Comparison of Rates and Timing of Applications of Transition-aide Herbicides

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Abstract

Application of Certainty, Manor*, Monument*, Revolver*, TranXit, Kerb*, and flazasulfuron in early June eliminated most ryegrass in one month with the onset of high summer temperatures. Certainty at 0.06 lb a.i./A, Manor at 0.012 lb a.i./A, Monument at 0.0047 lb a.i./A, Revolver at 0.008 lb a.i./A, TranXit at 0.0078 lb a.i./A, and flazasulfuron at 0.0039 lb a.i./A performed equivalent to higher rates to effectively remove ryegrass when applied in June. The herbicides at the lower rate range were not as effective in early May when ryegrass tended to regrow in cooler temperatures. Spring transition was achieved by applying higher rates of TranXit* at 0.031 lb a.i./A and flazasulfuron at 0.0156 lb a.i./A in early May to completely remove perennial ryegrass. Kerb at 1.0 lb a.i./A was effective in removing 80% of the ryegrass with a May application and 90% in June.*

Introduction

Spring transition is the changeover from winter overseeded perennial ryegrass to bermudagrass turf during the period of May to July. In recent years, herbicides have been utilized as transition-aides to accelerate the removal of the ryegrass to encourage the bermudagrass to grow into the summer. The acetolactate synthase (ALS) inhibiting herbicides have become the products of choice due to their rapid, selective, and efficient performance for eliminating ryegrass from bermudagrass. The ALS-inhibiting herbicides that are labeled for the specialty use include Certainty* (sulfosulfuron), Manor* (metsulfuron), Monument* (trifloxysulfuron), Revolver* (foramsulfuron), and TranXit* (rimsulfuron). Flazasulfuron (ISK Biosciences) is not yet labeled for use in turf. Kerb* (pronamide) is in a different class of herbicides that affects cell division. April and May are typically the onset of warmer temperatures in the desert when bermudagrass begins to grow out of winter dormancy. June is the start of summer when daytime temperatures regularly exceed 100°F and favorable for bermudagrass growth. This field experiment was conducted to compare labeled rates and proposed label rates for each herbicide and to apply them at two different times to achieve effective transition.

Materials and Methods

A small plot experiment was conducted on a fairway on the Renegade Golf Course at Desert Mountain Golf Club in Carefree, AZ. The turfgrass was a hybrid bermudagrass cv. Tifway 419 that was winter overseeded with perennial ryegrass in the fall of 2007. Treatment plots measured 5 ft by 8 ft and were replicated three times in a randomized complete block design. Treatments were applied using a backpack CO_2 sprayer equipped with a hand-held boom with three 8003LP flat-fan nozzles spaced 20 in apart. Sprays were applied in 48 gpa water pressurized to 30 psi and included a non-ionic surfactant Latron CS-7 at 0.25% v/v. The first timing of application was on 07 May 2008 when it appeared that bermudagrass achieved 50% greenup and the second application timing was 02 June at approximately 4 weeks later. On 07 May, the air temperature was approximately 70°F, clear sky, with a very slight

breeze, and turfgrass was dry. On 02 June, the air temperature was 88°F, clear, no wind, and turf was dry. At various intervals following each application, percent ryegrass removal was rated and overall turfgrass quality was evaluated on a 1-9 scale, 1 is worst and 9 is best.

Results and Discussion

At 14 days after treatment of the first timing of application (DAT-1), the higher rate of all of the herbicides were observed to be affecting and removing the ryegrass more than the lower rate (Table). TranXit at 0.031 lb a.i./A was most active by removing 47% of the ryegrass. Manor, Monument, and flazasulfuron at the high rates removed 33 to 37% of the ryegrass. The untreated check showed a reduction of 10% of the ryegrass and most of the remaining treatments exhibited only slightly better ryegrass removal ranging from 10 to 27%. At 26 DAT-1, TranXit and flazasulfuron at the high rates eliminated most of the ryegrass at 93 and 96%, respectively. Ryegrass treated by both herbicides did not recover and regrow. Transition by bermudagrass was slow and quality improved to an acceptable level at 35 DAT-1. Between 26 and 35 DAT-1, ryegrass recovered from the early timing applications except for the high rates of TranXit, flazasulfuron, and Kerb treatments. At 41 DAT-1, ryegrass recovery continued with only 27% or less observed to be removed by most treatments. Monument at 0.016 lb a.i./A removed nearly 50% and Kerb at 1.0 lb a.i./A continued to show 72% of ryegrass removed. At 2 months after the early timing applications, only TranXit and flazasulfuron at the high rates provided complete ryegrass removal for transition. Monument and Manor at high rates removed 85% of the ryegrass. Certainty and Revolver removed 75 to 80% of the ryegrass. Kerb at 1.0 lb a.i./A removed 80% of the ryegrass while the low rate at 0.5 lb a.i./A was not effective while removing only 30% of the ryegrass.

Initial observations at 9 DAT-2 (second timing of application) showed that most of the herbicides injured the ryegrass and 18 to 35% removal occurred. At 15 DAT-2, 80% or more of the ryegrass was removed by flazasulfuron, TranXit, Revolver, and Monument. Monument and Manor at lower rates showed more ryegrass removal than higher rates. Flazasulfuron, TranXit, Revolver, Certainty, and Kerb showed more efficacy in removing ryegrass at the higher rate compared to the lower rate. At 31 DAT-2, all treatments effectively removed ryegrass except the Kerb at 0.5 lb a.i./A.

The comparison of early versus late timing of application showed that most transition-aide herbicides at either low or high rates were more effective when applied in June instead of early May. Ryegrass was removed 90% or more for all treatments except for Kerb at the low rate at 0.5 lb a.i./A. All of the ALS-inhibiting herbicides removed 57% or more of the ryegrass in 2 weeks. In addition, Monument, Revolver, TranXit, and flazasulfuron eliminated 80% or more of the ryegrass within 2 weeks of being treated.

The rising temperatures were conducive for more activity exhibited by the ALS-inhibiting herbicides following the second timing of application. The average air temperatures during the week of 01 June rose to 80°F with highs above 90°F and nightly lows climbed above the 50's. Soil temperature at the 4 in depth slowly rose during May in the low 70's and then reached 80°F in mid-June.

Following the early timing application, during May with low temperatures in the 50's, all of the treatments at the low rate showed less than 25% ryegrass removal at 14 DAT-1. At the higher rate, most treatments removed less than 37% and only TranXit approached reducing 50% of the ryegrass. Due to the cooler temperatures in May, conditions were favorable for the ryegrass to persist and to regrow after being treated by most herbicides at low or high rates. The high rate of TranXit and flazasulfuron were sufficient to eliminate ryegrass within 26 DAT-1 and regrowth did not occur. At 41 DAT-1, ryegrass recovered by showing only 10% ryegrass removal for all treatments at the low rate The weekly average high temperatures exceeded 100°F in mid-June and high heat pressure caused gradual ryegrass population reduction by early July though not complete removal.

TranXit and flazasulfuron at the high rates were effective in removing ryegrass at both the early and late timing of application. The low rates were very effective and gave complete ryegrass removal at the later timing and at the early timing gave 80% reduction. Certainty applied later at both low and high rates were equally effective in removing 95% of the ryegrass while the early timing application approached only 80% ryegrass removal. Manor and Monument at the early timing of application showed a rate response with the higher rate consistently more

effective in removing ryegrass compared to the lower rate. At the later timing of application, both low and high rate of Manor and Monument were similarly effective in nearly completely removing ryegrass. Revolver applied early or later was comparable for the high rate removing more ryegrass than the low rate. At the early timing, Revolver at both rates approached 80% ryegrass reduction. Kerb at 0.5 lb a.i./A was less effective in removing ryegrass compared to the 1.0 lb a.i./A rate. At the early timing, Kerb steadily reduced more ryegrass from May to June and attained 80% reduction at 57 DAT. The later timing of Kerb application resulted in 90% ryegrass removal.

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Table. Spring transition ryegrass removal and overall turfgrass quality, Desert Mountain Golf Club, 2008

Treatment	Rate	Timing of	Ryegrass removal (%)					Overall turf quality		
	(lb a.i./A)	application	21-May	2-Jun	11-Jun	17-Jun	3-Jul	2-Jun	11-Jun	3-Jul
Untreated check			10	20	8	0	15	8.3	8	9
Certainty	0.06	early	20	37	22	10	80	6.3	6.7	8
Certainty	0.06	late			23	57	95		6	8
Certainty	0.094	early	27	47	37	12	75	6	6.7	8
Certainty	0.094	late			25	67	95		6	8
Manor	0.012	early	18	60	47	17	75	6	5.7	8
Manor	0.012	late			27	68	99		5.7	7
Manor	0.0188	early	37	68	53	25	85	5.7	5.7	8
Manor	0.0188	late			27	62	99		6	8
Monument	0.0047	early	20	37	23	10	75	6.7	7.3	8
Monument	0.0047	late			23	82	99		6	8
Monument	0.016	early	33	77	47	45	85	5.3	5	8
Monument	0.016	late			25	68	99		6	6
Revolver	0.008	early	20	33	13	10	80	6.7	8	8
Revolver	0.008	late			18	65	99		6	8
Revolver	0.025	early	25	82	33	23	75	5.7	6	8
Revolver	0.025	late			25	80	99		6	6
TranXit	0.0078	early	25	43	30	17	80	6	6.3	8
TranXit	0.0078	late			27	80	99		6	7
TranXit	0.031	early	47	93	97	95	99	5	4.7	8
TranXit	0.031	late			30	87	99		6	6
flazasulfuron	0.0039	early	23	60	27	25	80	6	6.7	8
flazasulfuron	0.0039	late			23	82	99		6	6
flazasulfuron	0.0156	early	33	96	96	95	99	4.3	4.3	6
flazasulfuron	0.0156	late			35	92	99		5.5	5
Kerb	0.5	early	10	30	23	7	30	7.3	7	8
Kerb	0.5	late			10	10	65		8	8
Kerb	1.0	early	17	60	72	72	80	6.3	5.3	8
Kerb	1.0	late			20	35	90		7.5	7
LSD (p=0.05)			9	11	14.6	17.6	-	0.92	0.73	-

Early application on 07 May 2008, late application on 02 June.
Turfgrass quality rating 1-9 scale, 1 = worst, 9 = best