

Tolerance of Warm Season Turfgrasses to Fall and Dormant Applications of Roundup ProMax

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Introduction

This study was conducted on mature stands of 'Riveria' and 'Yukon' bermudagrass (*Cynodon dactylon*), 'Tifway' hybrid bermudagrass (*Cynodon dactylon* X *Cynodon transvaalensis*), and 'Compadre' zoysiagrass (*Zoysia japonica*) at the East Tennessee Research and Education Center (Knoxville, TN). The objective of the study was to evaluate the tolerance of these turfgrasses to fall and dormant applications of Roundup ProMax.

Methods and Materials

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

Treatments were arranged in a randomized complete block design with four replications on each turf type. Data collected on each turf type were analyzed using separate ANOVAs. Herbicide treatments were applied to all turf types on 15 October 2008, 17 November 2008, and 29 January 2009 to plots (5' x 5') using a CO₂ 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.

Turfgrass tolerance was rated visually utilizing a 0 (no turf injury) to 100 % (complete control of turf) scale at 7, 14, and 26 days after initial treatment (DAIT). Percent spring green-up data were also collected at 160, 167, 174, 181, 188, 195, 201, and 208 DAIT. Note that zoysiagrass green-up data was collected one week prior (153 DAIT) to bermudagrass green-up data in the spring of 2009.

Results and Discussion

October applications of Roundup ProMax at 0.375 lb a.e./A induced significant turfgrass injury. At 26 DAIT, 'Riveria' bermudagrass injury was greater than 30% for all October treatments (Table 1). A similar response was observed for the other turf types. While a direct statistical comparison was not made, injury to 'Compadre' zoysiagrass at 26 DAIT tended to be greater than that which was observed on both common and hybrid bermudagrass.

October applications also significantly delayed spring green-up for all turfgrasses tested. Spring green-up values for 'Riveria' bermudagrass plots treated with Roundup ProMax at 0.375 lb a.e./A in October measured 8.8, 5.9, and 6.3% at 174 DAIT. Values for 'Riveria' bermudagrass plots treated in November and January (i.e- fully dormant) at the same rate measured 58.8 and 56.3%, respectively, at 174 DAIT (Table 3). These values were not significantly different from the untreated check at 174 DAIT (Table 3). By 208 DAIT spring green-up values for all turfgrass tested measured 100%.

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Table 1. Bermudagrass injury following applications of Roundup ProMax in 2008 and 2009.

Treatment	Rate -per A-	Time -Month-	Turfgrass Injury								
			'Riveria' Bermudagrass			'Yukon' Bermudagrass			'Tifway' Hybrid Bermudagrass		
			7 DAIT	14 DAIT	26 DAIT	7 DAIT	14 DAIT	26 DAIT	7 DAIT	14 DAIT	26 DAIT
			-----%-----								
1. UNTREATEDCHECK			0.0 b [†]	0.0 c	0.0 b	0.0 a	0.0 b	0.0 b	0.0 a	0.0 b	0.0 b
2. MON 76207	0.375 lb a.e.	OCT	6.3 a	18.8 b	36.3 a	2.5 a	20.0 a	28.8 a	3.8 a	12.5 a	30.0 a
3. MON 76207	0.375 lb a.e.	NOV	---	---	---	---	---	---	---	---	---
4. MON 76207	0.375 lb a.e.	JAN	---	---	---	---	---	---	---	---	---
5. MON 76207	0.375 lb a.e.	OCT	3.8 ab	26.3 a	37.5 a	1.3 a	15.0 a	27.5 a	3.8 a	13.8 a	24.5 a
MON 76207	0.375 lb a.e.	JAN									
6. MON 76207	0.375 lb a.e.	OCT	3.8 ab	22.5 ab	37.5 a	3.8 a	17.5 a	28.8 a	3.8 a	13.8 a	32.5 a
MON 76207	0.375 lb a.e.	JAN									

[†]Means followed by the same letter do not significantly differ (P = 0.05; Duncan's new MRT)

Table 2. Zoysiagrass injury following applications of Roundup ProMax in 2008 and 2009.

Treatment	Rate -per A-	Time -Month-	Turfgrass Injury		
			'Compadre' Zoysiagrass		
			7 DAIT	14 DAIT	26 DAIT
			-----%-----		
1. UNTREATEDCHECK			0.0 b [†]	0.0 b	0.0 b
2. MON 76207	0.375 lb a.e.	OCT	2.5 a	25.0 a	40.0 a
3. MON 76207	0.375 lb a.e.	NOV	---	---	---
4. MON 76207	0.375 lb a.e.	JAN	---	---	---
5. MON 76207	0.375 lb a.e.	OCT	2.5 a	22.5 a	40.0 a
MON 76207	0.375 lb a.e.	JAN			
6. MON 76207	0.375 lb a.e.	OCT	2.5 a	26.3 a	42.5 a
MON 76207	0.375 lb a.e.	JAN			

[†]Means followed by the same letter do not significantly differ (P = 0.05; Duncan's new MRT)

Table 3. Spring green-up of 'Riveria' bermudagrass following applications of Roundup ProMax in 2008 and 2009.

Treatment	Rate -per A-	Time -Month-	'Riveria' Spring Green-up							
			160 DAIT	167 DAIT	174 DAIT	181 DAIT	188 DAIT	195 DAIT	201 DAIT	208 DAIT
			-----%-----							
1. UNTREATEDCHECK			12.5 a [†]	25.0 a	56.3 a	66.3 a	90.0 a	92.5 a	96.3 ab	100.0 a
2. MON 76207	0.375 lb a.e.	OCT	3.8 a	1.3 b	8.8 b	15.0 b	60.0 b	85.0 b	91.3 c	100.0 a
3. MON 76207	0.375 lb a.e.	NOV	11.3 a	25.0 a	58.8 a	67.5 a	88.8 a	92.5 a	97.5 a	100.0 a
4. MON 76207	0.375 lb a.e.	JAN	12.5 a	28.8 a	56.3 a	67.5 a	87.5 a	92.5 a	96.3 ab	100.0 a
5. MON 76207	0.375 lb a.e.	OCT	0.0 b	1.3 b	5.0 b	15.0 b	47.5 b	83.8 b	93.8 bc	100.0 a
MON 76207	0.375 lb a.e.	JAN								
6. MON 76207	0.375 lb a.e.	OCT	3.8 b	3.8 b	6.3 b	11.3 b	57.5 b	87.5 ab	92.5 c	100.0 a
MON 76207	0.375 lb a.e.	JAN								

[†]Means followed by the same letter do not significantly differ (P = 0.05; Duncan's new MRT)

Table 4. Spring green-up of 'Yukon' bermudagrass following applications of Roundup ProMax in 2008 and 2009.

Treatment	Rate -per A-	Time -Month-	'Yukon' Spring Green-up							
			160 DAIT	167 DAIT	174 DAIT	181 DAIT	188 DAIT	195 DAIT	201 DAIT	208 DAIT
			-----%-----							
1. UNTREATEDCHECK			10.0 b [†]	32.5 b	58.8 a	67.5 a	91.3 a	93.8 a	98.5 a	100.0 a
2. MON 76207	0.375 lb a.e.	OCT	3.8 c	5.0 c	21.3 b	43.8 b	83.8 a	91.3 a	99.3 a	100.0 a
3. MON 76207	0.375 lb a.e.	NOV	13.8 a	38.8 a	60.0 a	70.0 a	91.3 a	93.8 a	99.3 a	100.0 a
4. MON 76207	0.375 lb a.e.	JAN	13.8 a	38.8 a	62.5 a	70.0 a	92.5 a	95.0 a	100.0 a	100.0 a
5. MON 76207	0.375 lb a.e.	OCT	0.0 d	1.3 c	10.0 c	27.5 c	80.0 a	93.8 a	100.0 a	100.0 a
MON 76207	0.375 lb a.e.	JAN								
6. MON 76207	0.375 lb a.e.	OCT	3.8 c	3.8 c	11.3 bc	32.5 bc	82.5 a	90.0 a	98.0 a	100.0 a
MON 76207	0.375 lb a.e.	JAN								

[†]Means followed by the same letter do not significantly differ (P = 0.05; Duncan's new MRT)

Table 5. Spring green-up of ‘Tifway’ bermudagrass following applications of Roundup ProMax in 2008 and 2009.

Treatment	Rate -per A-	Time -Month-	‘Tifway’ Spring Green-up							
			160 DAIT	167 DAIT	174 DAIT	181 DAIT	188 DAIT	195 DAIT	201 DAIT	208 DAIT
1. UNTREATEDCHECK			10.0 a [†]	13.8 a	37.5 a	56.3 ab	78.8 a	93.8 a	100.0 a	100.0 a
2. MON 76207	0.375 lb a.e.	OCT	2.5 a	3.8 bc	15.0 ab	35.0 bc	57.5 a	87.5 cd	100.0 a	100.0 a
3. MON 76207	0.375 lb a.e.	NOV	8.8 a	10.0 ab	28.8 ab	53.8 ab	81.3 a	92.5 ab	100.0 a	100.0 a
4. MON 76207	0.375 lb a.e.	JAN	8.8 a	12.5 a	37.5 a	63.8 a	87.5 a	93.8 a	100.0 a	100.0 a
5. MON 76207	0.375 lb a.e.	OCT	5.0 a	2.5 c	10.0 b	26.3 c	61.3 a	83.8 d	100.0 a	100.0 a
MON 76207	0.375 lb a.e.	JAN								
6. MON 76207	0.375 lb a.e.	OCT	6.3 a	3.8 bc	11.3 b	41.3 abc	75.0 a	88.8 bc	100.0 a	100.0 a
MON 76207	0.375 lb a.e.	JAN								

[†]Means followed by the same letter do not significantly differ (P = 0.05; Duncan’s new MRT)

Table 6. Spring green-up of ‘Compadre’ zoysiagrass following applications of Roundup ProMax in 2008 and 2009.

Treatment	Rate -per A-	Time -Month-	‘Compadre’ Spring Green-up								
			153 DAIT	160 DAIT	167 DAIT	174 DAIT	181 DAIT	188 DAIT	195 DAIT	201 DAIT	208 DAIT
1. UNTREATEDCHECK			28.8 a [†]	53.8 a	95.0 a	97.3 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
2. MON 76207	0.375 lb a.e.	OCT	5.0 c	10.0 b	26.3 b	46.3 b	73.8 b	85.0 b	96.3 bc	100.0 a	100.0 a
3. MON 76207	0.375 lb a.e.	NOV	21.3 b	52.5 a	95.0 a	97.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
4. MON 76207	0.375 lb a.e.	JAN	25.0 ab	52.5 a	95.0 a	98.8 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
5. MON 76207	0.375 lb a.e.	OCT	5.0 c	12.5 b	28.8 b	45.0 b	75.0 b	83.8 b	94.8 c	100.0 a	100.0 a
MON 76207	0.375 lb a.e.	JAN									
6. MON 76207	0.375 lb a.e.	OCT	5.0 c	12.5 b	27.5 b	43.8 b	75.0 b	83.8 b	98.0 ab	100.0 a	100.0 a
MON 76207	0.375 lb a.e.	JAN									

[†]Means followed by the same letter do not significantly differ (P = 0.05; Duncan’s new MRT)

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