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The Response of Kentucky Bluegrass Turf to Varying Nitrogen Sources

Christopher Blume

Iowa State University

Nick E. Christians

Iowa State University, nchris@iastate.edu

K. Joo Yong

(Visiting Scientist)

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The Response of Kentucky Bluegrass Turf to Varying Nitrogen Sources

Abstract

The objective of the 2005 nitrogen (N) source study was to compare the turf response and N release rates of various experimental fertilizer products being proposed for marketing to a number of industry standards, such as Milorganite, Sustane, Nature Safe, corn gluten meal, Renaissance, and urea. An untreated control was added for comparison.

Keywords

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Disciplines

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The Response of Kentucky Bluegrass Turf to Varying Nitrogen Sources

Chris J. Blume, graduate research assistant
Nick E. Christians, professor
Yong, K. Joo, visiting scientist
Department of Horticulture

Introduction

The objective of the 2005 nitrogen (N) source study was to compare the turf response and N release rates of various experimental fertilizer products being proposed for marketing to a number of industry standards, such as Milorganite, Sustane, Nature Safe, corn gluten meal, Renaissance, and urea. An untreated control was added for comparison.

Materials and Methods

The research was conducted at the Iowa State University Horticulture Research Station using an area of Kentucky bluegrass turf (Nassau cultivar). The study included eighteen different N fertilizer treatments obtained from varying companies that produce fertilizer materials for the turf industry and an untreated control (Table 1). Some of the experimental materials contain urea in addition to natural organic nitrogen sources. The study was a randomized complete block with three replications. Plots measured 5 ft × 5 ft. Following an initial mowing at 1.7 in. the fertilizers were applied at 1 lb N/1,000 ft². Applications were applied May 28, 2005.

The plots were again mowed at a uniform height 1 week after fertilizers were applied. Data collection began 1 week later, on June 9. Data were collected by harvesting clippings separately from each plot at a 1.7 in. mowing height. A 19.5-in.-wide test strip was mowed using a McClain reel mower with a catch basket. This allowed clippings to be collected from 8.125 ft² of plot area. After all the clippings were taken for a particular date, the remaining area on the plots was mowed to a

uniform height of 1.7 in., and the clippings were then discarded to avoid any nitrogen being put back into the soil. Following collection, the clippings were placed in an oven and allowed to dry for a minimum of 3 days at 67°C. They were then weighed and data were reported on the basis of grams of dry weight tissue/25 ft² plot (Table 1). Following the third week of clipping collection, an 18-in.-wide Toro Greensmaster[®] 3000 set at 1.4 in. mowing height was used for data collection. Using this mower allowed clippings to be collected from a 7.5 ft² plot area. Data were again expressed in grams dry weight tissue/25 ft² plot.

Visual quality ratings based on color, density, and overall appearance were taken weekly on a scale of 1–9, with 9 being the highest quality and 1 being the lowest quality (Table 2). A rating of 6 or higher was considered acceptable turf quality. The second application of N fertilizers was applied on July 14 and the third application of fertilizers was on September 9. Both of these treatments were made uniformly at 1 lb N/1,000 ft².

Drive[®] (quinclorac) was applied July 21 at 0.75 lb ai/acre for postemergence crabgrass control. Any broadleaves present throughout the growing season were spot-treated with Weed-B-Gone/Killex weed control.

Clippings were taken a total of 20 times. Every 2 weeks, weighed clippings were mixed together and then ground through a Wiley mill with a 20-mesh screen. Since there were twenty collection dates, there were ten dates of ground clippings. . Once the clippings were ground, 0.1 gram of tissue was weighed, added to Kjeldahl tubes, and processed through the Micro-Kjeldahl procedure using a Lachat BD-46 block digester. The liquid solution resulting from the

digestion process was then analyzed with a Lachat N analysis apparatus in accordance to the salicylate method for ammonium determination. The results of the procedure produced dry weight percentages of N for each tissue sample (Table 3).

Results and Discussion

Weekly clipping data are listed in Table 1. Clippings provide a more objective measurement of turf response than do the subjective quality ratings. The value of this data will be a demonstration of how the grass responded to each product versus the untreated control. It also shows how quickly the grass

responded to the various treatments and how long that response lasted. Weekly quality data for June 9 to October 27 are listed in Table 2. We have not attempted to make graphic representations of the comparative data because of the large numbers of treatments.

Table 3 includes data on the uptake of nitrogen by the grass on a percentage dry tissue basis in response to each treatment over the entire season. Again, we grouped clippings from 2-week time periods for N analysis. This data gives additional objective measurements that can be used to compare individual products to the control and to other industry standards.