

EFFECT OF SEVERAL FALL-APPLIED HERBICIDES ON INDIAN RICEGRASS, SQUIRRELTAIL, JUNEGRASS, IDAHO FESCUE, AND TALL FESCUE

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Introduction

Seed of native grasses for reseeding burned or otherwise disturbed rangelands are in chronic short supply. 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 at the Central Oregon Agricultural Research Center to observe the effects of several fall-applied herbicides registered for seed production of other grasses in the Pacific Northwest (Gingrich and Mellbye, 1998).

Materials and Methods

On 27 April 1999, seed of Indian ricegrass (*Oryzopsis hymenoides*), squirreltail (*Sitanion hystrix*), junegrass (*Koeleria cristata*), and Idaho fescue (*Festuca idahoensis*) were sown at rates of 460, 60, 70, 180, and 110 seeds/ft of row in 40-ft. rows using a small-plot cone planter (Almaco Inc., Nevada, IA). Planting depth was 3-6mm; row width was 2 ft. 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 with cultivation and hand weeding. There were originally four replications in the experiment, each surrounded by a border of tall fescue. One of the replicates was dropped due to problems with herbicide application.

On November 3, 1999 the following herbicides were applied with a CO₂-pressurized boom sprayer.

Trade name	Common name	Rate (product/acre)
Sinbar	terbacil	0.75 lb
Lexone	metribuzin	6.67 oz.
Kerb	pronamid	2.9 lb
Diuron	diuron	1.87 lb
Goal	oxyfluorfen	10 oz
Beacon	primisulfuron	0.375 oz
Axiom	metribuzin + flufenacet	11 oz.

Goal and Beacon were applied with 0.5 percent (v/v) NIS. Herbicides were applied in 4.5-ft. bands perpendicular to the grass rows with a space of 0.5 ft. between bands.

Plots were visually rated for crop damage on April 4, 2000. Stunting, chlorosis, and mortality of each plot were ranked on a 1 to 10 scale relative to the control, where a score of 1 meant it was within 10 percent of the control and a score of 10 meant it had been completely damaged (i.e. no growth/foliage all burned/all plants died, for the ratings of stunting/chlorosis/mortality, respectively). Percent heading for each treatment was rated on July 27, 2000. Two of the tall fescue borders were also rated for herbicide effects on heading at the same time. All data were subject to analysis of variance using the PROC GLM procedure of SAS statistical software (SAS Institute, Cary, NC). Percent data were arc-sine square-root transformed prior to analysis. Statistical analysis was conducted within (not between) species and the data were analyzed as a randomized complete block design.

Results

Squirreltail survival through the winter was poor and so it is difficult to assess herbicide effects versus poor persistence for this species. The control plots for the other grasses over-wintered well and allowed for a good evaluation of the herbicides. Idaho fescue showed good tolerance to Goal and to a lesser extent Lexone and Beacon (Table 1). In terms of growth and appearance, Indian ricegrass showed more tolerance to the herbicides used than did the other grasses. Nevertheless, its heading was severely decreased (80 percent less) by Diuron, and moderately decreased (25-30 percent less) by Axiom and Sinbar, even though the latter did not significantly affect growth. Junegrass was very sensitive to all the herbicides tested. Only Goal did not significantly decrease growth, and it dropped heading 40 percent. All the other herbicides essentially blocked heading in Junegrass. The squirreltail data was not analyzed because of problems with persistence, as stated earlier. Comparing means, it appears that Axiom greatly decreases heading in this grass, even though it has only mild effects on growth. Beacon and Diuron appeared to decrease heading about 50 percent and Sinbar appeared to essentially stop heading in this grass. Again the squirreltail data must be viewed with caution because even some of the control plots showed poor persistence. Heading in tall fescue was very sensitive to Beacon, Axiom, and Sinbar (Table 2). It appeared to tolerate Diuron fairly well; at least Diuron did not arrest development of reproductive tillers.

Literature Cited

Gingrich G. and M. Mellbye. 1998. Grass seed crops. Pp 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. Response of four native grasses to several fall-applied herbicides. Grasses were planted in April of 1999 and the herbicides were applied in November 1999. Stunting, chlorosis, and mortality ratings were made on April 4, 2000 on a 1 to 10 scale where the greater the number the more severe the damage. Percent heading was rated on July 27, 2000.

Herbicide	Heading (%)	Stunt	Chlorosis	Mortality
		-(1 to 10 rating)-		
Idaho Fescue:				
Control	96.8	1.0	1.0	1.0
Goal	82.5	2.7	2.0	1.0
Lexone	73.3	4.7	4.7	1.0
Beacon	71.7	6.7	5.3	1.3
Axiom	66.7	6.7	5.0	1.0
Diuron	22.5	8.0	8.0	1.0
Sinbar	8.3	9.0	9.3	4.7
Mean	60.3	5.5	5.0	1.6
LSD (0.05)	17.8	2.6	1.9	1.1
CV (%)	19.4	26.4	20.9	38.9
Indian Ricegrass:				
Control	82.7	1.0	1.0	1.0
Goal	82.7	1.0	1.3	1.0
Beacon	82.7	1.3	1.3	1.0
Lexone	82.7	1.3	1.3	1.0
Sinbar	55.0	1.7	2.3	1.0
Axiom	45.0	2.3	2.3	1.0
Diuron	1.5	4.0	5.0	1.0
Mean	61.7	1.8	2.1	1.0
LSD (0.05)	20.7	2.1	1.9	
CV (%)	21.2	66.6	52.2	
Junegrass:				
Control	62.5	1.0	1.0	1.0
Goal	20.8	1.3	1.3	1.0
Axiom	0.0	6.7	7.0	1.0
Beacon	0.0	8.3	8.0	2.3
Lexone	1.7	9.3	9.7	5.7
Diuron	0.0	10.0	9.7	9.3
Sinbar	0.0	10.0	9.7	9.0
Mean	12.1	6.7	6.6	4.2
LSD (0.05)	9.6	1.4	1.2	3.2
CV (%)	38.7	11.5	9.9	42.4
Control	94.5	1.0	1.0	1.0
Goal	89.5	1.0	1.0	1.0
Axiom	25.0	2.3	2.7	1.3
Lexone	89.5	3.7	4.3	3.3
Beacon	45.0	3.7	4.0	2.7
Sinbar	5.0	6.0	8.3	6.0
Diuron	49.5	7.0	8.0	9.3
Mean	56.9	3.5	4.2	3.5

¹ squirreltail survival through the winter was poor; therefore the data was not analyzed and only the mean is shown.

Table 2. Effect of several herbicides on heading of tall fescue. Herbicides were applied November 3, 1999 and heading was visually rated on July 27, 2000.

Herbicide	Heading (%)
Control	99 a
Goal	99 a
Lexone	99 a
Diuron	99 a
Beacon	38 b
Axiom	8 c
Sinbar	5 c
mean	63.7
CV %	8.4
