Kansas Agricultural Experiment Station Research Reports

Volume 7
Issue 5 *Kansas Field Research*

Article 16

2021

Foxtail Management in Smooth Brome Hay Meadows

S. R. Lancaster
Kansas State University, slancaster@ksu.edu

S. R. Duncan
Kansas State University, sduncan@ksu.edu

Foxtail Management in Smooth Brome Hay Meadows

Abstract

Three different herbicides were applied at early bromegrass greenup and at post hay harvest to assess their effectiveness in controlling foxtail at two producer hay meadow sites in Pottawatomie (PT) and Dickinson (DK) counties. Pendimethalin applied early resulted in the greatest foxtail control, but control did not extend through the season to reduce late-summer infestations. Metsulfuron applied early resulted in approximately 30% visible brome injury. The injury was associated with 77 and 48% brome hay losses when compared to the untreated check, at the PT and DK sites, respectively. Injury from the early spring treatments was exacerbated by six freeze events and cool, dry conditions for three weeks following application. Metsulfuron and pendimethalin applied post-harvest also resulted in visible brome injury, but dry matter yields were not measured. This study will be continued in 2021 without the metsulfuron treatments, but with the addition of sequential pendimethalin treatments.

Keywords

bromegrass, hay, foxtail control, herbicide injury

Cover Page Footnote

The authors express appreciation to Mr. Tony Whitehair, Chisholm Trail District Agriculture and Natural Resources agent; and Ms. Shannon Blocker, Pottawatomie County Agriculture and Natural Resources agent for their assistance with this project.

Foxtail Management in Smooth Brome Hay Meadows

S.R. Lancaster and S.R. Duncan

Summary

Three different herbicides were applied at early bromegrass greenup and at post hay harvest to assess their effectiveness in controlling foxtail at two producer hay meadow sites in Pottawatomie (PT) and Dickinson (DK) counties. Pendimethalin applied early resulted in the greatest foxtail control, but control did not extend through the season to reduce late-summer infestations. Metsulfuron applied early resulted in approximately 30% visible brome injury. The injury was associated with 77 and 48% brome hay losses when compared to the untreated check, at the PT and DK sites, respectively. Injury from the early spring treatments was exacerbated by six freeze events and cool, dry conditions for three weeks following application. Metsulfuron and pendimethalin applied post-harvest also resulted in visible brome injury, but dry matter yields were not measured. This study will be continued in 2021 without the metsulfuron treatments, but with the addition of sequential pendimethalin treatments.

Introduction

Smooth bromegrass (*Bromus inermis*) is a major hay and pasture crop in eastern Kansas, occupying approximately 1.2 million acres (Figure 1), and yielding up to three tons or greater of dry matter (Lamond et al., 1992) per growing season with good rainfall and adequate fertilization. Since 2007, a perceived or noted decline in smooth bromegrass yield as well as increased foxtail [primarily yellow (*Setaria pumila*) and giant (S. *faberi*)] competition in the summer months has been observed. Two field studies in the spring of 2020 evaluated and compared (1) the efficacy of spring and post-harvest applied herbicides, (2) their effect on the smooth bromegrass, and (3) their control of foxtail species in established smooth bromegrass hay meadows.

Procedures

The effects of early spring and post hay harvest applications of pendimethalin (Prowl H2O), *S*-metolachlor (Dual II Magnum), and metsulfuron (Escort XP) on smooth bromegrass injury, yield, and foxtail and other weed control/suppression were evaluated. Site descriptions and conditions at the time of herbicide application are listed in Table 1. The seven treatments in each experiment were arranged in a randomized complete block design with three replications. Herbicide treatments (Table 2) were applied using a CO_2 backpack sprayer with a 4-nozzle boom with 8002ER nozzles at 35 psi delivering 20 gallons/a of solution. Individual plots were 10- × 25-ft and the treated area was the center 7 × 25 ft of the plot. Crop injury (CI) and foxtail suppression (%) were assessed approximately every 10-14 days after herbicide applications. Two 18- × 18-in. quadrats were clipped from each plot at 3 in. in height on June 5, weighed

on an electronic scale, and placed in a dryer at 104°F for 48 hours. Samples were removed and weighed immediately on the same electronic scale. Dry matter percentage was calculated and used to calculate forage dry matter yields/a.

Results

Dry matter yield response trends to treatments were similar, so forage yields from the two sites were combined for analysis (Figure 2). Foxtail control and brome injury responses were also similar at both locations (Figure 3). Prowl H2O applied early in the spring resulted in 97% foxtail control, compared to only 47% and 34% control provided by Dual II Magnum and Escort XP, respectively. Post-harvest herbicide applications provided minimal, non-significantly different levels of foxtail control (Figure 3). When data collection ceased in early September, foxtail suppression was unacceptable in all plots (data not shown).

Escort XP applied in early spring (Figure 3) resulted in 28% visual injury to the brome, minimal foxtail control, and 62% less dry matter production compared to the untreated check (Figure 2). Smooth brome injury was likely exacerbated by below-average temperatures, including six freeze events that occurred the week after spring application (http://mesonet.k-state.edu/).

With the exception of early spring-applied pendimethalin, herbicides did not adequately control foxtail in the short term and caused visible, but not always statistically significant smooth brome injury.

Herbicides did not reduce the late-summer foxtail infestation, despite apparent suppression eight weeks after the early spring application.

Future Research

Based on these results, this work will be repeated in 2021 with refinement of treatments. Prowl H2O will be applied per labeled rates either at greenup or at greenup and after cutting. Smooth bromegrass injury from the Escort XP treatment was unacceptable on cooperators' hay meadows and will be dropped from this study.

Acknowledgments

The authors express appreciation to Mr. Tony Whitehair, Chisholm Trail District Agriculture and Natural Resources agent; and Ms. Shannon Blocker, Pottawatomie County Agriculture and Natural Resources agent for their assistance with this project.

References

Lamond, R.E., Fritz, J.O., Ohlenbusch, P.D. 1992. Smooth brome production and utilization. Kansas State University Agric. Expt. Sta. and Coop. Ext. Serv. Publication C-402.

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

Table 1. Site description and conditions when herbicides were applied to plots in Pottawatomie and Dickinson counties

Site	Soil	Dates of application	Temperature			Relative humidity	Wind speed and direction
			Air	2-in. Soil depth	4-in. Soil depth		
			---------- °F ----------			%	mph
PT	Pawnee clay loam	March 26	52	50	50	85	NE – 8
		June 22	68	70	72	78	W – 5
DK	Irwin silty clay loam	March 25	55	57	54	85	S – 6
		June 22	70	70	70	80	W – 3

Table 2. Herbicides and application rates applied in early spring and post brome hay harvest in Pottawatomie and Dickinson counties

Herbicide	Product	Rate, product/a
Metsulfuron†	Escort XP	1 oz/a
Pendimethalin	Prowl H2O	4 pt/a
S-metolachlor	Dual II Magnum	1 pt/a

† Metsulfuron was applied with 0.25% v/v crop oil concentrate.

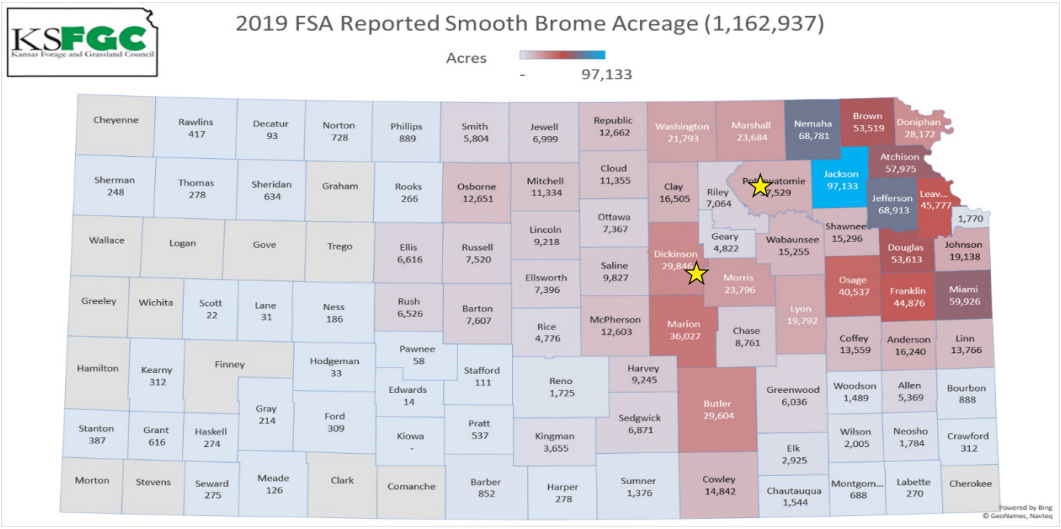

Figure 1. Location of plots (gold stars) and reported acreage by county. Map produced by Kansas Forage and Grasslands Council with Kansas Farm Service Agency data.

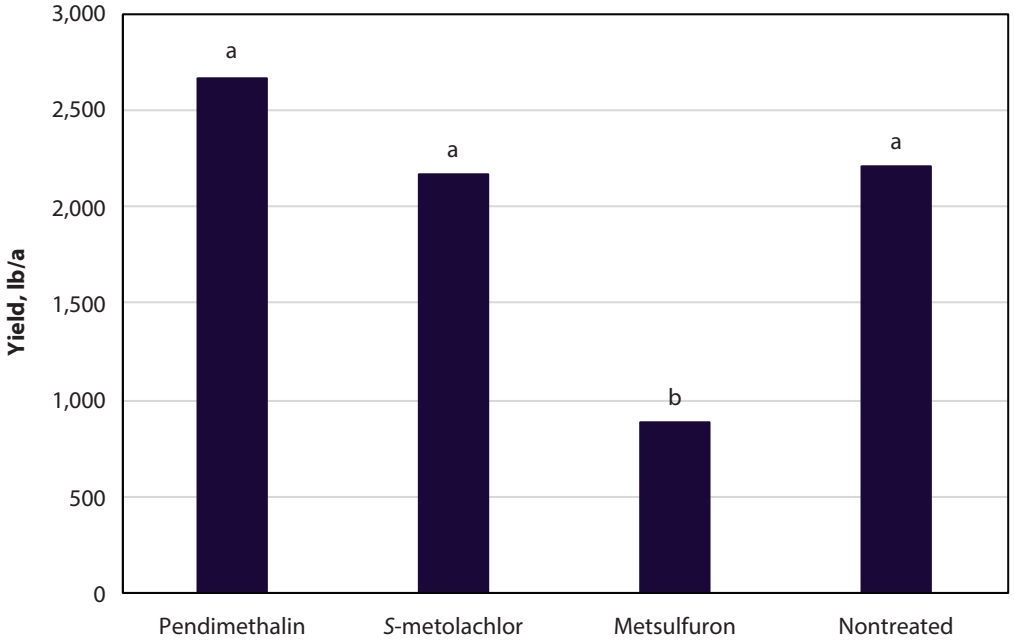

Figure 2. Smooth bromegrass hay yield at 8 weeks after spring herbicide application. Values followed by the same letter are not significantly different at *P* = 0.05.

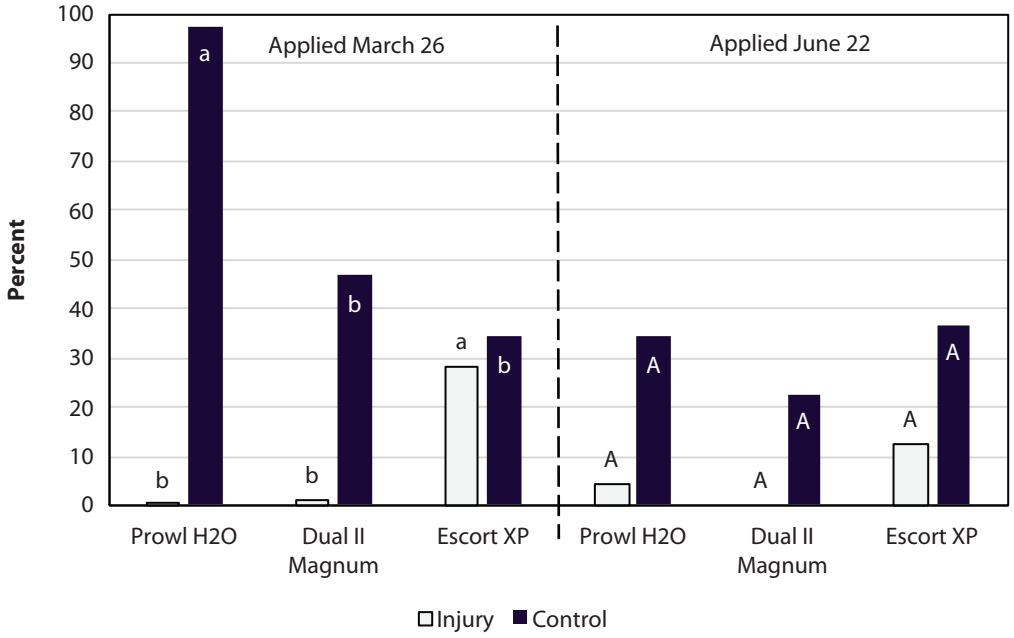

Figure 3. Foxtail control and brome injury at 8 weeks after herbicide application. Means within an application date followed by the same letter are not significantly different at *P* = 0.05.