SUMMER ANNUAL GRASS WEED CONTROL DURING ESTABLISHMENT OF KENTUCKY BLUEGRASS GROWN FOR SEED

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Introduction

Summer annual grass weeds, such as witchgrass (*Panicum capillare*) and green foxtail (*Setaria viridis*), are persistent problems during the establishment year of Kentucky bluegrass (KBG) seed production fields in the Grande Ronde Valley of northeastern Oregon. Herbicide options are limited for control of summer annual grass weeds in new KBG stands, in particular, for use during the early stage of stand establishment (before KBG develops six or more tillers). Mesotrione (Callisto) and flucarbazone-sodium (Everest 2.0) are registered for use in seedling KBG, providing two options for control of various broadleaf and grass weed species.

Mesotrione provides both selective contact and residual control either as a pre- or postemergence application but is limited to a maximum rate of 6 oz/acre per application and a maximum rate of 9 oz/acre/year. Previous research in seedling KBG indicates that mesotrione provides good postemergence control of witchgrass (WG) at 3- or 6-oz/acre application rates (Ball and Bennett, 2009).

Flucarbazone provides only postemergence control, and, due to soil residual concerns, its use is restricted in annual KBG seed production systems. East of the Cascade Mountain Range it is restricted to use only during the year of KBG establishment. Only one application is allowed per year at a maximum rate of 1 oz/acre. Previous research indicates fair to good control of WG with pre- and/or postemergence applications of flucarbazone at 0.3 or 0.6 oz/acre (Ball and Bennett, 2009).

A trial was conducted in spring/summer 2020 to evaluate crop tolerance and potential for long-term WG control in seedling KBG by using split applications (pre- and postemergence) of mesotrione and flucarbazone. Pendimethalin (Prowl H2O) at 5 pt/acre was also evaluated for preemergence WG control later in the growing season after KBG seedlings had developed six or more tillers. Mesotrione and flucarbazone split application timings and rates utilized in this study were for experimental purposes only and should not be considered recommendations for commercial use.

Materials and Methods

The trial was located in an irrigated commercial field of 'Wildhorse' KBG in the Grande Ronde Valley, Union County, OR. The new stand of KBG was seeded at a rate of 3.5 lb/acre on February 28, followed by a spring pea cover crop at 70 lb/acre. Preemergence (PRE) treatments were applied prior to WG emergence, when KBG seedlings were in the three- to five-leaf stage. Postemergence (POST) treatments were applied to WG seedlings when KBG seedlings were in the 5+ tiller growth stage. Environmental conditions at the time of herbicide application are summarized in Table 1, and herbicide rates and timings are provided in Table 2.

Plots were 8 feet x 25 feet and were arranged in a randomized complete block design with four replications. All herbicide treatments were applied with a hand-held CO_2 sprayer delivering 21 gpa at 32 psi. To minimize drift potential, TeeJet air-induction extended-range (AIXR) 11002 nozzle tips were used for all applications. Nonionic surfactant at 0.25% v/v was added to all POST treatments except treatment 8 (pendimethalin). All mesotrione treatments received an herbicide activator/deposition aid/water conditioner (Hel-fire) at 2 qt/100 gal water. A general broadleaf herbicide cover spray including pyrasulfotole +

Table 1. Crop growth stage and environmental conditions at time of herbicide application to seedling Kentucky bluegrass.

	Apr. 28, 2020	Jun. 5, 2020
Application timing	Preemergence (PRE)	Postemergence (POST)
KBG growth stage	1.5 to 2 leaf	5–10 tillers
Witchgrass growth stage	None emerged	1–4 leaf, 2½ to 3½ in
Air temperature (°F)	62	62
Relative humidity (%)	61	60
Cloud cover (%)	Zero	80
Wind velocity (mph)	0–3 mph from NW	0–2 mph from NE
Soil temperature, surface (°F)	62	77
Soil temperature, 1 inch (°F)	60	73
Soil temperature, 2 inch (°F)	60	72
Soil temperature, 4 inch (°F)	64	65

bromoxynil (Huskie) at 15 oz/acre + bromoxynil (Maestro) at 8 oz/acre was applied to the entire trial site on June 17. Visual evaluations of crop injury and WG control were made June 17, June 27, July 16, and August 13. Seed yield was not determined.

Results and Discussion

WG control evaluation results are summarized in Table 2. Mesotrione applied as a PRE- plus POST-emergence split application provided 87–100% WG control throughout the duration of the trial (10 weeks). Similarly, mesotrione applied PRE to WG, followed by pendimethalin applied at the POSTemergence application timing, also provided 93–100% WG control that lasted until trial termination on August 13. Regardless of application rate, stand-alone mesotrione treatments provided 84–100% WG control through late June, but control declined by August 13. No discernable differences were observed between the 5- and 6-oz/acre mesotrione rates applied preemergence to WG. All mesotrione treatments provided excellent broadleaf weed and cover crop pea control. Split application of flucarbazone did not provide acceptable WG control in this trial, a result that differs from previously reported results (Ball and Bennett, 2009). Crop injury was not observed from any treatments during the course of this trial, which is consistent with previously reported results (Ball and Bennett, 2007; Ball and Bennett, 2009). Further investigation of mesotrione split application rates is warranted to optimize summer annual grass weed control in spring-seeded stands of KBG.

References

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Table 2. Witchgrass control with pre- and postemergence herbicide applications in seedling Kentucky bluegrass in the Grande Ronde Valley of northeastern Oregon, 2020.[1]

Treatment	Application rate[2]	Timing	Witchgrass control			
			Jun. 17	Jun. 27	Jul. 16	Aug. 13
	(product/a)		---------- (%) ----------			
Control	—	—	0 c	0 c	0 c	0 c
Mesotrione // mesotrione	5 oz 5 oz	PRE POST	100 a	99 a	88 a	87 ab
Mesotrione + bromoxynil	6 oz 2 pt	PRE	100 a	94 a	68 a	78 ab
Mesotrione	6 oz	PRE	100 a	85 a	56 ab	71 ab
Mesotrione	5 oz	PRE	100 a	84 a	63 ab	55 b
Flucarbazone // flucarbazone	0.5 oz 0.5 oz	PRE POST	67 ab	35 b	24 bc	0 c
Mesotrione // pendimethalin	6 oz 5 pt	PRE POST	100 a	97 a	93 a	97 a
LSD (0.05)	—	—	35	22	41	40

[1]Numbers followed by the same letters are not significantly different by Tukey's HSD all-pairwise comparisons test.

[2]Application rates for mesotrione and flucarbazone = fluid ounces/acre.