

EFFICACY OF LEGACY AS A GROWTH REGULATOR IN A CREEPING BENTGRASS FAIRWAY

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INTRODUCTION

Legacy is a relatively new premix combination of two commonly used plant growth regulators (trinexapac-ethyl and flurprimidol). Trinexapac-ethyl is commonly used to suppress growth, improve shade tolerance of turf, and improve overall quality of golf course fairways and putting greens. This PGR is commonly used in monostands of creeping bentgrass or mixed stands of turf that include annual bluegrass. Also a gibberelic acid inhibitor, flurprimidol can be used to effectively reduce populations of annual bluegrass when found in mixed stands with creeping bentgrass. Increasing in popularity is the tank-mixing of these two products in hopes of achieving the benefits of both PGRs. The interaction between these two PGRs and any antagonistic or synergistic effects of the combination is relatively unknown. The objectives of this study were to assess the growth suppression capability and safety of Legacy when applied to a creeping bentgrass fairway.

MATERIALS AND METHODS

This study was initiated at the University of Connecticut Plant Science Research Facility located in Storrs, CT. In October 2006, a monostand of 'Putter' creeping bentgrass was seeded at a rate of 1.0 lb/1000ft². Prior to seeding, the area was treated with glyphosate and tilled. The area was irrigated as needed to promote rapid seed germination. In 2007, the area was maintained as a typical golf course fairway. In 2008, the area received no fertilizer prior to the study initiation, but was treated with 0.5 lb N/1000 ft² on 26 Jul.

Plots measured 3 ft x 8 ft and were arranged in a randomized complete block with 4 replications. All treatments were applied with a CO₂ pressurized (40 psi) backpack sprayer equipped with a flat-fan nozzle and calibrated to deliver 1.0 gal water per 1000 ft². Treatments included 3 progressive rates of Legacy applied on 1 Jun and 11 Jul. Plots were visually rated for quality of and injury to the creeping bentgrass. Finally, clippings were collected from the study approximately once per week by making a single pass through the center of each plot. Clippings from each plot were placed in paper bags and immediately placed in a drying oven (60°C). Clippings were allowed to dry for at least 3 days prior to weighing. Descriptions of all evaluations are outlined in the footnotes of each data table.

RESULTS AND DISCUSSION

Quality and Injury. No differences in turfgrass quality were observed among treatments when plots were first evaluated on 20 Jun. With one exception, turfgrass quality was equal to or greater in plots treated with Legacy when compared to the untreated control plots (Table 1). On 20 Jul (9 days after the second application), however, turfgrass quality was reduced in plots treated with ≥ 15 fl oz of Legacy when compared to the untreated control plots. This reduction in quality correlates to the increased turfgrass injury observed following the second application of Legacy. Although minor levels of injury were observed on a few rating dates, few differences were observed among treatments or the untreated control. Only after the initial application did injury to the creeping bentgrass reach unacceptable levels (≥ 2.5) (Table 2). Injury ratings after the second application were generally greater than the untreated control, but were still considered acceptable.

Clipping Yields. Clippings were collected at various times throughout the study. Although attempts to collect clippings were made weekly, several rain events precluded the ability to collect. When clippings were first collected on 19 Jun, all treatments provided a reduction in clipping yields (46 to 49%) when compared to the untreated control plots (Table 3). Clipping reductions reduced when plots were rated on 3 Jul and no differences in clipping yields were observed on 10 Jul (5 weeks after treatment; WAT). Following the second application on 11 Jul, clippings were reduced between 29% and 53% for 2 weeks when compared to untreated plots. No differences in clipping weights were observed on 1 and 7 Aug,

but a post-inhibition growth stimulation was observed within plots treated with 20 fl oz of Legacy on 14 Aug (~5 WAT). No differences in the growth of creeping bentgrass as measured by clipping yields were observed on the final rating date.

Based on the results of this one year study, it appears that although multiple applications of Legacy may result in short term discoloration of creeping bentgrass, an increase in quality due to improved density and texture can result from these applications. In terms of bentgrass growth regulation, Legacy reduced clipping weights within the first 2 weeks of the initial application and this reduction in growth ended approximately 3 to 4 weeks after application. Post-inhibition growth stimulation was observed when treatments ceased. The impact of continued application on the growth of bentgrass (rather than only two applications), may be necessary to determine an application interval resulting in continued regulation. Future research may also seek to evaluate Legacy on mixed stands of annual bluegrass and creeping bentgrass to determine the relative growth regulation of the two species and the ability of the combination product to reduce annual bluegrass populations.

Table 1. Overall Quality of Legacy as a growth regulator in creeping bentgrass fairways.

Treatment and rate per 1000 sq ft	Application timing ^z	Quality ^y					Color ^x
		20 Jun	3 Jul	20 Jul	1 Aug	15 Aug	20 Jun
Legacy 10 fl oz	AB	5.8 a	6.8 ab	7.0 ab	7.8 a	7.5 a	5.5 a
Legacy 15 fl oz	AB	6.5 a	7.5 a	6.3 b	8.0 a	7.8 a	6.0 a
Legacy 20 fl oz	AB	5.8 a	7.0 ab	6.3 b	8.0 a	7.8 a	5.5 a
Untreated.....	-	6.8 a	6.3 b	7.3 a	7.5 b	6.5 b	7.3 a

^z Treatments were applied as follows: A= 1 Jun, B = 11 Jul.

^y Quality was rated visually on 0 to 9 scale in which 0 = entire plot area brown or dead; 7 = minimum acceptable quality for a golf course fairway; and 9 = optimum density and texture.

^x Color was rated visually on a 0 to 9 scale in which 0 = entire plot area brown or dead; 7 = minimum acceptable color for a golf course fairway; and 9 = dark green.

^w Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to Fisher's protected least significant difference test.

Table 2. Injury to creeping bentgrass fairways with Legacy as a growth regulator.

Treatment and rate per 1000 sq ft	Application timing ^z	Injury ^y				
		20 Jun	3 Jul	20 Jul	1 Aug	15 Aug
Legacy 10 fl oz	AB	2.5 a ^x	0.3 a	1.3 ab	0.3 a	0.3 b
Legacy 15 fl oz	AB	2.5 a	0.8 a	1.8 a	0.0 a	0.0 b
Legacy 20 fl oz	AB	2.8 a	0.5 a	1.8 a	0.0 a	0.0 b
Untreated.....	-	0.8 b	0.0 a	0.5 b	0.5 a	1.8 a

^z Treatments were applied as follows: A = 1 Jun, B = 11 Jul.

^y Turfgrass injury was rated on a 0 to 5 scale where 0 = no injury visible; 2.5 = unacceptable injury for a golf course fairway; and 5 = entire plot brown or dead.

^x Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to Fisher's protected least significant difference test.

Table 3. Impact of Legacy on clipping yield of a creeping bentgrass fairway.

Treatment and rate per 1000 sq ft	Application timing ^z	Clipping weight (grams) ^y			
		19 Jun	3 Jul	10 Jul	17 Jul
Legacy 10 fl oz	AB	3.1 b	3.3 bc	3.4 a	1.5 b
Legacy 15 fl oz	AB	3.3 b	3.0 c	3.4 a	1.2 b
Legacy 20.0 fl oz	AB	3.1 b	3.5 ab	3.5 a	1.3 b
Untreated.....	-	6.1 a	3.9 a	3.6 a	2.1 a

^z Treatments were applied as follows: A = 1 Jun, B = 11 Jul.

^y Clipping weights were collected by mowing a single pass through each 3' x 8' plot with a walk-mower. Following collection from each plot, clippings were placed into paper bags and immediately placed in a drying oven for ≥ 72 hours.

^x Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to Fisher's protected least significant difference test.

Table 3. Impact of Legacy on clipping yield of a creeping bentgrass fairway.

Treatment and rate per 1000 sq ft	Application timing ^z	Clipping weight (grams) ^y				
		25 Jul	1 Aug	7 Aug	14 Aug	21 Aug
Legacy 10 fl oz	AB	5.1 b	8.3 a	5.7 a	3.8 ab	1.7 a
Legacy 15 fl oz	AB	4.0 c	7.5 a	5.2 a	3.6 b	1.6 a
Legacy 20.0 fl oz	AB	3.3 c	7.6 a	5.9 a	4.2 a	2.0 a
Untreated.....	-	7.0 a	7.3 a	5.1 a	3.3 b	1.7 a

^z Treatments were applied as follows: A = 1 Jun, B = 11 Jul.

^y Clipping weights were collected by mowing a single pass through each 3' x 8' plot with a walk-mower. Following collection from each plot, clippings were placed into paper bags and immediately placed in a drying oven for ≥ 72 hours.

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