EFFECT OF SEVERAL POST-EMERGENCE HERBICIDES ON INDIAN RICEGRASS, SQUIRRELTAIL, GREAT BASIN WILDRYE, JUNEGRASS, AND IDAHO FESCUE

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Abstract

There is little information in the literature on herbicide use for seed production of native grasses. Five native grasses [Indian ricegrass *(Oryzopsis hymenoides),* squirreltail *(Sitanion hystrix),* Great Basin wildrye *(Elymus cinereus),* junegrass *(Koelaria cristata),* and Idaho fescue *(Festuca idahoensis)]* were treated with the following herbicides at 75 days after planting: Plateau, Fusilade, Nortron, Horizon, and 2,4-D amine as a control. There were large differences in plant size among the grasses at the time of application (from 1.5" for junegrass to 16" for great basin wildrye). Idaho fescue appears to be quite tolerant of Fusilade. Plateau stunted growth in all the grasses and is not an appropriate herbicide for seed production stands.

Introduction

Seed of native grasses for reseeding burned or otherwise disturbed rangelands are in chronic short supply (personal communication, Jim Johanson, Bureau of Land Management, Boise, Idaho). There is a paucity of information on herbicide use in seed production stands of native grasses. As a first step towards addressing this lack of information, a small trial was conducted to observe the effects of several post-emergence herbicides registered for seed production of other grasses in the Pacific Northwest (Gingrich and Mellbye, 1998), along with an herbicide registered for use on native grasses (Plateau).

Materials and Methods

On 27 April 1999, seed of Indian ricegrass *(Oryzopsis hymenoides),* squirreltail *(Sitanion hystrix),* Great Basin wildrye *(Elymus cinereus),* junegrass *(Koelaria cristata),* and Idaho fescue *(Festuca idahoensis)* were sown at rates of 460, 60, 70, 180, and 110 seeds per foot of row in 40-foot rows using a small-plot cone planter (Almaco Inc., Nevada, Iowa). Planting depth was 3 to 6mm. Row width was two feet. Plots were rolled once with a cult-packer perpendicular to row direction after planting. Plots were irrigated as needed to keep the seed zone moist. Weeds were controlled by hoeing and cultivation. No herbicides were applied for weed control and the plots were kept weed-free.

On July 10, 1999 the following herbicides were applied with a CO_2 pressurized backpack sprayer:

Trade Name	Common Name	Company	per acre rate
2,4-D amine	2,4-D amine		0.5 lb
Plateau		Cyanamid	4 oz
Fusilade	Fluazifop	Zeneca	0.125 lb
Nortron	ethofumesate	AgrEvo	0.75 lb
Horizon	Fenoxaprop	AgrEvo	1.2 pints

Fusilade and Plateau were applied with 5% (v/v) Spray Booster-S (Cenex Cooperative). A repeat application of Fusilade was made on July 28, 1999 at the same rate as, the first application. Herbicides were applied in 4.5-foot bands perpendicular to the grass rows with a minimum space of 2 feet between bands.

Plots were evaluated by measuring plant height from five plants in the middle two feet of each treatment area on August 5, and a visual rating of stunting (based on overall size of the plant) on a percent scale was taken on August 9, 1999. The middle part of each plot was cut after this. Regrowth in cut areas was scored on a 1 to 5 scale for each plot on Sept. 23, 1999.

All data were directly subject to analysis of variance using the PROC GLM procedure of SAS statistical software (SAS Institute, Cary, NC).

Results

Application of the herbicides was delayed until the slowest growing grass (junegrass) had attained a height of 1.5 to 2 inches. Because the junegrass grew very slowly, application of the herbicides was delayed for the rest of the grasses. At time of application, grass heights were approximately as follows: junegrass, 1.7 inches; Indian ricegrass, 12 inches; squirreltail, 5 inches; Great Basin wildrye, 16 inches; and Idaho fescue, 2.5 inches. One would expect larger plants to be more resistant to a given herbicide, and results should be interpreted accordingly.

For all the grasses tested, Plateau decreased plant height, stunted plants, and, with the possible exception of squirreltail, its effects were persistent, causing decreased regrowth after cutting later in the season (Table 1). Its negative effects could still be seen six months after application, in Idaho fescue especially. Fusilade caused decreased height and stunting in all the species except for Idaho fescue, which appeared to tolerate it quite well. Fusilade did not appear to hinder regrowth of Indian ricegrass after cutting later in the season; however, the other grasses (except for Idaho fescue) showed negative effects of Fusilade on regrowth later in the season. Horizon had no apparent negative effects on growth. It did not differ from the 2,4-D control treatment in any of the grasses. Nortron had a negative effect on growth of Idaho fescue, and appeared to have a mild negative effect on squirreltail and junegrass. It may have had a stronger effect if it had been applied earlier.

Conclusions

This is a preliminary trial with materials being applied late for most of the grasses, especially the Great Basin wildrye and the Indian ricegrass. Further work needs to be done before firm conclusions can be made. Nevertheless, several salient points deserve mention:

1. Idaho fescue appears to be quite tolerant to fusilade, and merits further testing.
2. Plateau is not a useful herbicide for seed production of native grasses.
3. Indian ricegrass and Great Basin wildrye showed less effect of nortron application than did the other grasses - this was confounded with their larger size. Nevertheless, this may warrant further testing.
4. Junegrass is extremely slow to establish, and a persistent pre-emergence herbicide would be of great benefit in its cultivation.

Literature Cited

Gingrich, G. and M. Mellbye. 1998. Grass seed crops. p. 84-95. *In* Pacific Northwest 1998 Weed Control Handbook. Joint publication of Oregon State University, Washington State University, and the University of Idaho.

Table 1. Plant height, percent stunting, and regrowth rating for five native grasses treated with several different herbicides at 75 DAP. A second application of Fusilade was made at 93 DAP. Height was measured at 101 DAP; percent stunting (visual rating) at 105 DAP; and regrowth (visual rating) at 159 DAP.

	Height	Stunting	Regrowth
	(cm)	(%)	(1 to 5 rating)
Indian Ricegrass			
Horizon	58.0	0	4.8
2,4-D	56.9	0	5.0
Nortron	55.0	0	5.0
Fusilade	35.4	42	5.0
Plateau	33.5	72	3.3
LSD	7.0	31.9	NS
CV (%)	9.6	75.0	15.8
Squirreltail			
Horizon	26.0	0	5.0
2,4-D	25.2	6	5.0
Nortron	22.0	28	4.3
Plateau	15.2	55	4.5
Fusilade	132	75	2.8
LSD	3.5	15.0	12
CV (%)	11.2	29.6	17.9
Great Basin Wildrye			
Horizon	64.8	0	4.8
2,4-D	60.2	6	5.0
Nortron	59.8	5	4.0
Fusilade	46.7	66	2.7
Plateau	40.3	45	3.3
LSD	7.0	16.8	12
CV (%)	8.4	44.6	17.2
Junegrass			
Horizon	9.0	0	5.0
2,4-D	8.3	17	4.3
Nortron	7.5	8	3.8
Fusilade	4.8	72	2.3
Plateau	339	58	2.3
LSD	2.0	28.9	1.7
CV (%)	16.8	49.5	26.8
Idaho Fescue			
Fusilade	10.3	7	5.0
Horizon	9.8	0	4.5
2,4-D	9.6	0	5.0
Nortron	9.1	30	4.5
Plateau	5.7	63	1.8
LSD	1.7	29.9	0.7
CV (%)	12.5	79.3	10.3