# Evaluation of an Amino Acid Biostimulant to Hasten Turfgrass Recovery

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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 $ft^2$ 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 $CO_2$ powered backpack sprayer equipped with TeeJet 8002VS nozzles delivering a spray carrier volume of 3 gal/1,000 $ft^2$ 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 $ft^2$ 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 $ft^2$ rate of urea. Plots receiving 0.25 lb N/1,000$ft^2$ 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 $ft^2$ plus GreenNcrease at 0.12 lb N/1,000 $ft^2$ 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 $ft^2$ plus GreenNcrease at 0.12 lb N/1,000 $ft^2$ possessed darker green color compared with plots receiving urea at 0.25 lb N/1,000 $ft^2$ 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 $ft^2$) 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.**

| | Color ratings[a] | | | | | |
|---|---|---|---|---|---|---|
| **Treatment** | **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** |

[a]Color rated on a 1 to 9 scale with 1 = brown turf, 9 = dark green turf, 6 = least acceptable.