Mefluidide, Sulfosulfuron, and MSMA Combinations for Johnsongrass Control

Introduction

Johnsongrass (*Sorghum halepense* L.) is a perennial warm season nonnative invasive grass that has been problematic in Kentucky, as well as most of the United States, since its introduction in the mid 1800's (NAL 2006). Control options for this species have been heavily investigated in the past and there is no deficiency of acceptable suppression and control options available. Current chemical options for eradication include sulfosulfuron (an ALS inhibiting herbicide) and ACCase (grass specific) herbicides such as clethodim, fluaziflop, fenoxaprop. The ACCase herbicides, however, will have a negative impact on desirable grass species that will be needed to maintain a vegetative cover for reclamation.

Monosodium methanearsonate (MSMA) is an herbicide commonly used in turf and has been researched extensively for johnsongrass control with results varying greatly. Research at the University of Kentucky at the Turf Research Center in 2000 realized no more than 35 % control of johnsongrass at 4.125 lb a.i / ac (88 fl oz of 6 lb product) (UK Turf 2000). Taylor and Coats (1999) had similar results in 1998 with 3.3 lb a.i / ac of MSMA resulting in only 36 % control 12 WAT. Research performed in the summer of 2004 showed greater than 80 % control of johnsongrass with 1.5 lb a.i / ac of MSMA (Blair and Witt 2005). Studies have shown benefit of adding MSMA to other herbicides at decreased rates to improve or maintain control levels. Arnold et al (2001) showed similar control levels greater than 80 % with 0.125 lb a.i / ac of imazapic alone and with 0.094 lb a.i. / ac imazapic tank mixed with 2 lb a.i / ac of MSMA. This inconsistency of efficacy may be due to the slow absorption rate of MSMA in johnsongrass as Mason et al (1979) showed that 50 % absorption occurs after 6 hours of rain fastness while up to 155 hours are needed for 90 % absorption.

Mefluidide is another herbicide that has been researched for johnsongrass control in the past. Commonly used as a plant growth regulator and seedhead suppressant and known as Embark ®, past research shows inconsistent results similar to that of MSMA.

A trial was installed in 2006 to evaluate the ability of mefluidide and MSMA tank mixes to control johnsongrass and compare the results to sulfosulfuron, one of the industry standards.

Methods and Materials

The trial was located at Spindletop Farm in Lexington, KY. The area was a managed mature johnsongrass field (primarily rhizomatous) that had been routinely mowed to prevent seedhead formation. Ten treatments were evaluated in a randomized complete block design with four replications (Table 1). All treatments included a nonionic surfactant at 0.25 % v/v. Plots were 10' X 30' and treated at 25 GPA using a CO_2 powered sprayer mounted on an ATV. Treatments were applied on June 9, 2006 as the johnsongrass was about to set seedheads. Data collected included percent johnsongrass vegetative control 14, 41, and 95 DAT as well as percent seedhead

suppression 41 DAT. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at p = 0.05.

Results

Outrider at 0.5 and 1 oz per acre resulted in significantly higher control 14 DAT than any of the other treatments (48 and 46 % respectively) (Table 1). All of the Embark and MSMA treatments, whether alone or tank mixed, resulted in 30 % control or lower at 14 DAT.

The two Outrider treatments increased in control levels to 93 and 97 % at the 0.5 oz and 1 oz per acre rates respectively at 41 DAT. These control levels were again significantly higher than and of the Embark or MSMA treatments combinations at the same time interval. There were no significant differences between the Embark and MSMA treatments and no one treatment provided greater than 30 % control 41 DAT. In terms of seedhead suppression, however, all treatments provided greater than 80 % suppression 41 DAT.

The Embark / MSMA treatments provided no control of johnsongrass 95 DAT. The Outrider treatments decreased slightly in control from 41 DAT to 95 DAT to 80 and 94 % for the 0.5 oz and 1 oz treatments, respectively.

Literature Cited

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Table 1: Summary Statistics for Johnsongrass Control

Trt No.	Type	Treatment Name	Rate	Rate Unit	Percent Control	Percent Seedhead Suppression	Percent Control	Percent Control
					14 DAT	41 DAT	41 DAT	95 DAT
1	HERB HERB ADJ	Embark MSMA NIS	16 32 0.25	FL OZ/A FL OZ/A % V/V	24bc	100a	25b	0c
2	HERB HERB ADJ	Embark MSMA NIS	8 32 0.25	FL OZ/A FL OZ/A % V/V	28b	99a	16b	0c
3	HERB HERB ADJ	Embark MSMA NIS	4 32 0.25	FL OZ/A FL OZ/A % V/V	30b	100a	30b	0c
4	HERB HERB ADJ	Embark MSMA NIS	2 32 0.25	FL OZ/A FL OZ/A % V/V	30b	100a	25b	0c
5	HERB HERB ADJ	Embark MSMA NIS	16 16 0.25	FL OZ/A FL OZ/A % V/V	23bc	96a	13b	0c
6	HERB HERB ADJ	Embark MSMA NIS	16 8 0.25	FL OZ/A FL OZ/A % V/V	20bc	80b	16b	0c
7	HERB ADJ	Outrider NIS	0.5 0.25	OZ/A % V/V	48a	100a	93a	80b
8	HERB ADJ	Outrider NIS	1 0.25	OZ/A % V/V	46a	100a	97a	94a
9	HERB ADJ	Embark NIS	16 0.25	FL OZ/A % V/V	11c	98a	25b	0c
10	HERB ADJ	MSMA NIS	32 0.25	FL OZ/A % V/V	18bc	100a	29b	0c

Note: Treatment means followed by the same letter are not statistically different using Fishers LSD at p = 0.05.