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WEED CONTROL IN ALFALFA WITH PURSUIT

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INTRODUCTION

Afalfa is the major leguminous forage crop grown in Wyoming and has quite properly been labeled the "Queen of Forages." Alfalfa is currently grown on more than 600,000 acres of land; 79 percent of this acreage is irrigated. Weeds compete with alfalfa for water, nutrients, and light. Weeds cause immediate as well as future problems in alfalfa. The immediate problems are lower yields and nutritional value as well as impeded harvest. Future problems resulting from the large amount of weed seed produced in weedy alfalfa fields include increased weed populations, decreased stand life, and hampered production of rotational crops.

A successful weed control program involves effective cultural practices and the wise use of herbicides. Important cultural practices include a properly prepared seedbed, use of high-quality adapted varieties free of weed seed, use of fertilizers according to soil test, use of proper harvesting management, and use of timely irrigation. A vigorously growing alfalfa crop competes with weeds and lessens the need for other controls. Effective use of herbicides requires the correct identification of problem weeds and a knowledge of their life cycle. Growers should select herbicides that will control the weed species that are present. Excellent weed control can often mean the difference between profit and loss.

Pursuit®, a newly registered herbicide developed by American Cyanamid, is one of the herbicide options available for weed control in seedling as well as established alfalfa. This research report discusses some of the findings from research trials conducted at the University of Wyoming with Pursuit since 1985.

WEED CONTROL

Field experiments were conducted at Torrington, Powell, Archer, and Sheridan 1985-94 to evaluate factors influencing weed control with Pursuit. Redroot pigweed, kochia, common sunflower, hairy nightshade, black nightshade, Russian thistle, wild mustard, shepherdspurse, tumble mustard, and tansymustard control has been 90 percent or greater with Pursuit at 3 ounces per acre and common purslane, yellow foxtail, green foxtail, wild proso millet, wild buckwheat and skeletonleaf bursage control 90 percent or greater with 4 ounces per acre (Table 1). Control of downy brome and stinkgrass has not been adequate with Pursuit at rates as high as 6 ounces per acre. Common lambsquarters control with Pursuit has averaged 64, 70 and 78 percent at 3, 4 and 6 ounces per acre; respectively, but control has been variable ranging from 40 to 95 percent.

Additives are necessary for maximum postemergence activity with Pursuit (Table 2). Additives increased weed control with 3 ounces per acre Pursuit 23 to 62 percent in this trial depending on species. Any nonionic surfactant with at least 80 percent active ingredient is a suitable additive according to the Pursuit label. However, in UW trials oil additives have generally been slightly more effective than surfactants in enhancing Pursuit activity (Table 2). In addition, a surfactant plus liquid nitrogen (28-0-0) at 1 gallon per acre has dramatically enhanced control of the more resistant weeds (such as common lambsquarters).

Pursuit applications should be applied early postemergence when the weeds are less than 2 inches in size (Table 3). This is particularly important when weeds are more resistant. Common lambsquarters control was reduced 25 to 28 percent by delaying applications until the 2 to 4 inch stage and 45 to 50 percent by delaying applications until the 4 to 6 inch stage.

Table 1. Response of several weed species to spring postemergence applications of Pursuit, 1985-94.

Weed[1] species	Pursuit® oz/A 3	4	6	Range in control
	- - - - - - - - - - - (%)	- - - - - - - - - -		(%)
Common lambsquarters (14)	64	70	78	40-95
Redroot pigweed (10)	94	98	99	90-100
Kochia (12)	93	97	99	87-100
Common sunflower (5)	93	96	100	90-100
Hairy nightshade (9)	98	99	100	94-100
Black nightshade (4)	96	99	100	90-100
Russian thistle (7)	93	97	99	87-100
Wild mustard (3)	99	100	100	97-100
Shepherdspurse (3)	97	99	100	95-100
Tumble mustard (3)	95	98	100	90-100
Tansymustard (6)	97	100	100	95-100
Common purslane (4)	86	97	100	80-100
Wild buckwheat (3)	87	94	99	80-100
Skeltonleaf bursage (4)	83	90	94	78-100
Yellow foxtail (5)	85	92	98	80-100
Green foxtail (9)	87	93	97	80-100
Wild proso millet (4)	82	91	99	60-100
Downy brome (4)	28	40	50	0-75
Stinkgrass (4)	12	27	40	0-70

[1] Numbers in ( ) = locations. All treatments include X-77 at 0.25% v/v.

Table 2. Influence of additives on postemergence weed control with 3 ounces per acre Pursuit.

Additive[1]	Weed control: Common lambsquarters	Kochia	Redroot pigweed	Green foxtail
	- - - - - - - - - - - - - - - - - - - (%)	- -		
None	25	70	75	60
X-77	56	97	97	92
X-77+N	87	98	98	97
Prime Oil	65	95	95	95
Prime Oil+N	82	97	98	97
Sun-It	75	98	98	93
Sun-It+N	87	98	99	97

[1] X-77 at 0.25% v/v, Prime Oil or Sun-It at 1 qt/A and N (28-0-0) at 1 gal/A.

Table 3. Influence of common lambsquarters size on control with Pursuit.

Pursuit oz/A	Common lambsquarters 1-2"	2-4"	4-6"
	(%)		
3	70	45	20
4	78	50	30
6	90	65	45

ALFALFA RESPONSE

Alfalfa tolerance to Pursuit has been good to excellent with dormant or postemergence applications in established alfalfa or postemergence applications in seedling afalfa at rates as high as 8 ounces per acre. However, seedling injury with Pursuit has been severe from preplant incorporated or preemergence applications at rates as low as 2 ounces per acre (Table 4).

Slight injury (5 to 10 percent) but no stand reduction has been observed with postemergence Pursuit applications on occasion. Postemergence injury with Pursuit on seedling alfalfa was generally reflected in slight internode shortening and/or temporary leaf yellowing. Alfalfa recovery from postemergence Pursuit injury has been excellent and has never resulted in a yield reduction (Table 5). Environment and additives appear to be factors influencing postemergence injury with Pursuit (Tables 6 and 7).

Table 4. Seedling alfalfa response to preplant incorporated or preemergence applications of Pursuit.

Application method	Pursuit oz/A	Alfalfa Injury	Stand reduction	Yield
		(%)	(%)	T/A
PPI	2	50	22	1.0
	4	62	33	0.5
	6	72	43	0.6
PE	2	45	18	1.2
	4	60	42	0.8
	6	73	48	0.8
Weedy check	--	0	0	1.6
Weed-free check	--	0	0	2.1

Table 5. Alfalfa response to postemergence applications of Pursuit.

Pursuit oz/A	Alfalfa Injury	Stand reduction	Yield
	(%)	(%)	(T/A)
0	0	0	1.4
3	0	0	2.1
4	1	0	2.4
6	2	0	2.4
8	4	0	2.6

[1] Values based on 3 trails and all treatments applied with X-77 at 0.25% v/v.

Table 6. Influence of additives on alfalfa injury with Pursuit.

Additive[1]	Pursuit oz/A 3	4	6
	- - - - - - - (%) - - - - - - -		
X-77	0	0	0
X-77+N	0	2	5
Prime Oil	0	2	6
Prime Oil+N	2	4	7
Sun-It	0	0	0
Sun-It+N	0	0	0

[1] X-77 at 0.25% v/v, Prime Oil or Sun-It at 1 qt/A and N (28-0-0) at 1 gal/A.

Table 7. Influence of temperature on alfalfa injury with Pursuit.

Pursuit[1] oz/A	Temperature °F 50	70	90
	- - - - - - - (%) - - - - - - -		
3	0	0	4
4	0	4	6
6	0	8	12

[1] All treatments included X-77 at 1 qt/A.

ROTATIONAL CROP RESPONSE

Research has been conducted at several locations in Wyoming to evaluate the sensitivity of crops to soil residual levels of Pursuit under both furrow and sprinkler irrigation. Data indicates that Pursuit may carryover in the soil and affect some broadleaf crops for up to three years. The following crop rotation restrictions must be observed to avoid risk of crop injury to subsequent crops. Soybeans and imi-tolerant corn can be planted anytime following application; rye, wheat, and dry edible beans may be planted four months following application; barley and field corn 9.5 months following application. Oats and sorghum 18 months following application, sugar beets 40 months following application; and canola, potatoes, sunflowers and all other crops 26 months following application. Long-term planning should be considered with crop rotation before using Pursuit because soil residues can last several seasons. Pursuit persistence in soil is accentuated by low pH, cool soil, limited moisture, and reduced tillage.

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