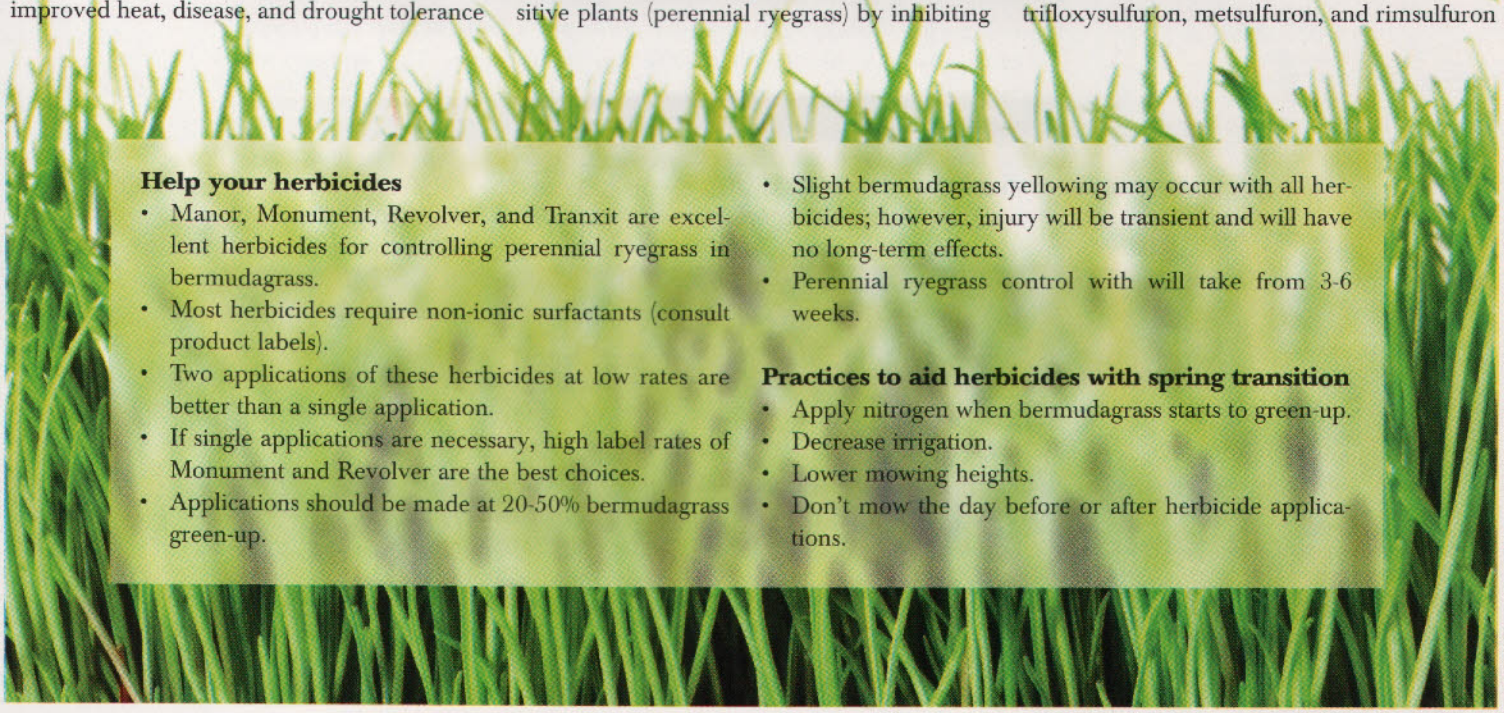
Removing overseeded rye from bermuda with chemicals

By Travis C. Teuton, Christopher L. Main, John C. Sorochan, and Thomas C. Mueller

Perennial ryegrass is commonly used in the transition zone of the United States for overseeding both common bermudagrass and hybrid bermudagrass sports fields. Benefits of overseeding a dormant warm-season sports field turf include reduced winter weed invasion, increased turf uniformity, better wear tolerance, and increased aesthetics quality of the field. Traditionally, sports field managers have relied on warmer weather, cultivation, fertilization, and bermudagrass competition to transition back to the bermudagrass base. However, perennial ryegrass varieties with improved heat, disease, and drought tolerance can persist longer into spring and cause delayed bermudagrass green-up.

Warm-season grasses in dormancy use stored carbohydrates to return to active growth when weather conditions warm during spring. Persistent perennial ryegrass competes with bermudagrass much like a weed. Perennial ryegrass shades the bermudagrass canopy and competes with bermudagrass roots for water and nutrients.

Foramsulfuron (Revolver), rimsulfuron (Tranxit), trifloxysulfuron (Monument), and metsulfuron (Manor) are ALS-inhibiting herbicides effective for the removal of perennial ryegrass. Sulfonylurea herbicides control sensitive plants (perennial ryegrass) by inhibiting the acetolactate synthase (ALS) enzyme, a key enzyme in the production of the branch chain amino acids. Foramsulfuron, metsulfuron, rimsulfuron, and trifloxysulfuron are effective in the removal of perennial ryegrass and several other weeds, which promotes healthier more uniform bermudagrass turf during summer. There is a wealth of information about each of these products on individual performance on perennial ryegrass. However, there is little research that includes direct comparisons of the products mentioned above. To this end, the objectives of our research were to evaluate the selective control of overseeded perennial ryegrass in bermudagrass with foramsulfuron, trifloxysulfuron, metsulfuron, and rimsulfuron



Help your herbicides

- Manor, Monument, Revolver, and Tranxit are excellent herbicides for controlling perennial ryegrass in bermudagrass.
- Most herbicides require non-ionic surfactants (consult product labels).
- Two applications of these herbicides at low rates are better than a single application.
- If single applications are necessary, high label rates of Monument and Revolver are the best choices.
- Applications should be made at 20-50% bermudagrass green-up.
- Slight bermudagrass yellowing may occur with all herbicides; however, injury will be transient and will have no long-term effects.
- Perennial ryegrass control with will take from 3-6 weeks.

Practices to aid herbicides with spring transition

- Apply nitrogen when bermudagrass starts to green-up.
- Decrease irrigation.
- Lower mowing heights.
- Don't mow the day before or after herbicide applications.

Table 1. **Perennial ryegrass control in overseeded bermudagrass, Knoxville, TN (2003 and 2005).**

Treatment	product/A	3 WAIT [a]	5 WAIT	8 WAIT
			% Control	
Untreated	-	0e	0g	0d
diclofop-methyl	44 fl. oz.	44 d	45 f	29 c
diclofop-methyl fb diclofop-methyl	44 fl. oz. fb 44 fl.oz.	60 c	72 cde	69b
foramsulfuron	10 fl. oz.	82 b	66 e	35 c
foramsulfuron	25 fl. oz.	91 ab	94 ab	84 ab
foramsulfuron fb foramsulfuron	10 fl. oz. fb 10 fl.oz.	90 ab	81 bcd	99 a
metsulfuron	0.5 oz.	90 ab	81 bcd	86 ab
metsulfuron	1 oz.	96 a	90 ab	93 a
metsulfuron fb metsulfuron	0.5 oz. fb 0.5 oz.	94 a	86 abc	99 a
rimsulfuron	1 oz.	93 a	90 ab	72 b
rimsulfuron	2 oz.	90 ab	91 ab	93 a
rimsulfuron fb rimsulfuron	0.5 oz. fb 0.5 oz.	90 ab	67 de	99 a
trifloxysulfuron	0.5 oz.	93 a	96 a	94 a
trifloxysulfuron	1 oz.	97 a	98 a	97 a
trifloxysulfuron fb trifloxysulfuron	0.5 oz. fb 0.5 oz.	94 a	96 a	99 a
LSD (0.05)		**10**	**15**	**19**

[a]Abbreviations: WAIT, weeks after initial treatment; fb, followed by.

compared to diclofop-methyl and natural (non-chemical) transition.

Testing herbicides

Treatments were applied at the University of Tennessee football practice field on April 14, 2003 and April 12, 2004 with sequential treatments applied on May 19, 2003 and May 10, 2004. The study was also conducted at the University of Tennessee golf practice facility on March 24, 2005 with sequential treatments applied on April 21, 2005. Tifway bermudagrass was seeded the previous September with a blend of 30% SR4200, 30% SR4220, and 40% Hawkeye perennial ryegrasses at 15 lb/1000 sq. ft., fertilized with 44 lb N/1000 sq. ft. in September and April, and 22 lb N/1000 sq. ft. in October and November, at all locations. Plots were mowed weekly at 0.5 in at all locations for the duration of the study.

Treatments included foramsulfuron at 10, 25, and 10 followed by (fb) 10 fl oz/A, trifloxysulfuron at 0.5, 1, and 0.5 fb 0.5 oz/A, metsulfuron 0.5, 1, and 0.5 fb 0.5 oz/A, rimsulfuron at 1, 2, and 1 fb 1 oz/A, and diclofop-methyl at 43.5 and 43.5 fb 43.5 fl oz/A. All treatments were tank-mixed with a 90:10 nonionic surfactant at 0.25% v/v. All herbicide treatments were applied with a CO_2 pressurized backpack sprayer calibrated to deliver 23 gal/A at 30 psi. Treatments were applied to 5 x 10-foot plots arranged in a randomized complete block design with four replications. Perennial ryegrass control and bermudagrass injury were visually evaluated 3, 5, and 8 weeks after the initial treatment (WAIT) using a scale of 0-100%, 0 indicating no control or injury and 100 equal to complete control or perennial ryegrass death. Turfgrass quality was based on color, density, texture, and uniformity of both bermudagrass and perennial ryegrass. Turfgrass quality was visually assessed 3, 5, and 8 WAIT using a scale of 0-9, 0 indicated turfgrass death and 9 equaling ideal turf.

Ryegrass response

In the spring of 2004, the average daily temperature (maximum plus minimum temperature divided by two) for May 20 to 25 was 89 F, which was 14 F above the averages for 2003 and 2005. The experiment was also placed on an experiment 3% southwestern slope and it received no irrigation or precipitation from May 14 to May 26, 2004. These factors contributed to a smooth natural transition and ryegrass death resulted regardless of herbicide treatment 5 WAIT. Therefore, the experiment in 2004 was terminated after 5 WAIT and all conclusions for ryegrass removal with herbicides were based on 2003 and 2005 data. This also indicates that ideal weather conditions may decrease the need for chemical transitions.

All herbicides provided > 90% ryegrass control except diclofop-methyl and foramsulfuron at 10 fl oz/A by three weeks after initial application (WAIT) (Table 1). By 5 WAIT >90% perennial ryegrass control was observed with foramsulfuron at 10 fl oz, metsulfuron at 1 oz, rimsulfuron at 1 and 2 oz, and all trifloxysulfuron treatments. However, by 8 WAIT excellent control (99%) was achieved for all treatments with a sequential application except diclofop-methyl. Also, metsulfuron at 1 oz, rimsulfuron at 2 oz, and trifloxysulfuron at 0.5 and 1 oz provided provide >93% 8 WAIT with a single application. These results are similar to others that demonstrated that foramsulfuron, metsulfuron, rimsulfuron, and trifloxysulfuron exhibited excellent control of perennial ryegrass, including Askew and Beam 2003, Askew et al. 2003, Walker et al. 1999, and Yelverton 2000.

Bermudagrass injury

There was no bermudagrass injury observed except for sequential applications of rimsulfuron at 0.5 oz fb 0.5 oz 3 WAIT in 2003.

Table 2. **Overall turfgrass quality following herbicide applications to remove overseeded perennial ryegrass from bermudagrass, Knoxville, TN (2003 and 2005).**

Treatment	product/A	3 WAIT [a]	5 WAIT	8 WAIT
		% Control		
Untreated	-	8.6 a	8 a	8 a
diclofop-methyl	44 fl. oz.	6.8 b	7.1 ab	6.9 c
diclofop-methy fb diclofop-methyl	44 fl. oz. fb 44 fl. oz.	6 bc	5.3 d	7.1 bc
foramsulfuron	10 fl. oz.	6 bc	6.3 bc	7 bc
foramsulfuron	25 fl. oz.	5.5 cde	5.8 cd	7.4 abc
foramsulfuron fb foramsulfuron	10 fb 10 fl. oz.	5.5 cde	5.8 cd	7.9 a
metsulfuron	0.5 oz.	6 bc	6.5 bc	7.2 b
metsulfuron	1 oz.	6 bc	6.5 bc	7.9 a
metsulfuron fb metsulfuron	0.5 fb 0.5 oz.	5.8 cd	6.5 bc	7.9 a
rimsulfuron	1 oz.	5.5 cde	6.3 bc	7.6 ab
rimsulfuron	2 oz.	6 bc	6.5 bc	7.6 ab
rimsulfuron fb rimsulfuron	0.5 fb 0.5 oz.	5 de	6.3 bc	7.5 abc
trifloxysulfuron	0.5 oz.	5.8 cd	5.9 cd	7.5 abc
trifloxysulfuron	1 oz.	5.5 cde	6.5 bc	7.4 abc
trifloxysulfuron fb trifloxysulfuron	0.5 fb 0.5 oz.	5.8 cd	5.8 cd	8.0 a
LSD (0.05)		**0.8**	**1.0**	**0.6**

[a]Abbreviations: WAIT, weeks after initial treatment; fb, followed by. Turfgrass quality (color, density, and playability) was evaluated on a scale of 1-9, 1 indicating turfgrass death and 9 indicating the highest quality turfgrass.

However, there was no injury in 2005 for any treatment on any observation date. The injury observed in 2003 (8%) was minimal and was mostly bermudagrass growth reduction (stunting), however bermudagrass injury was not evident by 5 WAIT.

The untreated control had the highest overall turfgrass quality observations for all observations and ranged from 8.6 to 8.0 (Table 2). This was due to the thick, dark green ryegrass cover that resulted in high quality ratings.

The lowest overall turfgrass quality observation (5.0) was from applications of rimsulfuron at 0.5 fb 0.5 fl oz at 3 WAIT. Quality for the other herbicide treatments 3 WAIT ranged from 5.5 to 6 due to the discoloration of the treated ryegrass. By 5 WAIT, the lowest overall quality observation resulted from applications of diclofop-methyl at 43.5 fb 43.5 fl oz. All other herbicides ranged from 5.8 to 7.1 at 5 WAIT. By 8WAIT, the highest quality observation (8.0) was trifloxysulfuron at 0.5 fb 0.5 oz and was similar to the untreated control. All other herbicide quality observations ranged from 6.9 to 7.9 with no statistical differences between many of the herbicides and the untreated check. Quality evaluations indicated that bermudagrass had completely grown in these plots and was again a premium turfgrass surface.

Overall, all of the ALS-inhibiting herbicides worked well for perennial ryegrass control in overseeded bermudagrass. In warmer, dryer years natural transition may aid herbicides or herbicides may not even be necessary depending on the individual situation. However, this work indicates that the best treatments for ryegrass removal were sequential applications of the ALS-inhibiting herbicides applied 4 weeks apart. If a single application is required for perennial ryegrass control, metsulfuron or trifloxysulfuron should be utilized for maximum efficacy. These herbicides are extremely safe on warm season turfgrasses and turfgrass managers should not worry about delayed

bermudagrass green-up or bermudagrass injury when using these products. Diclofop is only labeled for use on golf courses and should not be used in sports fields. Most of the ALS-inhibiting products control some broadleaf weeds, so consult individual product labels for weed spectrums. Also, ALS-inhibiting herbicides will take from 1 to 4 weeks to control perennial ryegrass; be patient.

Using herbicides to aid spring transition is valuable tool for sports field managers. However, there will be a short period of time when the perennial ryegrass is dying and the bermudagrass is filling in, that overall turfgrass quality may be decreases to unacceptable level. With that said, a fertilizer application will decrease the time that it takes for the bermudagrass to fill in (assuming there is no winterkill). The use of chemical transition aids can increase the overall bermudagrass quality during the summer, which equals a better playing surface for the following fall when it is time to overseed with perennial ryegrass again. ■

Literature Cited

Askew, S. and J. Beam. 2003. Spring transition aides: New products, new possibilities, and old concerns. North Carolina Turfgrass. 21(4):16-17.

Askew, S.D., J.B. Beam, and W.L. Barker. 2003. Control of overseeded ryegrass on bermudagrass fairways with trifloxysulfuron sodium. Northeastern Weed Sci Soc. Proc. 57: 110.

Devine, M., S.O. Duke, and C. Fedtke. 1993. Physiology of Herbicide Action. Prentice-Hall Inc. pp. 263-273. Horgan, B. P. and F.H. Yelverton. 2001. Removal of perennial ryegrass overseeded bermudagrass using cultural methods. Crop Sci. 41:118-126.

Mazur, A.R. and D.F. Wagner. 1987. Influence of aeration, topdressing, and vertical mowing on overseeded bermudagrass putting green turf. HortScience 22:1276-1278.

Walker, R.H., J.L. Belcher, and J.M. Higgins. 1999. Rimsulfuron: potential for use in sports turf. Southern Weed Sci. Proc. 52:251.

Yelverton, F. 2000. Manor 60 DF (metsulfuron) is an option for removal of perennial ryegrass overseeded into bermudagrass. TURFAX. 8(3):2

Travis C. Teuton is assistant professor, Division of Plant Sciences, University of Missouri; Christopher L. Main, John C. Sorochan, and Thomas C. Mueller are, respectively, assistant professor, associate professor, and professor, Plant Sciences Department, University of Tennessee, Knoxville. Email contact: TeutonT@missouri.edu.

John Mascaro's Photo Quiz

Can you identify this sports turf problem?

Problem: White objects on turf

Turfgrass Area: Soccer field

Location: Nashua, NH

Grass Variety: Kentucky Bluegrass/ Ryegrass Blend

Answer to John Mascaro's Photo Quiz on Page 51

John Mascaro is President of Turf-Tec International