

# SELECTIVE REMOVAL OF CREEPING BENTGRASS FROM KENTUCKY BLUEGRASS WITH TENACACITY

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## INTRODUCTION

Tenacity (mesotrione) is a relatively new herbicide that was released for use within CT in 2008. Although capable of providing control of a variety of weeds commonly found in stands of turf, a unique quality of Tenacity is its ability to selectively remove creeping bentgrass from stands of Kentucky bluegrass. Kentucky bluegrass is widely used as a primary species within home lawns, athletic fields, and on golf courses. To this point, herbicides that can selectively remove creeping bentgrass have yet to be identified and control only has been achievable by physical removal or through the use of a non-selective herbicides. The objective of this study was to evaluate the ability of multiple applications of mesotrione formulations to selectively remove creeping bentgrass from a mature stand of Kentucky bluegrass.

## MATERIALS & METHODS

This study was conducted at the University of Connecticut Plant Science Research Facility located in Storrs, CT. Turf consisted of a monostand of 'Langara' Kentucky bluegrass maintained as an athletic field. The site was severely infested with creeping bentgrass. Mowing was performed approximately 3 times per week to a height of 1.5 to 2.0 in. Plots measure 3 ft x 6 ft, and were arranged in a randomized complete block with four replications. All treatments were applied with a CO<sub>2</sub> pressurized (40 psi) sprayer equipped with a flat-fan nozzle and calibrated to deliver 1.0 gal water per 1000 ft<sup>2</sup>. All treatments and application dates are listed in the data tables.

Data collected from the study included creeping bentgrass injury and percent plot area covered with living bentgrass. Injury to the creeping bentgrass was rated on a 0 to 5 scale where 0 = no bentgrass injury observed; 3 = minimum acceptable level of bentgrass injury; and 5 = entire bentgrass plant brown or dead. Plot area covered with living bentgrass was also rated visually on a percent scale where 0 = entire stand of bentgrass brown or dead and 100 = all bentgrass living and appearing healthy. Other ratings and observations are described in the results and data show in the tables.

## RESULTS

**Bentgrass Injury and Turfgrass Quality.** Discoloration of the bentgrass was observed within 7 to 10 days of the initial application and appeared as the typical white bleaching of the tissues of susceptible species. No discoloration to the Kentucky bluegrass was observed on any rating date. When plots were first rated on 20 Jul, all mesotrione-treated plots exhibited similar injury to the creeping bentgrass and were all higher than the untreated control (Table 1). Following the second application of mesotrione, injury to the creeping bentgrass generally changed from the bleached white to a brown or tan discoloration. The trend in the injury ratings and the percent plot area with living bentgrass tissues continued through 1 Aug. On 18 Aug, few differences were observed among mesotrione treatments, but differences were not considered agronomically important. Kentucky bluegrass quality within treated plots generally was near or above acceptable levels ( $\geq 7.0$ ) (Table 1). Quality within the untreated plots was considered unacceptable due to high creeping bentgrass populations.

**Bentgrass Control.** When plots were first rated on 1 Aug (4 weeks after initial treatment; WAIT), all plots treated with mesotrione had similar amounts of creeping bentgrass and ranged from 17 to 26% (Table 2). Creeping bentgrass within the untreated plots were higher than all mesotrione-treated plots and averaged 52% on 1 Aug. When plots were rated in Oct, all treatments provided between 91 and 99% control of the creeping bentgrass. While none of the treatments provided complete control, plots treated with four applications of A12738 at 4.0 fl oz provided the greatest suppression and plots only had 1% bentgrass on the final rating date. The least suppression was provided by EXC3937 when applied 3 times at 8 fl oz. In general, plots treated with EXC3937 did not control creeping bentgrass as well as A12738.

Leaf Spot. On the final rating date (16 Oct), moderate decline of the Kentucky bluegrass was observed due to an unidentified leaf spot pathogen. Although disease levels were variable and no statistical differences were observed among treatments and the untreated control, all plots receiving mesotrione had greater levels of leaf spot (7 to 14%) when compared to the untreated control plots (3%) (Table 3).

## **DISCUSSION**

Based on previous research at the University of Connecticut, multiple applications of mesotrione have been shown to effectively control creeping bentgrass within stands of Kentucky bluegrass. Our research suggests that applications should be made on 14 to 21-d intervals to prevent recovery of weed species. A potential negative of this product is the bright white appearance of susceptible weeds following application. A second treatment applied 14-days following the first, however, generally turned the tissue tan or brown and the symptoms became less prominent while still achieving excellent control. In addition to control of creeping bentgrass, trials conducted at the University of Connecticut have shown that mesotrione can effectively control crabgrass, false green kyllinga, clover and other weed species. It is important to note that multiple applications are necessary to provide adequate control and that rates and number of applications must be selected so as not to exceed the annual limit of 16 oz/A.

Results of this study suggest that optimal control of creeping bentgrass can be obtained by applying four applications of mesotrione at 4 fl oz/A every two weeks for a total of 4 applications. While these applications have been show to significantly reduce creeping bentgrass, complete control may require a programmatic approach in which Tenacity may be required every few year to keep populations at bay. Additionally, routine overseeding of bentgrass putting greens and fairways likely would result in the addition of seed populations to undesirable areas. An unexpected observation of this study was the increase in leaf spot of the Kentucky bluegrass in the fall following repeated applications of Tenacity. Future research may seek to identify long-term control of creeping bentgrass as well as the influence of Tenacity on the development of leaf spot and potentially other diseases.

Table 1. Kentucky bluegrass quality and bentgrass injury following the application of Tenacity and various mesotrione formulations.

Treatment and rate per acre	Application <sup>z</sup> Timing	Quality <sup>y</sup>		Injury <sup>x</sup>		
		1 Aug	18 Aug	20 Jul	1 Aug	18 Aug
A12738 4.0 fl oz .....	ACE	7.3 a <sup>w</sup>	8.0 a	3.0 a	3.3 a	3.8 a
A12738 5.0 fl oz .....	ACE	7.3 a	7.0 ab	3.0 a	3.5 a	3.3 ab
A12738 4.0 fl oz .....	ACEG	7.5 a	7.5 ab	3.0 a	2.8 a	2.8 b
EXC3937 8.0 fl oz .....	ACE	7.0 a	7.3 ab	2.3 a	3.3 a	3.0 ab
EXC3937 10.0 fl oz.....	ACE	7.5 a	7.5 ab	2.5 a	3.0 a	2.8 b
EXC3937 8.0 fl oz .....	ACEG	7.3 a	6.8 b	2.0 a	3.5 a	3.0 ab
A14203 0.125 lb ai/a .....	ACE	6.8 a	8.0 a	2.8 a	2.8 a	2.8 b
Untreated.....	-	6.5 a	4.8 c	0.0 b	0.8 b	0.8 c

<sup>z</sup> Treatments were applied as follows: A = 2 Jul, C = 15 Jul, E = 31 Jul, G = 13 Aug.

<sup>y</sup> Quality was rated visually on 0 to 9 scale in which 0 = entire plot area brown or dead, 7 = minimal acceptable quality for a highly maintained lawn or athletic field and 9 = optimum density and color.

<sup>x</sup> Turfgrass injury was rated on a 0 to 5 scale where 0 = no injury visible and 5 = entire plot brown or dead.

<sup>w</sup> Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test.

Table 2. Percent bentgrass within a stand of Kentucky bluegrass following the application of Tenacity and various mesotrione formulations.

Treatment and rate per acre	Application <sup>z</sup> Timing	Percent bentgrass <sup>y</sup>		
		1 Aug	8 Oct	16 Oct
A12738 4.0 fl oz .....	ACE	18 b <sup>x</sup>	1 b	3 cd
A12738 5.0 fl oz .....	ACE	26 b	4 b	4 bcd
A12738 4.0 fl oz .....	ACEG	17 b	1 b	1 d
EXC3937 8.0 fl oz .....	ACE	25 b	1 b	8 b
EXC3937 10.0 fl oz.....	ACE	26 b	3 b	7 bc
EXC3937 8.0 fl oz .....	ACEG	22 b	1 b	2 cd
A14203 0.125 lb ai/a .....	ACE	22 b	0 b	5 bcd
Untreated.....	-	52 a	83 a	89 a

<sup>z</sup> Treatments were applied as follows: A = 2 Jul, C = 15 Jul, E = 31 Jul, G = 13 Aug.

<sup>y</sup> Percent of the plot area infested by bentgrass was visually rated on a 0 to 100 scale where 0 = no living bentgrass present or 100 = entire plot covered with living bentgrass.

<sup>x</sup> Means in a column followed by the same letter are not significantly different at P ≤ 0.05 level according to the Fisher's protected least significant difference t-test.

Table 3. Percent leaf spot on a stand of Kentucky bluegrass following the application of Tenacity and various mesotrione formulations.

Treatment and rate per acre	Application <sup>z</sup> Timing	Leaf Spot <sup>y</sup>
		16 Oct
A12738 4.0 fl oz .....	ACE	13 a
A12738 5.0 fl oz .....	ACE	14 a
A12738 4.0 fl oz .....	ACEG	12 a
EXC3937 8.0 fl oz .....	ACE	11 a
EXC3937 10.0 fl oz.....	ACE	11 a
EXC3937 8.0 fl oz .....	ACEG	13 a
A14203 0.125 lb ai/a .....	ACE	7 a
Untreated.....	-	3 a

<sup>z</sup> Treatments were applied as follows: A = 2 Jul, C = 15 Jul, E = 31 Jul, G = 13 Aug.

<sup>y</sup> Percent of the plot area infested leaf spot (pathogen not identified) was visually rated on a 0 to 100 scale where 0 = no disease present or 100 = entire plot infested with leaf spot.

<sup>x</sup> Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test.