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This publication includes lecture notes of papers presented at the 2000 New Jersey Turfgrass Expo. Publication of these lectures provides a readily available source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann B. Gould, Editor
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A SECOND SEASON OF RESIDUAL EFFECTS OF COMMERCIAL FERTILIZERS ON TURF QUALITY OF KENTUCKY BLUEGRASS

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INTRODUCTION

Nitrogen is the primary nutrient required to maintain high turf quality. Commercial fertilizers typically provide nitrogen as quick-release, slow-release, or a combination. Quick-release nitrogen sources fall into the categories of inorganic salts and urea; they are water-soluble and in a form which is readily taken up by the plant (Murphy, 1994). Slow-release nitrogen sources include natural organic sources such as animal tankage, ureaformaldehyde, water-insoluble organic nitrogen compounds, or encapsulated water-soluble sources. Natural organic nitrogen sources have the benefit of building soil organic matter, which improves soil quality. During the growing season, turf color responds to the timing of the nutrient release. Nitrogen that is slowly released causes a slower rate of turf green-up but lasts longer. Slow-release forms of nitrogen help control the rate of spring growth as well as produce a more uniform green turf color (Heckman, 1999).

The objective of continuing this study beyond the 4-year period of fertilizer application was to observe the residual effects of previous fertilizer types on turfgrass quality. This report updates a previous version that included results after one year following discontinuation of fertilization. The results of the second growing season in 2000 are presented below.

PROCEDURES

This study is a follow up to a turfgrass fertilizer response experiment begun on Kentucky bluegrass (*Poa pratensis* L.) sod in April 1994 (Heckman et al., 1994 and 2000). A Sassafrass sandy loam soil was used at the Rutgers Horticultural Research Farm II in North Brunswick, NJ. Fertilizer applications were made on a regular basis in April, May, September, and October of each year from 1994 to 1998. Fertilizer applications were discontinued after October 1998 so that residual effects of the previous 4 years of treatment could be observed in the spring and summer season of 1999 and 2000. Except for the control, this study only examines the 4 lb/1000 ft^2 rate of nitrogen with clippings removed, although the original experiment also included a 2 lb rate of nitrogen and a clipping returned mowing practice. The fertilizer products that were compared in this study are described in Table 1.

Beginning April of 1999, turf quality was rated on a weekly basis prior to mowing (Zarzecka and Heckman, 2000). The quality of turf was determined by evaluating color and grass density on a 1 to 10 scale, where a 10 represented dark green, dense grass and a 1 represented brown, dead grass. Color ratings were averaged monthly (Table 2) and were statistically analyzed using analysis of variance (ANOVA) and the least significant difference (LSD) multi-comparison test ($\alpha = 0.05$).

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Table 1. Commercial fertilizer nutrient sources.

Espoma Organic	Animal tankage, ureaform, triple superphosphate, sulfate of potash (100% slow-release nitrogen)
Plant Tone	Dehydrated manure, animal tankage, crab meal, cocoa meal, bonemeal, dried blood, sunflower meal, kelp, greensand, rock phosphate, sulfate of potash (50% slow-release and 50% quick-release nitrogen)
Turf Tone	Dehydrated manure, animal tankage, ureaform, urea, ammounium sulfate, triple superphosphate, sulfate of potash (50% slow-release and 50% quick-release nitrogen)
Quick Green	Ammonium sulfate, triple superphosphate, muriate of potash
Sta Green	Polymer-coated urea, urea, diammonium phosphate, muriate of potash

RESULTS

In 2000, 2 years after discontinuing the fertilizer applications, the slow-release fertilizer products generally exhibited better turfgrass color ratings than the quick-release fertilizer products (Table 2). However, color ratings were generally one to two points lower than in the first year after discontinuing fertilizer applications (Zarzecka and Heckman, 2000). In August and September of 2000, the Espoma Organic fertilizer exhibited significantly better turf color ratings over other fertilizer products (Table 2 and Figure 1). Results suggest that Espoma Organic continued to supply some nitrogen to turf nearly 2 years after its application was discontinued.

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Table 2. Turfgrass color responses in 2000 to the residual nitrogen (N) from fertilizer applied from 1994 to 1998.[1]

Fertilizer	Analysis	N Applied per Year (lb/1000 ft^2)	Fertilizer Applied (lb/1000 ft^2)	Color Ratings[2]				
				May	June	July	Aug.	Sept.
Control	---	0	0	4.5 bc[3]	4.1 b	4.4 a	4.1 b	4.2 bc
Espoma Organic	18-8-6	4	22.2	4.9 a	4.3 ab	4.8 a	5.4 a	5.2 a
Plant Tone	5-3-3	4	80	4.7 ab	4.6 a	4.3 a	4.3 b	4.0 c
Turf Tone	10-6-4	4	40	4.7 ab	4.1 b	4.5 a	4.2 b	4.5 b
Quick Green	10-6-4	4	40	5.0 a	4.4 a	4.4 a	4.5 b	4.2 bc
Sta Green	29-3-4	4	13.8	4.3 c	4.1 b	4.3 a	4.1 b	4.0 c

[1]Clippings were removed from plots with each mowing.
[2]Turfgrass color ratings based on a 1 to 10 scale, where 1 = brown, dead grass to 10 = dark green, dense grass.
[3]Means followed by the same letter within a column are not significantly different at $P < 0.05$ (LSD).

Figure 1. Monthly turf color responses in 2000 of residual fertilizers applied to Kentucky bluegrass from 1994 to 1998 at the Rutgers Horticultural Research Farm II, North Brunswick, NJ.