Evaluation of Humic Fertilizers on Kentucky Bluegrass Under Simulated Traffic

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A.J. Lindsey, graduate research assistant
Adam Thoms, assistant professor
Ben Pease, research associate
Nick Christians, university professor
Department of Horticulture

Introduction

Athletic field safety is a primary concern for turfgrass managers. Having a successful fertility program is one tool to help ensure field safety. Adequate nutrition promotes turf growth and density, which improves playing conditions and field safety. Humic substances are organic compounds that can improve plant and soil health. Manufacturers of humic products claim many benefits to turfgrass such as improved stress tolerance and improved soil structure. The objective of this study is to evaluate turfgrass performance and recovery to simulated traffic after being fertilized with humic containing products. This is part of the first year of a two-year study.

Materials and Methods

Research was conducted at the Iowa State University Horticulture Research Station in Ames, Iowa, on Kentucky bluegrass (*Poa pratensis* L.) on a native soil athletic field. Turf was maintained at a 2-in. mowing height and received irrigation as needed.

The experimental design was a randomized complete block with four replications. Treatments included humic coated urea; poly-coated humic-coated urea; 22-0-4 w/black gypsum (BG); BG; Uflexx (stabilized nitrogen fertilizer); XCU (slow-release fertilizer); Urea; and a nontreated control (Table 1). Traffic was applied with a modified Baldree Traffic Simulator. Plots received three traffic events per week starting July 29, 2019, to September 25, 2019.

Data collection included percent green cover, surface hardness, volumetric water content, and shear strength. Digital images were collected using a light box and a digital camera. Digital image analysis was performed to get percent green cover. Surface hardness was collected using a 2.25 kg Clegg Impact Soil Tester. Soil volumetric water content was collected using a FieldScout TDR Meter with 3-in. probes. Shear strength was collected using a Turf-Tec Shear Tester. All data were analyzed using SAS at the 0.05 level of significance and means separated with Fisher's LSD (least significant difference).

Results and Discussion

Minimal differences occurred in the first year of the study. There was no treatment effect on volumetric water content, surface hardness, and shear strength (data not shown). A significant date-by-treatment interaction occurred for percent green cover; data were analyzed by date (Table 2). After 25 traffic events, XCU had the highest percent green cover compared with all other treatments. No other treatment was different than the nontreated control. Four weeks after traffic (WAT), treatments started to recover (increased percent green cover). However, only XCU had greater percent green cover relative to the control.

Treatments will be repeated over two years. Additional analysis will occur after the second year data have been collected.

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Table 1. List of fertilizer treatments, application rates, and application timings, ISU Horticulture Research Station, Ames, IA.

Treatment	Application rate	Application timing
Humic coated urea	1 lb N 1,000 sq ft^{-1}	April, May, September, October
Poly-coated humic-coated urea	1 lb N 1,000 sq ft^{-1}	April, May, September, October
22-0-4 w/black gypsum (BG)	1 lb N 1,000 sq ft^{-1}	April, May, September, October
22-0-4 w/BG	1 lb N 1,000 sq ft^{-1}	April, September
BG	3 lb BG 1,000 sq ft^{-1}	April, May, September, October
Uflexx	1 lb N 1,000 sq ft^{-1}	April, May, September, October
XCU	1 lb N 1,000 sq ft^{-1}	April, May, September, October
Urea	1 lb N 1,000 sq ft^{-1}	April, May, September, October
Nontreated	-	-

Table 2. Effect of various fertilizers on Kentucky bluegrass percent green cover under simulated traffic, ISU Horticulture Research Station, Ames, IA.

Treatment	Number of simulated traffic events[1]			
	0	12	25	4 WAT[2]
Humic coated urea	97.3[3]	34.1	15.4	22.4
Poly-coated humic-coated urea	96.8	34.5	21.0	26.4
22-0-4 w/black gypsum (BG)	97.9	33.5	19.7	27.0
22-0-4 w/BG	97.0	43.4	19.1	22.4
BG	97.2	32.4	22.6	24.3
Uflexx	97.3	35.9	15.4	24.6
XCU	97.6	46.6	38.9	44.4
Urea	97.4	36.1	23.6	28.5
Nontreated	96.0	28.2	18.1	19.3
$LSD_{0.05}$	NS4	NS	10.9	10.5

[1]Simulated traffic events started July 29, 2019, and were applied using a modified Baldree traffic simulator with three traffic events/week.
[2]WAT = weeks after traffic.
[3]Percent green cover was determined with digital image analysis.
[4]NS = nonsignificant.