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Evaluation of an Amino Acid Biostimulant to Hasten Turfgrass Recovery

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Abstract

Turf managers strive to maintain dense, uniform stands of turf. Damage caused by winter desiccation, diseases, insects, traffic, or other stresses can compromise turf cover. Recovery of the turf stand is essential in maintaining proper ball roll, playability, and weed control for golf course superintendents. Timely recovery from damage from advantageous and anecdotal evidence suggests GreenNcrease, an Ajinomoto USA, Inc. biostimulant product, may aid in the recovery of damaged turf. Previous research has also demonstrated the product's ability to stimulate certain growth characteristics of creeping bentgrass.

A research trial was conducted to evaluate GreenNcrease's impact on the recuperative potential of a damaged creeping bentgrass stand.

Keywords

RFR A1116, Horticulture, Turfgrass

Disciplines

Agriculture | Horticulture

Evaluation of an Amino Acid Biostimulant to Hasten Turfgrass Recovery

RFR-A1116

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Introduction

Turf managers strive to maintain dense, uniform stands of turf. Damage caused by winter desiccation, diseases, insects, traffic, or other stresses can compromise turf cover. Recovery of the turf stand is essential in maintaining proper ball roll, playability, and weed control for golf course superintendents. Timely recovery from damage from advantageous and anecdotal evidence suggests GreenNcrease, an Ajinomoto USA, Inc. biostimulant product, may aid in the recovery of damaged turf. Previous research has also demonstrated the product's ability to stimulate certain growth characteristics of creeping bentgrass.

A research trial was conducted to evaluate GreenNcrease's impact on the recuperative potential of a damaged creeping bentgrass stand.

Materials and Methods

Research was conducted at the Iowa State University Horticulture Research Station during the fall of 2011. The experiment was conducted on 'T-1' creeping bentgrass mowed at 0.25 in. twice weekly and irrigation was applied to prevent drought stress. Plots measured 5 ft × 5 ft and were arranged in a randomized complete block design with three replications. Blocks were positioned in order to capture damage that had occurred during the previous winter. The sand based rootzone had 7 ppm phosphorus (P), 33 ppm potassium (K), a pH of 8.4, and 1.7 percent organic

matter. Applications of P and K were made on September 29 to all plots uniformly, each at a rate of 1 lb/1,000 ft² to account for nutrient deficiencies.

Treatments included two rates of urea applied alone and with increasing amounts of GreenNcrease (Table 1). Treatments were applied weekly beginning on September 15 with a CO₂ powered backpack sprayer equipped with TeeJet 8002VS nozzles delivering a spray carrier volume of 3 gal/1,000 ft² at 40 pounds per square inch.

Turf color and percentage cover were evaluated using digital image analysis (DIA). Data collected in November was excluded from analysis since plots began to enter dormancy and the subsequent loss of color interfered with accurate DIA. Coverage values obtained on September 21 were used to calculate percentage recovery since each plot had different starting values for percentage cover. Data were analyzed using the General Linear Model procedure of SAS (Statistical Analysis Software) and means were separated using Fisher's protected least significant difference at the (P<0.05) level.

Results and Discussion

All treatments hastened turf recovery compared with the untreated control and differences between treatments were observed on all five rating dates (Table 2). Recovery values ranged from 0 to 27 percent and recovery of most plots plateaued on October 12. The slight decrease in recovery in some plots after October 12 was the result of the plots beginning to enter dormancy.

Treatments receiving urea alone were contrasted with treatments receiving equal

amounts of urea plus GreenNcrease and differences were observed on the four October evaluations. Plots receiving the 0.125 lb N/1,000 ft² rate of urea in combination with GreenNcrease slowed recovery compared with plots receiving similar rates of urea alone. These findings were only observed for the 0.125 lb/1,000 ft² rate of urea. Plots receiving 0.25 lb N/1,000ft² plus GreenNcrease provided equal recovery compared with plots receiving similar amount of urea alone on all five rating dates.

Color differences were observed between treatments for five of the six rating dates (Table 3). In general, plots receiving higher rates of nitrogen exhibited darker green color later into the fall. Differences in plots treated with urea alone compared with plots receiving equal amounts of urea plus GreenNcrease

were observed for five on the six rating dates. Plots treated with urea at 0.125 lb N/1,000 ft² plus GreenNcrease at 0.12 lb N/1,000 ft² exhibited darker green color compared with plots receiving similar amount of urea alone on September 28 and October 5, 12, and 19. Similarly, plots treated with urea at 0.25 lb N/1,000 ft² plus GreenNcrease at 0.12 lb N/1,000 ft² possessed darker green color compared with plots receiving urea at 0.25 lb N/1,000 ft² alone on October 5, 12, 19, and 27.

Results from this study indicate that applications of GreenNcrease do not hasten recovery of T-1 creeping bentgrass turf compared with urea. However, GreenNcrease does help extend green color later into the fall compared with urea especially at low (0.125 lb N/1,000 ft²) application rates.

Table 1. Application rates of urea and GreenNcrease to evaluate recuperative potential of creeping bentgrass turf.

Treatment	Products
1	Untreated Control
2	Urea at 0.125 lb N/1,000 ft ²
3	Urea at 0.25 lb N/1,000 ft ²
4	Urea 0.125 lb N/1,000 ft ² + GreenNcrease 0.03 lb N/1,000 ft ²
5	Urea 0.125 lb N/1,000 ft ² + GreenNcrease 0.06 lb N/1,000 ft ²
6	Urea 0.125 lb N/1,000 ft ² + GreenNcrease 0.12 lb N/1,000 ft ²
7	Urea 0.25 lb N/1,000 ft ² + GreenNcrease 0.03 lb N/1,000 ft ²
8	Urea 0.25 lb N/1,000 ft ² + GreenNcrease 0.06 lb N/1,000 ft ²
9	Urea 0.25 lb N/1,000 ft ² + GreenNcrease 0.12 lb N/1,000 ft ²

Table 2. Percentage recovery of T-1 creeping bentgrass receiving two rates of urea applied alone and with increasing amounts of GreenNcrease.

Treatment	Sept. 28	Oct. 5	Oct. 12	Oct. 19	Oct. 27
1	-1	0	6	-4	-32
2	7	15	27	26	21
3	8	12	20	20	22
4	3	6	13	14	11
5	4	7	13	14	14
6	7	12	18	19	18
7	9	13	18	20	20
8	6	11	16	17	18
9	10	13	17	18	19
LSD	5	6	6	7	10

Table 3. Color of T-1 creeping bentgrass receiving two rates of urea applied alone and with increasing amounts of GreenNcrease.

Treatment	Color ratings ^a					
	Sept. 21	Sept. 28	Oct. 5	Oct. 12	Oct. 19	Oct. 27
1	8	7	7	6	5	5
2	8	7	7	7	6	6
3	8	8	8	8	7	7
4	8	8	8	7	7	6
5	8	8	8	7	7	6
6	8	8	8	8	7	6
7	8	8	8	8	8	8
8	8	8	8	8	8	8
9	9	8	9	9	8	9
LSD	NS	1	1	1	1	1

^aColor rated on a 1 to 9 scale with 1 = brown turf, 9 = dark green turf, 6 = least acceptable.