Control Strategies for Some Difficult to Control Weeds

Mick Canevari , UCCE Advisor Emeritus, San Joaquin County. 2101 E Earhart Ave, Ste 200, Stockton, Ca 95216

Abstract

Common Groundsel *Senecio vulgaris* and Field Dodder, *Cuscata sp* have long been serious weed pest of alfalfa and are becoming more difficult to control. Groundsel is toxic and has caused animal deaths when mixed in hay and fed to horses and other livestock. Dodder is a parasitic plant that imbeds its haustoria (suction caps) onto alfalfa stems to live eventually leading to plant death. Hairy Fleabane *Conyza bonariensis* is a widespread weed pest plaguing orchards and vineyards of the central valley's of California. More recently fleabane is beginning to invade alfalfa hay fields, and proving difficult to control. Research efforts have demonstrated some new information effective in controlling these three weeds.

Key Works: herbicides, axil branching, Velpar, Gramoxone, Chateau, Raptor.

Introduction

Common Groundsel

The fall/winter weed control programs that are used in central valley alfalfa fields failed to effectively control common groundsel in 2008. Groundsel is a problem weed of alfalfa hay and is of particular importance since it contains toxic alkaloids that are poisonous when fed to livestock. Research field trials were initiated in 2008 evaluating several herbicides practices for post and pre emergent control. Figure 1.

Studies were also set up to evaluate different application timings, and control at various growth stages of groundsel.

Results indicated that groundsel control using a post and pre emergent herbicide combination of Gramoxone, Chateau and Velpar were highly effective. Applications made at the first sign of groundsel germination provided the best overall control. As groundsel plants began to mature and form branches (axil budding) they became more tolerant to post herbicide treatments. Figure2.

Dodder

Dodder is an annual parasitic weed that is sustained 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, 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. Flowers and seed capsules are borne in clusters.

Currently, there are two management options effective as control measures using preemergent herbicides Prowl *pedimethalin,* and Treflan *trifluralin* if applications are made in advance of germination with adequate rainfall or irrigation to activate the herbicides. However, in cases where pre emergent herbicides are not applied or weed escapes occur later in the season, dodder plants rapidly grow into colonies and invade large areas of the field. There are few effective post emergent methods and at best are limited in their success. These include using high spray volumes of acid based fertilizers, or propane flaming; both are costly and may reduce the alfalfa stand. Glyphosate herbicide in Roundup Ready alfalfa varieties has demonstrated to a very effective post emergent method in controlling dodder when it begins to attach.
In 2009, research trials were established on an alfalfa field that was 80% covered with dodder. Several post herbicides treatments were applied using high volumes of water and different adjuvant loads to improve spray coverage and penetration into the dense canopy of dodder attached to the alfalfa. To enhance maximum spray coverage, the research plots were mowed with a15'flail chopper set at a height of 2-4" above the soil surface. Good control was achieved in the Chateau and Raptor plus surfactant treatments for approximately 50 days burning 90% of the dodder and reducing competition. Beyond 60 days, even the best treatments became re-infested with dodder that was not initially killed. This suggests that early applications when dodder is small would be the most effective strategy. Figure 4

Hariy 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 into the following year. 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. Contamination of fleabane plants reduces hay quality, is difficult to cure in the windrow and unpalatable to horses and livestock.
Research trials in 2009 were established to monitor fleabane germination times and effectiveness of pre and post emergent herbicide treatments. A pre emergent application of Chateau and Velpar that were made on 10/29/2008 and post emergent treatments applied on 12/10/2008 showed promising resluts. Figure 3.
Chateau and Velpar were effective on fleabane germination and provided 90% control for three months after application (Jan, Feb, Mar). Beyond three months time treatments began to break. A sequential application of Chateau plus Chateau was applied in February which provided 90% control into May. The combination of Chateau and Velpar appeared to be synergistic providing control better than each one individually. This combination of two different modes of action herbicides appears to be a good strategy for groundsel control as well.

Summary

All three weeds discussed can be controlled adequately if herbicides are properly timed and combined with good alfalfa cultural practices of irrigation, fertility and harvest management. Proper herbicide combinations will achieve desirable results. Early herbicide timing was always more effective than delayed later timings when plants were larger and more tolerant. Also, spray coverage became an issue when treatments were made later. Dodder remains a problem weed to control and is especially important to attach the problem from a pre emergent herbicide standpoint. Some success was achieved with post attached control using Chateau but this should not be considered the first line of defense and used only as an in season management for escapes and spot treatments.

Figure 1 – Winter Weed Control in Established Alfalfa

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

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

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

[3]Gramoxone Inteon formulation 2AS

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

Treatment	Rate lb ai/A	% Control[1] – Common Groundsel Growth Stage: No Axil Budding 1-4" Height	Axil Budding[4] 1.25-3.5" Height	Axil Budding[4] Flowering, 4.5- 6" Height
Gramoxone[2]	**0.5**	92	59	47

[1]0 = No groundsel control; 100 = Complete groundsel control
[2]Gramoxone Inteon 2AS formulation
[3]No Foam A (NIS) added at 0.25% V/V (1 qt/100 gal)
[4]Axial budding = branching

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

Treatment	Rate lb ai/A	Application Date	% - Alfalfa Injury[1] Necrosis 6 DAT[2]	Necrosis 33DAT	Stunting 33 DAT	% - Dodder Control[1] 6 DAT	33 DAT	54DAT
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[3] + 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

[1]0 = No dodder control or crop injury; 100 = Complete dodder control; crop dead
[2]Data taken days after treatment (DAT)
[3]Roundup Weathermax formulation

Figure **4 – Treatment List and Weed Control in Established Alfalfa**

			% **Hairy Fleabane Control**[1]				% Preemergence Control[1]				
	Rate	Application	**Fleabane New Plants**[2]				Yellow Foxtail		Common Lambsquarters		AVG%[3]
Treatment[4]	lb ai/A	Date	12/30[5]	2/12	3/5	5/15	3/25	5/15	3/25	5/15	Weed Control
Chateau SW[6]	0.125	10/29/08	100	94	89	73	80	75	94	83	86
Chateau SW[7]	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_2O	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_2O	0.5 + 2.0	12/10/08	100	91	50	17	100	100	97	96	91
Gramoxone + Prowl H_2O	0.5 + 3.0	12/10/08	100	95	75	17	100	100	100	100	92
Gramoxone + Treflan TR10[8]	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[6] Chateau SW	0.125 0.125	10/29/08 2/18/09	100	99	100	92	100	96	100	100	95
Check	-	-	0	0	0	0	0	0	0	0	0

[1]0 = No weed Control; 100 = Complete weed control

[2]Plants that germinated after the first rain event which occurred on 10/30/08

[3]Average % control for the 12 weed species evaluated

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

[5]Data taken on 11/12 & 12/30/08 and 2/12, 3/5, 3/25 and 5/15/09

[6]Herbicide applied preemergence to the above weed species

Herbicde applied post emergent to the above weed species

[8]Treflan (TR10) applied with a fertilizer spreader after the Gramoxone application