Efficacy of Flazasulfuron for Bermudagrass Spring Transitioning

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Introduction

This study was conducted on a mature stand of 'Tifway' bermudagrass (*C. dactylon x C. transvaalensis*) at Egwani Farms Golf Course (Rockford, TN) overseeded with a 'Champion GQ' perennial ryegrass (*Lolium perenne* L.) blend (Seed Research of Oregon, Corvallis, OR). The objective of the study was to evaluate the efficacy of flazasulfuron for transitioning the bermudagrass out of overseeding during the spring of the year.

Methods and Materials

The test site was maintained similar to that of a golf course fairway with respect to irrigation, fertilization and mowing.

This study was arranged in a randomized complete block design with three replications. Treatments were initially applied on 13 April 2009 to plots (10' x 5') using a CO_2 powered boom sprayer calibrated to deliver 30 gpa using four, flat-fan, 8002 nozzles at 18 psi, configured to provide a 5-ft spray swath. Bermudagrass green-up had reached approximately 50% when treatments were initially applied. Treatments requiring sequential applications were re-applied on 11 May 2009 using the same spray apparatus. The urea component of treatments 8, 9, and 10 was applied as a granular, separate from the spray solution, using a shaker jar.

Perennial ryegrass control was rated visually on a 0 (no control) -100% (complete plant death) scale at 7, 14, 21, 28, 35, and 43 days after initial treatment (DAIT). Annual bluegrass (*Poa annua* var. annua) control was also rated using the same 0-100% scale at 7, 14, 21, 28, 35, and 43 DAIT. Bermudagrass cover and quality was rated visually at 14, 21, 28, 35, and 43 DAIT.

Results and Discussion

All treatments except flazasulfuron at 0.25 oz/A provided greater than 85% control of overseeded perennial ryegrass at the conclusion of the study (Table 1). At 7, 14, and 21 DAIT, perennial ryegrass control following treatment with flazasulfuron at 0.25 and 0.50 oz/A alone was significantly lower than that which was observed following treatment with flazasulfuron at 0.25 and 0.50 oz/A in combination with urea (Table 1). A similar response was observed for following treatment with flazasulfuron at 1.0 oz/A as well.

At all rates, flazasulfuron treatments including urea (treatments 8, 9, 10) provided greater annual bluegrass control than those that included ammonium sulfate (Table 2). For example, at 21 DAIT, the highest level of annual bluegrass control following treatment with flazasulfuron alone, or in combination with ammonium sulfate, was 40.0%; treatment with flazasulfuron at 0.25 oz/A and urea provided 91.3 % control on the same rating date (Table 2). It is not clear whether flazasulfuron and urea acted synergistically in this study or the difference in control observed was due to the increased amount of nitrogen provided by the urea application compared to the ammonium sulfate-flazasulfuron tank mix.

No differences in bermudagrass cover were detected in this study (data not shown). Treatments including urea yielded higher quality scores than those containing ammonium sulfate at 43 DAIT (Table 3). This may be due to the increased amount of nitrogen delivered from the urea treatments relative to the treatments that contained ammonium sulfate.

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Table 1. Perennial ryegrass control following applications of flazasulfuron (SL-160) in 2009

	Treatment	Rate (per A)	Perennial Ryegrass Control 7DAIT	14DAIT	21DAIT	28DAIT	35DAIT	43DAIT
			----------%----------					
1.	UNTREATED CHECK		0.0 e[†]	0.0 c	0.0 d	0.0 b	0.0 d	0.0 d
2.	SL-160	0.25 oz wt.	3.8 cde	63.8 b	78.8 c	100.0 a	82.5 c	72.5 c
	INDUCE	0.25 % v/v						
3.	SL-160	0.25 oz wt.	5.0 bcde	62.5 b	77.5 c	97.5 a	87.5 bc	86.3 b
	INDUCE	0.25 % v/v						
	AMMONIUM SULFATE[‡]	2lb						
4.	SL-160	0.50 oz wt.	5.0 bcde	60.0 b	76.3 c	100.0 a	90.0 b	93.8 ab
	INDUCE	0.25 % v/v						
5.	SL-160	0.50 oz wt.	2.5 de	58.8 b	81.3 bc	97.5 a	89.3 b	86.3 b
	INDUCE	0.25 % v/v						
	AMMONIUM SULFATE[‡]	2lb						
6.	SL-160	1.0 oz wt.	6.3 abcd	67.5 b	81.3 bc	98.8 a	91.3 b	98.8 a
	INDUCE	0.25 % v/v						
7.	SL-160	1.0 oz wt.	3.8 cde	67.5 b	90.0 a	98.8 a	93.8 ab	100.0 a
	INDUCE	0.25 % v/v						
	AMMONIUM SULFATE[‡]	2lb						
8.	SL-160	0.25 oz wt.	10.0 ab	81.3 a	90.0 a	100.0 a	100.0 a	100.0 a
	INDUCE	0.25 % v/v						
	UREA (46-0-0)[¶]	65 lb						
	UREA (46-0-0) (4 wk later)[¶]	65 lb						
9.	SL-160	0.50 oz wt.	11.3 a	82.5 a	90.0 a	100.0 a	98.8 a	100.0 a
	INDUCE	0.25 % v/v						
	UREA (46-0-0)[¶]	65 lb						
	UREA (46-0-0) (4 wk later)[¶]	65 lb						
10.	SL-160	1.0 oz wt.	8.8 abc	81.3 a	91.3 a	100.0 a	98.8 a	100.0 a
	INDUCE	0.25 % v/v						
	UREA (46-0-0)[¶]	65 lb						
	UREA (46-0-0) (4 wk later)[¶]	65 lb						
11.	MONUMENT	0.56 oz wt.	7.5 abcd	65.0 b	86.3 ab	100.0 a	98.0 a	100.0 a
	NIS	0.25% v/v						

[†] Means followed by same letter do not significantly differ (P=.05 Duncan's New MRT)
[‡] Ammonium sulfate applied in spray solution
[¶] Urea applied as a granular material

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Table 2. Annual bluegrass control following applications of flazasulfuron (SL-160) in 2009

	Treatment	Rate (per A)	Annual Bluegrass Control					
			7DAIT	14DAIT	21DAIT	28DAIT	35DAIT	43DAIT
			----------%----------					
1.	UNTREATED CHECK		0.0 e[†]	0.0 d	0.0 d	0.0 d	0.0 e	0.0 e
2.	SL-160	0.25 oz wt.	8.8 bcd	20.0 c	27.5 c	0.0 d	20.0 d	22.5 de
	INDUCE	0.25 % v/v						
3.	SL-160	0.25 oz wt.	7.5 bcd	30.0 b	27.5 c	0.0 d	40.0 bc	40.0 cd
	INDUCE	0.25 % v/v						
	AMMONIUM SULFATE[‡]	2lb						
4.	SL-160	0.50 oz wt.	7.5 bcd	27.5 bc	35.0 c	10.0 cd	35.0 c	40.0 cd
	INDUCE	0.25 % v/v						
5.	SL-160	0.50 oz wt.	6.3 cde	27.5 bc	30.0 c	0.0 d	50.0 bc	40.0 cd
	INDUCE	0.25 % v/v						
	AMMONIUM SULFATE[‡]	2lb						
6.	SL-160	1.0 oz wt.	6.3 cde	27.5 bc	37.5 c	25.0 c	47.5 bc	75.0 ab
	INDUCE	0.25 % v/v						
7.	SL-160	1.0 oz wt.	5.0 de	27.5 bc	40.0 c	10.0 cd	55.0 b	60.0 bc
	INDUCE	0.25 % v/v						
	AMMONIUM SULFATE[‡]	2lb						
8.	SL-160	0.25 oz wt.	13.8 ab	78.8 a	91.3 a	60.0 b	100.0 a	98.5 a
	INDUCE	0.25 % v/v						
	UREA (46-0-0)[¶]	65 lb						
	UREA (46-0-0) (4 wk later)[¶]	65 lb						
9.	SL-160	0.50 oz wt.	17.5 a	76.3 a	91.3 a	86.3 a	100.0 a	98.8 a
	INDUCE	0.25 % v/v						
	UREA (46-0-0)[¶]	65 lb						
	UREA (46-0-0) (4 wk later)[¶]	65 lb						
10.	SL-160	1.0 oz wt.	12.5 abc	78.8 a	92.5 a	95.0 a	100.0 a	100.0 a
	INDUCE	0.25 % v/v						
	UREA (46-0-0)[¶]	65 lb						
	UREA (46-0-0) (4 wk later)[¶]	65 lb						
11.	MONUMENT	0.56 oz wt.	7.5 bcd	30.0 b	67.5 b	100.0 a	100.0 a	77.5 ab
	NIS	0.25% v/v						

[†] Means followed by same letter do not significantly differ (P=.05 Duncan's New MRT)
[‡] Ammonium sulfate applied in spray solution [¶] Urea applied as a granular material

Table 3. Bermudagrass quality ratings following applications of flazasulfuron (SL-160) in 2009.

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	Treatment	Rate (per A)	Bermudagrass Quality 14DAIT	21DAIT	28DAIT	35DAIT	43DAIT
			1 to 9[†]				
1.	UNTREATED CHECK		6.50 a[‡]	6.85 a	6.65 abc	6.85 a	6.80 b
2.	SL-160	0.25 oz wt.	6.48 ab	6.78 a	6.50 c	6.78 a	6.80 b
	INDUCE	0.25 % v/v					
3.	SL-160	0.25 oz wt.	6.45 ab	6.83 a	6.63 bc	6.78 a	6.78 b
	INDUCE	0.25 % v/v					
	AMMONIUM SULFATE[¶]	2lb					
4.	SL-160	0.50 oz wt.	6.48 ab	6.85 a	6.60 bc	6.80 a	6.80 b
	INDUCE	0.25 % v/v					
5.	SL-160	0.50 oz wt.	6.48 ab	6.80 a	6.60 bc	6.78 a	6.78 b
	INDUCE	0.25 % v/v					
	AMMONIUM SULFATE[¶]	2lb					
6.	SL-160	1.0 oz wt.	6.48 ab	6.78 a	6.60 bc	6.78 a	6.80 b
	INDUCE	0.25 % v/v					
7.	SL-160	1.0 oz wt.	6.48 ab	6.75 a	6.55 c	6.78 a	6.78 b
	INDUCE	0.25 % v/v					
	AMMONIUM SULFATE[¶]	2lb					
8.	SL-160	0.25 oz wt.	6.45 ab	6.80 a	6.73 ab	6.85 a	7.00 a
	INDUCE	0.25 % v/v					
	UREA (46-0-0)[#]	65 lb					
	UREA (46-0-0) (4 wk later)[#]	65 lb					
9.	SL-160	0.50 oz wt.	6.40 bc	6.70 a	6.80 a	6.80 a	7.00 a
	INDUCE	0.25 % v/v					
	UREA (46-0-0)[#]	65 lb					
	UREA (46-0-0) (4 wk later)[#]	65 lb					
10.	SL-160	1.0 oz wt.	6.35 c	6.73 a	6.80 a	6.78 a	7.00 a
	INDUCE	0.25 % v/v					
	UREA (46-0-0)#	65 lb					
	UREA (46-0-0) (4 wk later)[#]	65 lb					
11.	MONUMENT	0.56 oz wt.	6.45 ab	6.80 a	6.65 abc	6.83 a	6.78 b
	NIS	0.25% v/v					

[‡] Means followed by same letter do not significantly differ (P=.05 Duncan's New MRT) ; [¶]Ammonium sulfate applied in spray solution ; [#]Urea applied as a granular material ; [†] Rating Scale 1-9 where 1 = worst, 6 = acceptable, 9 = best

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