

INTRODUCTION

Chinese silvergrass (*Miscanthus sinensis*) is a tall non-native bunchgrass that is widespread in the eastern and southern parts of the United States. Leaves are upright, curly tipped with white midribs, approximately 2 centimeters wide, and plants can attain heights up to 1.5 – 2 meters. Preferred habitats include sites with full sunlight and well drained soils. Although not as aggressive as other invasive grasses, Chinese silvergrass is problematic in forest and roadside situations as senesced leaves are extremely flammable. It has become established along roadsides in the eastern regions of Kentucky. These infestations are a concern due to line of sight issues, potential for fire, and mowing costs.

Current chemical control recommendations are limited and include a foliar spray of a 4% glyphosate solution, a 1% imazapyr solution, or a combination of the two (0.5% imazapyr + 4% glyphosate) applied during flowering (September or October) (Miller et al. 2010). The management question is which combinations of herbicides, application timing, and mowing will result in effective and selective control of Chinese silvergrass?

OBJECTIVES

The objectives were to:

- 1) evaluate the timing of herbicide application and sequential herbicide applications on mowed and unmowed Chinese silvergrass stands

MATERIALS & METHODS

A pair of trials was established on unmowed and mowed Chinese silvergrass stands in 2010 on a roadside in eastern Kentucky. The following herbicides were evaluated: Arsenal (imazapyr), Roundup Pro (glyphosate), Envoy (clethodim), and Fusion (fluazifop + fenoxaprop). The efficacy of Roundup Pro and Roundup + Arsenal applied once in summer (vegetative) or fall (flowering) and sequentially in summer and fall was evaluated. Envoy and Fusion applied once or twice (4 weeks after first treatment) were also evaluated. All herbicide treatments contained the adjuvant, Activator 90 at 0.25% v/v. Plots were 14' long X 8' wide and were arranged as a RCBD with 3 replications at both locations. Treatments were applied at 30 GPA using a TeeJet® Boomless tip mounted on the rear of an ATV (Figure 1).

At the unmowed site, treatments were applied on July 1, Aug. 4, and Sept. 24 with evaluations for visual percent control 24 (8/4/2010), 85 (9/24/2010), 340 (6/6/2011), and 397 (8/2/2011) days after the first application (DAFA). The Chinese silvergrass was mowed on July 13 and the new growth was sprayed on Aug. 17, Sept. 19, and Oct. 6 with evaluations 33 (9/19/2010), 76 (11/1/2010), 293 (6/6/2011), and 350 (8/2/2011) DAFA.

RESULTS & DISCUSSION

At the unmowed site where the herbicides were applied to large plants, Roundup and Roundup + Arsenal gave greater control 34 DAFA than the graminicides Envoy and Fusion (Table 1). However, at the mowed site, Envoy provided greater control 33 DAFA of the young leaf tissue than the Roundup and Roundup + Arsenal treatments (Table 2).

In the unmowed trial, 340 DAFA, all the treatments with Roundup alone and in combination with Arsenal provided at least 90% control while the twice applied Fusion and Envoy treatments had 47 to 58% control (Table 1). Control was still >80% for some treatments 397 DAFA (Table 1 & Figure 2).

Figure 1. Application using ATV at unmowed site in 2010.



Figure 2. Unmowed trial in August 2011.



Figure 3. Roundup Pro + Arsenal treatment in August 2011.



Figure 4. Imazapyr damage on tree from plot pictured in Fig. 3.

Literature Cited:

Miller, J.H., S.T. Manning, and S.F. Enloe. 2010. A management guide for invasive plants in southern forests. USDA Forest Service Southern Research Station. GTR SRS-131.

Table 1. Chinese silvergrass control from unmowed 2010 trial.

Treatment	Rate per Acre	Application Dates			34 DAFA*	Visual Percent Control						
		July 1	Aug. 4	Sept. 24		85 DAFA	340 DAFA	397 DAFA				
Arsenal	2 PT	Y			50	a	73	ab	93	a	87	ab
Roundup Pro	1.5 QT	Y										
Roundup Pro	1.5 QT	Y			37	ab	87	a	93	a	93	a
Arsenal	2 PT	Y		Y	50	a	83	a	97	a	99	a
Roundup Pro	1.5 QT	Y		Y								
Roundup Pro	1.5 QT	Y		Y	43	a	85	a	98	a	96	a
Arsenal	2 PT			Y	0	d	5	e	93	a	85	ab
Roundup Pro	1.5 QT			Y								
Roundup Pro	1.5 QT			Y	0	d	8	e	90	a	72	b
Envoy	32 FL OZ	Y			32	abc	77	ab	13	de	13	d
Fusion	12 FL OZ	Y			12	cd	50	cd	27	cd	17	d
Envoy	32 FL OZ	Y	Y		17	bcd	58	bc	58	b	47	c
Fusion	12/8 FL OZ	Y	Y		10	cd	32	d	47	bc	20	d
Nontreated Control					0	d	10	e	0	e	0	d

Table 2. Chinese silvergrass control from mowed 2010 trial.

Treatment	Rate per Acre	Application Dates			33 DAFA*	Visual Percent Control						
		Aug. 17	Sept. 19	Oct. 6		76 DAFA	293 DAFA	350 DAFA				
Arsenal	2 PT	Y			33	cd	63	c	86	abc	77	abc
Roundup Pro	1.5 QT	Y										
Roundup Pro	1.5 QT	Y			35	cd	77	abc	77	bcd	62	abcd
Arsenal	2 PT	Y		Y	17	de	67	c	97	ab	96	a
Roundup Pro	1.5 QT	Y		Y								
Roundup Pro	1.5 QT	Y		Y	18	de	77	abc	98	a	95	a
Arsenal	2 PT			Y	0	e	68	bc	99	a	96	a
Roundup Pro	1.5 QT			Y								
Roundup Pro	1.5 QT			Y	0	e	63	c	96	abc	91	ab
Envoy	32 FL OZ	Y			72	ab	90	a	60	d	50	cd
Fusion	12 FL OZ	Y			50	bc	77	abc	33	e	13	ef
Envoy	32 FL OZ	Y	Y		82	a	92	a	75	cd	60	bcd
Fusion	12/8 FL OZ	Y	Y		58	abc	85	ab	63	d	40	de
Nontreated Control					0	e	7	d	0	f	0	f

All herbicide treatments contained the adjuvant, Activator 90 at 0.25% v/v.

* Abbreviations: DAFA, days after first application.

Means within a column followed by the same letter are not different according to Fisher's Protected LSD at P < 0.05.

In the mowed trial, one year after first application, the twice and fall applied treatments with Roundup alone and in combination with Arsenal provided >90% control while the twice applied Fusion and Envoy treatments had 40 to 60% control (Table 2).

Damage to non-target plants was evident with treatments including imazapyr (Fig. 3 & 4).

SUMMARY

The addition of Arsenal did not increase Chinese silvergrass control compared to Roundup alone. The twice and fall applied treatments with Roundup alone and in combination with Arsenal provided consistent control in both trials. One factor to consider is waiting for enough leaf regrowth after mowing before applying foliar applied herbicides for greater control of roots and rhizomes.