Performance of Postemergence Herbicides on Eight Native Grass Species Grown for Seed in Central Oregon, 2000-2002

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Abstract

Herbicide screenings were conducted over two seasons on eight native grass species: great basin wildrye, bluebunch wheatgrass, streambank wheatgrass, big bluegrass, Idaho fescue, Indian ricegrass, squirreltail and prairie junegrass. Fall applications were made October 18, 2000 and October 14, 2001. These included 1x and 2x label rates of Axiom®, Beacon®, Clarity®, Diuron, Frontier®, Goal®, Kerb®, Maverick®, Sencor®, Sinbar®, and Surflan®. Treatments were applied to the same plots 2 years in a row to increase confidence concerning crop safety. During 2002 treatments producing the most negative effect were 2x rates of Sinbar at 1.5 lb/acre and Kerb at 0.80 lb/acre. Treatments with the least effect on both stand reduction and reduced heading across grass species were 1x rates of Diuron at 1.80 lb/acre, Goal at 10 fl oz/acre, and Sencor at 0.40 lb/acre. Stand reduction across herbicide treatments was least for Great Basin wildrye, and was greatest for prairie junegrass and squirreltail. The least herbicide impact on heading was observed with Great Basin wildrye and streambank wheatgrass, while it was most severe for squirreltail and prairie junegrass.

Introduction

The demand for seed of native grasses used to reseed burned or otherwise disturbed forests and rangelands continues to increase. Because agricultural production of native grasses is relatively new, management practices are still being developed. A major factor in successful production is adequate weed control. The objective of this project is to evaluate crop safety for potential herbicides that may be used in native grass seed production.

Materials and Methods

Big bluegrass, bluebunch wheatgrass, squirreltail, Great Basin wildrye, streambank wheatgrass, and Idaho fescue were planted at the Central Oregon Agricultural Research Center, Madras, Oregon, on April 20, 2000 at a rate of 45 seeds/ft. Indian ricegrass was planted at a rate of 90 seeds/ft and prairie junegrass was planted at 135 seeds/ft. A four-row small-plot cone planter (Almaco Inc.) was used, with a planting depth of 0.25 inches. Plots were a single row 80 ft long with a 2-ft row spacing placed in a randomized complete block design. Plots were irrigated as needed to keep the seed zone moist for 2 weeks following planting. Prior to treating the plots, weeds were controlled by hoeing and cultivation.

Herbicide treatments were fall-applied at both 1x and 2x label rates on October 18, 2000 and October 4, 2001. Treatments were applied with a CO_2-pressurized, hand-held boom sprayer at 40 psi and 20 gal/acre water in a band perpendicular to the grass rows. A non-ionic surfactant was not included with applications in 2000, but was added at 0.5 percent v/v in 2001.

Evaluations were conducted using a rating scale from 0 (no negative effect) to 5 (maximum negative effect). Plots were evaluated for stunting, chlorosis, and mortality on March 27 and 28, 2001 and May 15, 2002. Reduced heading was evaluated June 16-19, 2001 and June 10, 2002. Stand reduction was evaluated following the first season on November 2, 2001 and

during the second season on May 15, 2002. No comparisons were made between grass species.

Results and Discussion

The average effect of herbicide treatments at 1x label rate on stand reduction and reduced heading over the two seasons on eight native grass species is provided in Tables 1-4.

Treatments that consistently caused the most damage across grass species were 2x rates of Sinbar at 1.5 lb/acre and Kerb at 0.80 lb/acre. Treatments with the least effect on both stand reduction and reduced heading across grass species were 1x rates of Diuron at 1.8 lb/acre, Goal at 10 fl oz/acre, and Sencor at 0.4 lb/acre. An additional product with little effect on stand reduction was a 1x rate of Surflan at 3 qt/acre. Products that had the least effect on heading across species were 1x rates of Axiom at 11 oz/acre, Clarity at 4 pt/acre, Maverick at 0.67 oz/acre, and a 2x rate of Frontier at 64 fl oz/acre. The safest herbicide at the 2x rate across grass species was Goal at 20 fl oz/acre.

Overall, stand reduction was the least for Great Basin wildrye, and was the greatest for prairie junegrass and squirreltail. Great Basin wildrye and streambank wheatgrass were largely unaffected by the various herbicide treatments except 2x rates of Sinbar at 1.5 lb/acre and Kerb at 0.8 lb/acre. Species where herbicides generally had the most effect on reducing heading were squirreltail and prairie junegrass.

Table 1. Effect of herbicides on stand reduction of native grass species grown for seed, Madras, Oregon, 2000-2002.

Herbicide	Rate per acre	Great Basin wildrye		Bluebunch wheatgrass		Streambank wheatgrass	
Axiom	11 oz	0.4[1]	ab[2]	0.9	ab	0.9	cd
Beacon	0.76 oz	0.5	ab	1.3	bc	0.8	bc
Clarity	4 pt	0.3	ab	0.8	ab	0.4	abc
Diuron	1.8 lb	0.3	ab	0.8	ab	0.3	ab
Frontier	32 fl oz	0.3	ab	0.6	ab	0.3	ab
Goal	10 fl oz	0.3	ab	0.8	ab	0.3	ab
Kerb	0.4 lb	1.8	c	2.2	c	0.5	bc
Maverick	0.67 oz	0.6	b	1	b	0.4	abc
Sencor	0.4 lb	0.5	ab	0.8	ab	0.3	ab
Sinbar	0.75 lb	0.3	ab	1.6	bc	1.3	d
Surflan	3 qt	0.3	ab	1.1	b	0.3	ab
untreated	---	0.0	a	0.0	a	0.0	a

[1]Rating scale from 0 (no negative effect) to 5 (maximum negative effect).
[2]Mean separation with LSD $P \leq 0.05$.

Table 2. Effect of herbicides on stand reduction of native grass species grown for seed, Madras, Oregon, 2000-2002.

Herbicide	Rate per acre	Idaho fescue		Indian ricegrass		Squirreltail	
Axiom	11 oz	0.5[1]	bc[2]	0.5	ab	2	bc
Beacon	0.76 oz	0.8	bcd	0.6	abc	2.6	bcd
Clarity	4 pt	0.8	bcd	0.7	abc	3.1	bcde
Diuron	1.8 lb	0.6	bc	0.9	bc	3.1	bcde
Frontier	32 fl oz	0.8	bcd	1.4	c	1.6	b
Goal	10 fl oz	0.4	ab	0.5	ab	3.5	cde
Kerb	0.4 lb	1.9	e	1.1	bc	4.4	e
Maverick	0.67 oz	1.2	d	1.0	bc	3.1	bcde
Sencor	0.4 lb	0.5	bc	0.6	abc	2.2	bc
Sinbar	0.75 lb	0.9	cd	0.4	ab	4.2	de
Surflan	3 qt	0.8	bcd	0.9	bc	2.5	bcd
untreated	---	0.0	a	0.0	a	0.0	a

[1]Rating scale from 0 (no negative effect) to 5 (maximum negative effect).
[2]Mean separation with LSD $P \leq 0.05$.

Table 3. Effect of herbicides on reduced heading of native grass species grown for seed, Madras, Oregon, 2000-2002.

Herbicide	Rate per acre	Great Basin wildrye		Bluebunch wheatgrass		Streambank wheatgrass	
Axiom	11 oz	1.1[1]	ab[2]	0.8	ab	1.1	bc
Beacon	0.76 oz	0.0	a	0.6	ab	1.2	bcd
Clarity	4 pt	1.81	b	1.3	bc	1.6	cd
Diuron	1.8 lb	0.0	a	0.7	ab	1.2	bcd
Frontier	32 fl oz	1.8	b	0.6	ab	1.0	bc
Goal	10 fl oz	1.0	ab	0.7	ab	0.9	bc
Kerb	0.4 lb	1.8	ab	2.3	c	1.7	cd
Maverick	0.67 oz	1.3	ab	0.6	ab	0.2	ab
Sencor	0.4 lb	0.8	ab	1.1	b	0.3	ab
Sinbar	0.75 lb	1.6	ab	1.7	bc	2.1	d
Surflan	3 qt	0.3	ab	1.1	b	0.5	ab
untreated	---	0.0	a	0.0	a	0.0	a

[1]Rating scale from 0 (no negative effect) to 5 (maximum negative effect).
[2]Mean separation with LSD P ≤ 0.05

Table 4. Effect of herbicides on reduced heading of native grass species grown for seed, Madras, Oregon, 2000-2002.

Herbicide	Rate per acre	Idaho fescue		Indian ricegrass		Squirreltail	
Axiom	11 oz	1.5[1]	bcd[2]	1.8	bcd	2.4	bc
Beacon	0.76 oz	1.6	bcd	1.1	abc	2.4	bc
Clarity	4 pt	2.9	e	2.4	cd	5.0	e
Diuron	1.8 lb	1.0	b	1.0	abc	1.8	b
Frontier	32 fl oz	2.4	de	2.9	d	1.4	ab
Goal	10 fl oz	0.9	b	1.9	bcd	3.9	cde
Kerb	0.4 lb	2.3	de	2.0	bcd	4.6	de
Maverick	0.67 oz	2.1	cde	2.3	cd	3.1	bcd
Sencor	0.4 lb	1.0	b	1.3	abc	2.7	bc
Sinbar	0.75 lb	1.3	bc	0.6	ab	5.0	e
Surflan	3 qt	1.0	b	1.6	bcd	2.2	bc
untreated	---	0.0	a	0.0	a	0.0	a

[1]Rating scale from 0 (no negative effect) to 5 (maximum negative effect).
[2]Mean separation with LSD P ≤ 0.05.