

Evaluation of plant growth enhancer (GABA – gamma aminobutyric acid) for *Poa pratensis* L. growth and sod establishment

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Introduction

Gamma aminobutyric acid (GABA) is a plant growth enhancer based on the non-protein amino acid. It enhances nutrients uptake by roots and leaves so that plant nutrient levels are higher than can be achieved with nutrients alone. When plants are stressed and nutrient uptake is limiting it is believed that this product facilitates nutrient utilization, thereby enhancing growth during stress.

Materials and Methods

This study was conducted for ten weeks at the Iowa State University Horticulture Research Station in Ames, Iowa, and for four weeks in a greenhouse at Iowa State University. The trial was conducted using a randomized complete block design. Each treatment was replicated three times with plots being 5*4 ft. Treatments were applied on July 30, 2003 to a mature stand 'Unique' Kentucky bluegrass (*Poa pratensis* L.) growing on a 6-inch pad of sand. Treatment 1 was an untreated control. Treatments 2 and 3 were 150ppm and 300ppm GABA with foliar fertilizer, respectively. Treatment 4 was only foliar fertilizer. Treatments were applied weekly for 6 consecutive weeks. Fifty passes per week were applied with the modified Brouwer Traffic Simulator during each week during week 5 and 6. Two cores per plot were harvested after 6 weeks of treatment and transplanted in the greenhouse to evaluate recovery.



Table 1. List of treatments

Treatment #	Treatment list
TRT 1	Control – No treatment
TRT 2	150 ppm GABA with foliar fertilizer
TRT 3	300 ppm GABA with foliar fertilizer
TRT 4	Only foliar fertilizer

Turf color and quality were evaluated visually every ten days during a 50 day period. (Visual ratings followed a 1-9 scale, where 1 is the worst and 6 is the lowest acceptable rating) Grass was mowed at a height of 1.5 inches every 5 days and clippings were collected every 10-days. During the recovery phase in the greenhouse, one of the two subsamples from each treatment received two additional applications of its respective GABA and/or foliar fertilizer treatment. Two weeks after this application, turf color, quality, and clipping dry weight were measured again. Finally, to determine if there was any effect from the GABA on recovery after traffic or prior to wilt stress all grass samples underwent a two week period without irrigation.

Data were processed using the analysis of variance (ANOVA), and mean separation was performed by the least significant difference (LSD) method with the Statistical Analysis System (SAS).

Results and Discussion

No difference was found for turf color, quality and clipping dry weight during the 6 week field trial of summer 2003 (Table. 2).

A visual increase in turf height was observed when samples were treated and allowed to recover in the greenhouse after application of field traffic (Pic 1 and 2). The 300ppm GABA with foliar fertilizer produced higher shoot growth after traffic stress. However, there was no significant difference on clipping dry weight after traffic stress (Table 2). There were no significant differences among greenhouse samples that did not receive treatments to recover from the traffic period (Pic. 2).

There were no differences among treatments when wilting stress was applied (Pic. 3 and 4).

Table 2. Summary of ANOVA to evaluate AuxiGro products for Kentucky bluegrass growth.

Source of variance	df	Turf Color					Turf quality				
		8.9	8.19	8.29	9.8	9.18	8.9	8.19	8.29	9.8	9.18
Treatment	3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Source of variance	df	Clipping dry weight before traffic stress					Clipping dry weight two weeks after traffic stress	
		8.9	8.19	8.29	9.8	9.18	Additional treatment	No additional treatment
Treatment	3	NS	NS	NS	NS	NS	NS	NS

NS : Not significant



Pic. 1. Visual observation of shoot height of additional application after traffic treatments.



Pic. 2. Visual observation of shoot height of no additional application after traffic treatments.



Pic. 3. Visual observation of shoot height and turf color after 2 weeks of drought stress. One additional application was made at the beginning of the greenhouse recovery period.



Pic. 4. Visual observation of shoot height and turf color after 2 weeks of drought stress. No additional application was made at the beginning of the greenhouse recovery period.