

Chemical Control of Chinese Silvergrass (*Miscanthus sinensis* Anderss.)

Introduction

Chinese silvergrass, often times simply referred to as miscanthus, is a non-native bunchgrass that has become widespread in the eastern and southern parts of the United States. Occurrences are also being reported in Missouri, Illinois, Colorado, and California. Native to eastern Asia, this warm season grass species is used for bio-energy and paper pulp on Europe and Asia as well as erosion control and field hedges (Morisawa 1999). In the United States, *M. sinensis* is still widely sold as an ornamental with several varieties being imported and sold (Miller 2003).

The grass is a tall perennial that forms dense clumps. Leaves are upright, curly tipped with white midribs, approximately 2 centimeters wide, and can attain heights up to 1.5 – 2 meters. Plants flower in September through November and are pink to red at first turning brown to tan in the fall. Preferred habitats include sites with full sunlight and well drained soils. Reproduction by seed is not as common as sprouting from an extensive subterranean rhizomatous system. This characteristic allows Chinese silvergrass to form dense and extensive infestations along forest edges, roadsides, and other disturbed sites. Although not as aggressive as other invasive grasses, Chinese silvergrass is problematic in forest and roadside situations as leaves are extremely flammable and can be easily ignited.

Control options available appear to be limited. Mechanical control (mowing, burning, manual removal) does not appear to be effective as the entire root system will need to be removed to obtain complete control (Morisawa 1999). Mechanical control may also lead to the spread of the plant. Current chemical control recommendations are limited and include a foliar spray of a 2% glyphosate solution, a 1% imazapyr solution, or a combination of the two.

Chinese silvergrass has become established along Kentucky roadsides in the eastern regions of the state. These infestations are a concern due to line of sight issues, potential for fire, and mowing costs. A study was initiated in June 2005 to examine several herbicides available for grass control to evaluate their effectiveness on Chinese silvergrass.

Methods and Materials

The study was installed directly behind a guardrail on the eastbound lane of the Mountain Parkway in Wolfe County. Active ingredients tested included glyphosate, imazapyr, sulfosulfuron, clethodim, fluazifop + fenoxypop, and imazapic (Table 1). Plots were 15' X 10' and arranged in a completely randomized block with 3 replications. Treatments were applied on June 21, 2005 at 20 GPA using a TeeJet® Boomless tip mounted on the rear of an ATV. Plots were evaluated for visual percent control at 31 and 61 DAT.

Table 1: Treatment list for Miscanthus trial in Eastern Kentucky

Treatment	Compounds	Active Ingredients	Rate per acre
1	Arsenal + RoundUp Pro	Imazapyr + glyphosate	2 pt + 1.5 qt
2	Arsenal	Imazapyr	2 pt
3	RoundUp Pro	Glyphosate	1.5 qt
4	Outrider	Sulfosulfuron	1.25 oz
5	Outrider	Sulfosulfuron	1.67 oz
6	Envoy	Clethodim	18 fl oz
7	Envoy	Clethodim	24 fl oz
8	Fusion	Fluazifop + fenoxypop	7 fl oz
9	Fusion	Fluazifop + fenoxypop	9 fl oz
10	Plateau	Imazapic	8 fl oz
11	Plateau	Imazapic	12 fl oz

Results

Treatments that included RoundUp Pro had statistically higher control rates than those that did not at all evaluation intervals (Table 2). The addition of RoundUp Pro to the Arsenal treatment dramatically increased control levels at 31 and 62 DAT and statistically increased control levels at 359 DAT. There was no significant increase in control levels with the Arsenal / RoundUp tank mix versus RoundUp alone.

Outrider failed to provide satisfactory control which is consistent with other warm season grass applications with this product. Outrider is labeled for cool season grass control, such as tall fescue, and had documented tolerance on warm season grasses, such as big bluestem. Envoy, a graminicide, provided higher control levels than Fusion, another type of graminicide, yet both products provided overall unsatisfactory control levels at the evaluation periods. Plateau provided extremely low levels of control in 2005. Outrider, Envoy, Fusion, and Plateau had no effect on *Miscanthus* 1 YAT.

Future work with *Miscanthus* will include the use of a MSO in combination with Arsenal to determine if MSO will increase herbicide efficacy. The study area used in 2005 will be retreated in 2006 to determine the effect of sequential applications of Round Up and Arsenal in increasing control levels from those reported here.

Table 2: Summary statistics for *Miscanthus* trial in Eastern Kentucky

Trt No.	Type	Treatment Name	Rate	Rate Unit	Visual Percent Control					
					31 DAT	62 DAT	359 DAT			
1	HERB	Arsenal	2	PT/A	80	a	92	a	85	a
	HERB	RoundUp Pro	1.5	QT/A						
2	HERB	Arsenal	2	PT/A	15	bc	17	cd	62	b
	ADJ	NIS	0.25	% V/V						
3	HERB	RoundUp Pro	1.5	QT/A	72	a	88	a	82	a
4	HERB	Outrider	1.25	OZ/A	7	c	5	d	0	c
	ADJ	NIS	0.25	% V/V						
5	HERB	Outrider	1.67	OZ/A	8	c	3	d	0	c
	ADJ	NIS	0.25	% V/V						
6	HERB	Envoy	18	FL OZ/A	18	bc	52	b	0	c
	ADJ	COC	1	% V/V						
7	HERB	Envoy	24	FL OZ/A	30	b	50	b	0	c
	ADJ	COC	1	% V/V						
8	HERB	Fusion	7	FL OZ/A	12	bc	35	bc	0	c
	ADJ	COC	1	% V/V						
9	HERB	Fusion	9	FL OZ/A	18	bc	23	cd	0	c
	ADJ	COC	1	% V/V						
10	HERB	Plateau	8	FL OZ/A	5	c	12	d	0	c
	ADJ	NIS	0.25	% V/V						
11	HERB	Plateau	12	FL OZ/A	8	c	8	d	0	c
	ADJ	NIS	0.25	% V/V						
12	CHK	Untreated Check			0		0		0	

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

Literature Cited

Miller, J.H., 2003. Nonnative invasive plants of southern forests. USDA Forest Service Southern Research Station. GTR SRS-62. p.55, 83.

Morisawa, TunyaLee. Weed Notes: *Miscanthus sinensis*. The Nature Conservancy. Nov. 2 2002. <<http://tncweeds.ucdavis.edu/esadocs/miscsine.html>>