

Effects of foot traffic on the off-site movement of flazasulfuron

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Introduction

This study was conducted on a mature stand of 'Tifway' bermudagrass (*C. dactylon* x *C. transvaalensis*) at the University of Tennessee Golf Practice Facility (Knoxville, TN) bordering a 'Penncross' creeping bentgrass (*Agrostis stolonifera* L.) putting green. The objective of the study was to evaluate the effects of foot traffic on the tracking of flazasulfuron from the bermudagrass green surrounds onto a creeping bentgrass putting green.

Methods and Materials

Plot area

The creeping bentgrass putting green used in this study had been mowed regularly with a reel mower set to a height of 0.12" (3.0 mm) prior to initiating this experiment. Mowing was withheld for three days after treatment (DAT) to allow for walking maneuvers to be performed. The putting green had also been core aerified with 0.5" (12.7 mm) hollow-tines on 2" (51 mm) centers, topdressed with silica sand and broomed prior to initiating the study. Bermudagrass areas surrounding the green were maintained at a 0.5" (12.7 mm) height of cut with a reel mower. Mowing was withheld on these areas for 3 DAT to allow for walking maneuvers to be performed.

Experimental design

The experiment was arranged in a split-split-split-plot design; irrigation level (no irrigation or applying 0.1" (2.5 mm) of irrigation 1, 2, and 3 DAT with a syringing hose) served as the whole plot treatment and each herbicide-buffer zone combination served as the sub-plot treatment. Walking maneuver served as the sub-subplot treatment, and day of walking served as the sub-sub-subplot treatment.

Herbicide-buffer zone combinations included flazasulfuron at 3, 1.5, and 1.0 oz/A, trifloxysulfuron-sodium at 0.56 and 0.35 oz/A, and an untreated check; each herbicide was applied with buffer zones of 5, 15, and 25 feet (1.5, 4.5, and 7.6 m). Sub-plots measured 85-105 ft (26 – 32 m) in length (depending on buffer zone) and 40" (1 m) wide. All herbicides were applied on 26 May 2009, at 4pm, using a CO₂ powered boom sprayer calibrated to deliver 30 gpa using four, flat-fan, 8002 nozzles at 18 psi, configured to provide a spray swath measuring 80' x 40" (24.3 x 1 m).

Two walking maneuvers were performed in this study using a pair of men's, U.S. size 12, Nike Air Max Rejuvenate golf shoes. The first maneuver, termed "in place walking," involved making 80 footfalls through treated turf onto a buffer zone and then onto the creeping bentgrass putting green. Immediately after entering the putting green each foot contacted the surface 5 times in the same location. The second maneuver, termed "straight line walking," involved making 80 footfalls through treated turf onto a buffer zone and then taking 10 steps forward on the putting green. For each maneuver, golf tees were inserted into the turf at the heel of every footfall on the putting green. Tees were colored and marked with numbers to identify the herbicide-buffer zone combination and walking day to which they corresponded. Each walking maneuver was performed at 1, 2, and 3 DAT at 8am. Each maneuver was also performed on all non-irrigated sub-plots treated with flazasulfuron at 3 oz/A and trifloxysulfuron-sodium at 0.56 oz/A immediately following treatment on 26 May 2009.

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Data collected

Creeping bentgrass injury was rated visually on a 0 (severe injury/ brown turf) - 9 (no injury/dense, vigorous green turf) scale, with a score greater than or equal to 6 considered acceptable. Ratings were made at 7, 14, 21, 28 DAT for each footfall. Quantitative assessments of creeping bentgrass injury were made by assessing NDVI with a TCM-500 turf color meter (Spectrum Technologies, E. Plainfield IL). For the in-place walking maneuver, means were calculated using three sub-samples per footfall location. Single measurements were made for each footfall in the straight line walking maneuver.

Results and Discussion

When performed immediately after spraying, both walking maneuvers induced significant (visual score < 6) creeping bentgrass injury when executed on non-irrigated sub-plots treated with either flazasulfuron at 3 oz/A or trifloxysulfuron-sodium at 0.56 oz/A. This response was observed for both the 5 and 15 ft (1.5 and 4.5 m) buffer zones at 7 DAT and for all buffer zones by 14 DAT. All creeping bentgrass injury had recovered by 21 DAT.

No other treatment resulted in significant creeping bentgrass injury in this study.

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