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Removal of Creeping Bentgrass from Kentucky Bluegrass with Mesotrione

Marcus Jones
Iowa State University

Nick E. Christians
Iowa State University, nchris@iastate.edu

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Abstract
Creeping bentgrass (*Agrostis stolonifera* L.) creates a dense, high-quality playing surface on golf courses, but often encroaches adjacent areas of Kentucky bluegrass (*Poa pratensis* L.). Callisto, a herbicide produced and marketed by Syngenta containing the active ingredient mesotrione, provides preemergence and postemergence control of broadleaf and annual grassy weeds. Preliminary field trials show that mesotrione kills creeping bentgrass, but more information is needed regarding the application protocol. Research was conducted to determine: 1) what rates of mesotrione are best for removing creeping bentgrass from Kentucky bluegrass, and 2) what mesotrione rates are safe for Kentucky bluegrass.

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Marcus A. Jones, graduate research assistant
Nick E. Christians, professor
Department of Horticulture

Introduction

Creeping bentgrass (*Agrostis stolonifera* L.) creates a dense, high-quality playing surface on golf courses, but often encroaches adjacent areas of Kentucky bluegrass (*Poa pratensis* L.). Callisto, a herbicide produced and marketed by Syngenta containing the active ingredient mesotrione, provides preemergence and postemergence control of broadleaf and annual grassy weeds. Preliminary field trials show that mesotrione kills creeping bentgrass, but more information is needed regarding the application protocol. Research was conducted to determine: 1) what rates of mesotrione are best for removing creeping bentgrass from Kentucky bluegrass, and 2) what mesotrione rates are safe for Kentucky bluegrass.

Materials and Methods

The experiment was conducted at the Iowa State University Horticulture Research Station in 2005. The research area consisted of a mixed sward of Kentucky bluegrass and creeping bentgrass. Turf was regularly irrigated and maintained at a 1.5 in. mowing height. The trial was arranged as a randomized complete block design with four replications. Each plot measured 5 ft × 5 ft.

On July 27, 2005, mesotrione was applied at 0.125 and 0.187 lb ai/acre. Repeat applications followed at 2-week intervals until plots had received two, three, or four applications of mesotrione. Mesotrione was mixed and applied with a non-ionic surfactant at 0.25% v/v for all applications. A backpack sprayer pressurized with carbon dioxide at 38 psi and equipped with TeeJet #8002 flat fan nozzles was used to make all applications. Total spray volume was 3 gal/1000 ft^2. Visual estimates of creeping bentgrass control were recorded 14 days after each application on a 0%–100% linear scale. Turfgrass phytotoxicity was evaluated 7 and 14 days after each application on a scale of 1–9 with 1=brown turf, 6=acceptable damage, and 9=no phytotoxicity.

All data were analyzed using the general linear models procedure of SAS. Crabgrass control and phtotoxicity means were compared by using an F-protected least significant different test. All tests of significance were made at $P \leq 0.05$.

Results and Discussion

Mesotrione provided effective postemergence control of creeping bentgrass in Kentucky bluegrass. Creeping bentgrass treated with mesotrione displayed phytotoxicity 67% greater than untreated control plots 7 days after initial treatment DAIT (Table 1). Phytotoxicity symptoms continued to progress 21 DAIT, when all bentgrass tissue appeared dead. Greater than 93% creeping bentgrass control was observed in all treated plots 28, 42, and 56 DAIT (Table 2). All mesotrione treatments were equally effective at controlling creeping bentgrass 26 and 42 DAIT. Fifty-six days after the initial treatment, minimal regrowth of creeping bentgrass was observed in some plots that had received only two applications of 0.125 or 0.187 lb ai/acre mesotrione and plots that received three applications of 0.125 lb ai/acre.

Applications of three and four applications might be more effective than one or two applications in large swards of creeping bentgrass with dense canopies, which offer more opportunities for escape.

Table 1. Effects of mesotrione rates and number of applications on creeping bentgrass phytotoxicity.

		1st application		2nd application		3rd application		4th application	
Mesotrione	Apps.	7 DAIT	14DAIT	7 DAIT	14DAIT	7 DAIT	14DAIT	7 DAIT	14DAT
lb ai/acre		creeping bentgrass phytotoxicity							
0.125	2	3b[2]	3b	1b	1b	-	-	-	-
0.187	2	3b	3bc	1b	1b	-	-	-	-
0.125	3	3b	3bc	1b	1b	1b	1b	-	-
0.187[1]	3	3b	2c	1b	1b	1b	1b	-	-
0.125	4	3b	3bc	1b	1b	1b	1b	1b	1b
Control	-	9a	9a	9a	9a	9a	9a	9a	9a

[1]Mesotrione rates on July 27, Aug. 10, and Aug 24 were 0.187, 0.187, and 0.125 lb ai/acre, respectively.
[2]Means within columns followed by the same letter are not different according to Fisher's $LSD_{0.05}$.

Table 2. Effects of mesotrione rates and application timing on creeping bentgrass control.

Mesotrione (lb ai/A)	Application timing	14 DAIT	28 DAIT	42 DAIT	56 DAIT
		% creeping bentgrass control			
0.125	July 27, Aug. 10	1b[2]	99a	99a	93b
0.187	July 27, Aug. 10	7ab	100a	99a	97ab
0.125	July 27, Aug. 10, Aug. 24	10ab	98a	99a	95ab
0.187[1]	July 27, Aug. 10, Aug. 24	13a	100a	100a	99ab
0.125	July 27, Aug. 10, Aug. 24, Sept. 7	8ab	99a	100a	100a
Control		0b	0b	0b	0c

[1]Mesotrione rates on July 27, Aug. 10, and Aug 24 were 0.187, 0.187, and 0.125 lb ai/acre, respectively.
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