Alfalfa Weed Control in Arizona

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Weed problems occurring in Arizona non-dormant alfalfa can be divided into two seasons, winter and summer. For control of summer annual and perennial weeds EPTC has found wide spread useage in Arizona as a repeated water run treatment.

Winter annual weeds are a serious problem in Arizona non-dormant alfalfa. It should be pointed out that only a minor percentage of alfalfa is treated for winter weed control each year. Little malva, London rocket, shepherds purse, spiny sowthistle, canarygrass and wild oat are very common winter annual weeds. While Arizona alfalfa is not sold under any uniform grading system, weedy alfalfa is discounted in the marketplace. The most valuable and highest quality alfalfa is normally produced in the first two or three spring cuttings. This unfortunately, is when winter annual weeds are most likely to occur.

The list of registered herbicides for annual winter weed control in non-dormant alfalfa is not a large one. It includes the following:

Pronamide (Kerb) appears to have a relatively broad spectrum of activity on winter annual weeds. Composite and Malva species are tolerant to Kerb. Established alfalfa is also very tolerant of Kerb. The relative cost of this herbicide may have limited its use in alfalfa. It also must be applied preemergence to all broadleaf weeds. Therefore, the grower must anticipate the weed problem.

Propham (Chem Hoe) and chloropropham (Furloe) have limited weed spectrums. They will give good pre and early postemergence control of seedling grass weeds. Chloropropham will control some annual broadleaf weeds but should be applied preemergence to the weeds.

Paraquat (Gramoxone or Paraquat CL) has done well on most small seedling weeds. Little malva is more difficult to control and is often missed. Alfalfa foliage present at application time is burned back. There is no residual control, therefore, on occasions weeds may emerge later in the season and escape control.

Metribuzin (Sencor) can only be applied to established alfalfa recently sheeped off. This limits its use. It controls a broad spectrum of seedling weeds, pre and postemergence, including little malva. Salty or alkaline soils should not be treated as injury to alfalfa is possible.

Velpar for Arizona

In 1982-83 a herbicide, hexazinone (Velpar), was evaluated for control of winter weeds in alfalfa in Maricopa and Yuma Counties. Velpar had been recently labeled for use in alfalfa in the central valley of California. To evaluate Velpar for possible registration in Arizona, eight strip tests were established in November to January in established alfalfa fields. Velpar at .29, .45, .54 lb/A AI was compared to Paraquat at 0.5 lb/A AI. In each comparison the herbicides were applied in a 20 ft. swath the length of the field in 28 GPA water using a tractor mounted sprayer and 8004 nozzles. In each test a 200 ft. length of swath treated with Velpar at .54 lb/A was sprayed a second time to achieve a rate of 1.08 lb/A.

Alfalfa in 2 locations at the time of application following sheeping ranged from 1 to 2 inches tall. In 2 tests alfalfa was 4 to 8 inches tall and in the other test alfalfa was 2 to 5 inches tall following baling or green chopping.

Weed size varied greatly at time of application. Grass weeds tended to be 1 to 3 inches tall and broadleaf weeds were mostly in the rosette stage, dime size to 4 inches across. Little malva varied from 2 to 8 inches tall.

Strip tests were used instead of replicated small plots to enable us to observe the herbicide under as many varied field conditions as possible with the time and resources available. Work with Velpar in previous years on small replicated plots had indicated

excellent weed control characteristics on some broadleaf weeds. The principal question was how much crop safety there would be under the varied soil, water and cultural practices that occur in Arizona.

Observations of phytotoxicity and weed control were made periodically on each field through the second harvest following application. The results reported here were observed prior to the first harvest following application. Weed control by species was averaged over all the tests where the species occurred.

Number of fields in which weeds occurred

Species	Abbreviations	Number of fields
Littleseed canarygrass	(CG)	3
Wild Barley	(WB)	2
Annual bluegrass	(AB)	2
London rocket	(LR)	5
Little malva	(LM)	2
Spring sowthistle	(SS)	2
Shepherds purse	(SP)	2

The % stunt to alfalfa and % control of seven weed species prior to the first harvest following treatment at eight locations from five herbicide treatments in Arizona 1983.

Treatment	lb/A	% Stunt alfalfa	% Control by weed species						
			CG	WB	AB	LR	LM	SS	SP
Velpar	.29	7.6	10	20	48	97	62	82	37
Velpar	.45	11.5	48	52	84	99	98	99	83
Velpar	.54	19.4	70	87	99	99	99	99	97
Velpar	1.08	24.3	82	94	95	100	100	99	99
Paraquat	.5	9.3	93	97	97	93	85	99	85

Control of most broadleaf weeds with Velpar was satisfactory at rates of .45 lb/A or higher. Control of grass weeds required higher rates of Velpar. Velpar is less effective for annual grass control. Paraquat gave good control of all weeds but was weakest on little malva and shepherds purse.

Velpar caused chlorosis on alfalfa at all rates following treatment. This chlorosis tended to disappear at the lower rates within 3 weeks. Velpar at 1.08 lb/A, approximately the 2X rate required for annual broadleaf weed control, often resulted in severe chlorosis and stunting for 4 weeks or longer. The alfalfa plant was slow to recover and make normal growth at this highest rate. Velpar at .54 lb/A also appeared to stunt alfalfa

severely in those locations where salty or compacted soil occurred or where there were stem nematode infestations. Paraquat damaged all alfalfa foliage it contacted. The larger the alfalfa at time of treatment the more the apparent injury. Regrowth of alfalfa was rapid after treatment. However, where severe stem nematode infestations occurred, regrowth was not as rapid and plant height was reduced until harvest with paraquat.

To determine the effect of Velpar on yield of alfalfa at 2 locations small plots 3 ft. X 14.5 ft. were harvested for green weight of alfalfa from 5 locations in each strip treatment prior to the commercial harvest. Two sites were chosen for yield. The Bruce Hieden location near Buckeye was used because the herbicides were applied under what was considered near ideal conditions. The alfalfa was 1 to 2 inches tall after sheeping off. There was an excellent stand of alfalfa with no symptoms of disease or nematode infestation. The Dale Riggins location near Gilbert was chosen because the alfalfa had more regrowth than thought desireable at time of application, 4 to 8 inches. The extra regrowth site was selected for yield because under commercial conditions, Velpar might be applied after excessive regrowth because of unavoidable delays in baling or bale removal due to adverse weather conditions. There were no symptoms of disease or nematode problems in this field. Weed populations at both areas were relatively light. Control of weeds did not appear to have any measurable effect on yield.

Bruce Hieden Farm - Buckeye - First Cutting

Yield of alfalfa green weight as a percent of untreated check on March 7th following application of herbicides on January 7, 1983

Treatment	lb/A ai	Yield as % of check
Velpar	0.29	101
Velpar	0.45	93
Velpar	0.51	100
Velpar	1.08	88
Paraquat	0.5	93
Check		100

Yield of alfalfa was not seriously affected at the Bruce Hieden test with the possible exception of Velpar at 1.08 lb/A. Under ideal application conditions Velpar had no effect on alfalfa yield until the 2X rate.

Dale Riggins Farm - Gilbert - First and Second Cuttings

Yield of alfalfa green weight as a percent of untreated check on March 8 and April 26 following application of herbicides on January 13, 1983.

Treatment	lb/A ai	Yield as % of check	
		March 8	Apri 26
Velpar	0.29	95	94
Velpar	0.45	89	98
Velpar	0.51	76	75
Velpar	.08	39	62
Check		100	100

Yield of alfalfa at the Dale Riggins test was severely reduced at the 0.51 lb/A application rate and higher for the 2 cuttings measured. Velpar should not be applied to alfalfa with 4 to 8 inches of regrowth.

Conclusions

While Velpar gave good control of annual broadleaf weeds at rates of .45 lb/A or more, control of annual grass weeds was not adequate. In most alfalfa fields annual grass and broadleaf weeds occur together. The use of Velpar would result in only partial weed control.

Where Velpar at .51 lb/A or less was applied to alfalfa regrowth of 1 or 2 inches and where no adverse disease or nematode infestations occurred adequate crop safety could be achieved. However, where alfalfa regrowth was 4 to 8 inches in height at time of application severe injury could occur for 1 or more cuttings. Where disease, nematode or soil problems occurred and alfalfa growth was already affected by these problems, the application of Velpar could prove to be hazerdous. The use of Velpar for annual winter weed control in Arizona does not appear to be feasible at this time.

Postemergence Selective Grass Control

Recently several postemergence foliar applied selective herbicides for control of annual and perennial grasses in broadleaf crops have been developed.

Fluazifop-butyl (Fusilade), sethoxydim (Poast) and more recently DPX-Y6202 (Assure) have been tested in a very limited way on alfalfa for control of bermudagrass and johnsongrass, 2 of our important perennial grass weeds. At this date none of these herbicides have been registered for use in alfalfa. They do show promise for selective control.

During the past season Fusilade and Poast were available for use in cotton in Arizona. These herbicides have performed well in controlling johnsongrass and bermudagrass. We have had several years of experience using Fusilade and Poast in cotton and this experience may be helpful in learning how to use these products in alfalfa. Control of johnsongrass and bermudagrass in cotton has tended to be better when:

1. there was adequate crop competition.
2. cultivation followed treatment to break up roots and rhizomes.
3. treatment began in the spring before bermuda runners were longer than 6 inches or johnsongrass was more than 15 inches tall.

4. at least 2 applications of 0.5 lb/A were applied.
5. the weeds were not stressed for moisture and were growing rapidly at time of application.

Most of these criteria can be met in alfalfa. Cultivation to break up roots and rhizomes is not practical in alfalfa, but mowing or grazing off the weed foliage may compensate for lack of cultivation. Where dense stands of johnsongrass or bermudagrass occur and the alfalfa stand loss is already severe these herbicides will not be very useful. Treatment should be most successful where spots of weeds occur and the stand of alfalfa is still adequate.

In September, 1982, Barry Tickes, Agricultural Agent, Yuma County, treated a heavy infestation of bermudagrass in alfalfa with 3 rates of Poast and Fusilade 0.3, 0.5, and 1.0 lb/A followed by a second treatment at the same rate on one half of the plots in October. All treatments were applied in 30 GPA water with 1 qt. of nonphytoxic crop oil per acre. This test was on the MCP Farm, Yuma Mesa. Plot size was 30 feet by 50 feet replicated 3 times. The alfalfa was 6 to 10 inches tall at each application date and the bermuda was 4 to 6 inches tall with no seed heads. There was no moisture stress but by October the bermudagrass was making very slow growth due to the cool nighttime temperatures and was approaching winter dormancy. No herbicide treatment affected alfalfa growth or vigor.

% control of bermudagrass from 1 or 2 application of Poast and Fusilade at 3 rates on March 30, 1983, 5 months following the last application

Treatment	Rate	Number of applications	% control
Fusilade	0.3	1	63
Fusilade	0.5	1	65
Fusilade	1.0	1	82
Fusilade	0.3	2	68
Fusilade	0.5	2	65
Fusilade	1.0	2	89
Poast	0.3	1	63
Poast	0.5	1	62
Poast	1.0	1	67
Poast	0.3	2	67
Poast	0.5	2	68
Poast	1.0	2	68
Untreated			0

Control of bermudagrass was not adequate with rates of Fusilade at 0.5 lb/A or less. Poast gave poor control at all rates. Two applications of Poast or Fusilade were little better than 1 application. Late fall applications of Poast and Fusilade for bermudagrass control in alfalfa do not appear effective.

A similar test was established on the Yuma Mesa Experiment station in July, 1983. Fusilade, Poast and Assure were applied at 2 rates after alfalfa hay was harvested before or after the first irrigation following harvest. The same rates were applied to the same plots following the next harvest in August. Plot size was 10 feet by 25 feet replicated 4 times. Herbicides were applied in 20 GPA water with 1 qt. of nonphytoxic crop oil per acre. Bermudagrass infestations varied from 10 to 50% of the area. The alfalfa and weeds were severely stressed for moisture between cuttings. Applications of herbicides made prior to irrigation were made to severely stressed plants but irrigation followed treatment by 48 hours.

Size of alfalfa and bermudagrass at time of first and second application, Yuma Mesa Experiment Station

	1st application			2nd application		
	Date	Alfalfa	Bermuda	Date	Alfalfa	Bermuda
Before irrigation	7/26	5 to 7 in	3 to 5 in	8/26	2 to 4 in	3 to 5 in
After irrigation	7/29	6 to 9 in	4 to 6 in	9/1	6 to 10 in	3 to 5 in

The bermudagrass had no seed heads at any application date

% control bermudagrass from 3 herbicides at 2 rates and dates September 4, 1983, 35 days following the last hercicide aplication Yuma Mesa Exp. Station

		% control bermudagrass	
Treatment	lb/A	applied before irrigation	applied following irrigation
Fusilade	0.5	97	99
Fusilade	0.3	95	97
Poast	0.5	92	88
Poast	0.3	82	75
Assure	0.25	76	94
Assure	0.125	24	73

Control of bermudagrass was increased with Assure where applied following irrigation. Applications before or after irrigation did not appear to be as important with Fusilade or Poast. No treatment affected the growth of alfalfa in this test. Further evaluation of bermudagrass control should be observed in the spring to see if the bermudagrass would recover. Control of perennial grass weeds in alfalfa looks promising where treatments are begun earlier in the season than September.

Trade names used in this publication are for identification only and do not imply endorsement of products named or criticism of similar products not mentioned.