad-Wet 90CA (NIS) added to all herbicide treatments at 0.25% V/V (1 qt/100 gal)

<sup>3</sup>Gramoxone Inteon formulation 2AS

**Figure 2 – Groundsel Control With Paraquat on Three Growth Stages in Established Alfalfa**

Treatment	Rate lb ai/A	% Control <sup>1</sup> – Common Groundsel Growth Stages		
		No Axil Budding 1-4” Height	Axil Budding <sup>4</sup> 1.25-3.5” Height	Axil Budding <sup>4</sup> Flowering, 4.5- 6” Height
		<b>Gramoxone<sup>2</sup></b>	<b>0.5</b>	92

<sup>1</sup>0 = No groundsel control; 100 = Complete groundsel control

<sup>2</sup>Gramoxone Inteon 2AS formulation

<sup>3</sup>No Foam A (NIS) added at 0.25% V/V (1 qt/100 gal)

<sup>4</sup>Axial budding = early branching

**Figure 3– Treatment List, Alfalfa Injury and Dodder Control in Established Alfalfa**

Treatment	Rate lb ai/A	Application Date	% - Alfalfa Injury <sup>1</sup>			% - Dodder Control <sup>1</sup>		
			Necrosis		Stunting	6 DAT	33 DAT	54DAT
			6 DAT <sup>2</sup>	33DAT	33 DAT			
Chateau SW + No Foam A	0.125 + 0.25% V/V	6/24/09	68	0	0	65	37	13
Chateau SW + No Foam A + UN32	0.125 + 0.25% V/V + 1.0% V/V	6/24/09	68	0	0	62	7	0
Chateau SW + UN32 + Silwet L-77 + Hasten	0.125 + 1.0% V/V + 0.125 % V/V + 1.0% V/V	6/24/09	87	0	0	88	71	47
Raptor + Hasten + UN32	0.047 + 1.0% V/V + 1.0% V/V	6/24/09	0	0	0	40	30	13
Raptor + Chateau SW + Hasten	0.047 + 0.125 + 1.0% V/V	6/24/09	83	0	0	92	81	63
Roundup SL <sup>3</sup> + Chateau SW	0.5 + 0.125	6/24/09	28	0	0	61	60	43
Scythe EC+ Hasten + UN32	7.0% V/V + 1.0% V/V + 1.0% V/V	6/24/09	48	0	0	48	7	0
Scythe EC + Chateau SW	7.0% V/V + 0.125	6/24/09	85	0	0	93	73	50
Check	-	-	0	0	0	0	0	0

<sup>1</sup>0 = No dodder control or crop injury; 100 = Complete dodder control; crop dead

<sup>2</sup>Data taken days after treatment (DAT)

<sup>3</sup>Roundup Weathermax formulation

Figure 4 – Treatment List and Weed Control in Established Alfalfa

Treatment <sup>4</sup>	Rate lb ai/A	Application Date	% Preemergence Control <sup>1</sup>								AVG% <sup>3</sup> Weed Control
			% Hairy Fleabane Control <sup>1</sup>				Yellow		Common		
			Fleabane New Plants <sup>2</sup>				Foxtail		Lambsquarters		
			12/30 <sup>5</sup>	2/12	3/5	5/15	3/25	5/15	3/25	5/15	
Chateau SW <sup>6</sup>	0.125	10/29/08	100	94	89	73	80	75	94	83	86
Chateau SW <sup>7</sup>	0.125	12/10/08	65	62	63	13	97	92	94	81	88
Chateau SW + Gramoxone	0.125 + 0.5	12/10/08	100	98	95	72	88	75	80	63	89
Chateau SW + Gramoxone + Prowl H <sub>2</sub> O	0.125 + 0.5 + 2.0	12/10/08	100	99	95	87	100	100	100	94	98
Chateau SW + Velpar L	0.125 + 0.5	12/10/08	100	98	95	88	73	63	90	81	93
Sencor DF	0.5	12/10/08	73	95	57	17	0	0	0	0	64
Chateau SW + Butyrac 200	0.125 + 1.0	12/10/08	96	80	69	37	90	75	89	75	89
Chateau SW + Butyrac 200	0.125 + 1.5	12/10/08	100	92	83	40	83	65	71	67	86
Velpar L	0.5	12/10/08	60	99	98	68	0	0	0	0	73
Gramoxone + Velpar L	0.5 + 0.5	12/10/08	100	100	85	43	0	0	0	0	67
Gramoxone	0.5	12/10/08	100	73	23	0	0	0	0	0	57
Gramoxone + Prowl H <sub>2</sub> O	0.5 + 2.0	12/10/08	100	91	50	17	100	100	97	96	91
Gramoxone + Prowl H <sub>2</sub> O	0.5 + 3.0	12/10/08	100	95	75	17	100	100	100	100	92
Gramoxone + Treflan TR10 <sup>8</sup>	0.5 2.0	12/10/08 12/10/08	100	89	78	13	100	100	96	95	88
Raptor AS + Butyrac 200	0.032 + 1.0	12/17/08	0	32	0	0	0	0	0	0	33
Raptor AS + Butyrac 200	0.047 + 1.0	12/17/08	0	82	35	0	0	0	0	0	35
Chateau SW <sup>6</sup>	0.125	10/29/08	100	99	100	92	100	96	100	100	95
Chateau SW	0.125	2/18/09									
Check	-	-	0	0	0	0	0	0	0	0	0

<sup>1</sup>0 = No weed Control; 100 = Complete weed control

<sup>2</sup>Plants that germinated after the first rain event which occurred on 10/30/08

<sup>3</sup>Average % control for the 12 weed species evaluated

<sup>4</sup>No Foam A (NIS) added to all herbicide treatments at 0.25% V/V (1 qt/100 gal)

<sup>5</sup>Data taken on 11/12 & 12/30/08 and 2/12, 3/5, 3/25 and 5/15/09

<sup>6</sup>Herbicide applied pre emergence to the above weed species  
Herbicide applied post emergent to the above weed species

<sup>8</sup>Treflan (TR10) applied with a fertilizer spreader after the Gramoxone application