The Effects of Biosol Organic Fertilizer on Creeping Bentgrass Fairway Turf

Final Report

Submitted by:

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Introduction

Organic fertilizers are commonly used in professional turfgrass management programs because they usually contain a substantial proportion of controlled-release nitrogen. Controlled-release nitrogen is preferred by turfgrass managers because it provides a more uniform response of turfgrass color and growth over time as compared to quickly-available nitrogen sources, such as urea and ammoniated sources. Biosol is an organic fertilizer that is derived from the residual biomass of penicillin production. The biomass primarily consists of soybean and cotton seed meal. The biomass is dried and granulated prior to packaging.

The first objective of this experiment was to determine if repeat applications of 0.75 and 1.00 lbs N/1,000 sq ft would provide a better response than a single 2.0 lb N/1,000 sq ft application. The second objective was to determine if Biosol provides a color and yield response similar to the industry standard organic fertilizer Milorganite.

Materials and Methods

The experiment was conducted at University Park, PA, on Penneagle creeping bentgrass grown on Hagerstown silt loam and maintained at 0.5 inches. Plots were mowed twice per week, and clippings were removed. Treatments included Biosol and Milorganite applied at 0.75, 1.0, and 2.0 lbs N/1,000 sq ft at various frequencies (Table 1). Plots were 3 by 10 ft with treatments replicated three times and plots were arranged in a randomized complete block design.

Table 1. Fertilizer treatment, analysis, rate, frequencies, and total nitrogen applied.

Treatment	Analysis	Rate (lbs N/1,000 sq ft)	Frequency (weeks)	Total N (lbs)
Biosol	7-2-3	0.75	8	1.5
Biosol	7-2-3	1.00	8	2.0
Biosol	7-2-3	2.00	16	2.0
Milorganite	6-2-0	0.75	8	1.5
Milorganite	6-2-0	1.00	8	2.0
Milorganite	6-2-0	2.00	16	2.0

Treatments were applied with a hand-held shaker jar and 0.5 inches of irrigation was applied immediately after application. The first treatments were applied April 29, 2002, and treatments requiring re-application were applied on July 1, 2002. Plots were irrigated and treated with fungicides as needed to encourage active growth.

Color was rated weekly on a scale of 1-5 with 1 being brown, 5 being dark green, and 3 and above being acceptable color. Yield was measured weekly by removing clippings with a 20-inch reel mower set at 0.5 inches. Plots were mowed on Fridays and clippings were collected on Mondays, so yield represented 3 days of growth. Clippings were dried at 60^{o}C for 24 hours and then weighed.

Data was statistically analyzed using Analysis of Variance and treatment means were separated within each rating date using Duncan's New Multiple Range test with $p = 0.05$.

Results and Discussion

The application of treatments went fairly well, except the pelleted Biosol did not provide good coverage because of the large pellet size. Even after the materials were watered in, many of the pellets were still intact and would be subject to removal by mowing. Product

modifications should be made to decrease particle size so that the material can be applied to low-cut turf and not be subjected to removal by mowers.

Color

There were no significant differences in color 1 and 3 weeks after treatment (WAT) (Fig. 1). Two WAT, Biosol at the 2 lb rate provided better color than Biosol and Milorganite at the lower rates. This same response was observed at 6, 7, and 8 WAT. For the first 8 weeks, there was rarely a difference between Biosol at 0.75 and 1.00 lbs N/1,000 sq ft, and Biosol and Milorganite provided similar responses at the same application rates.

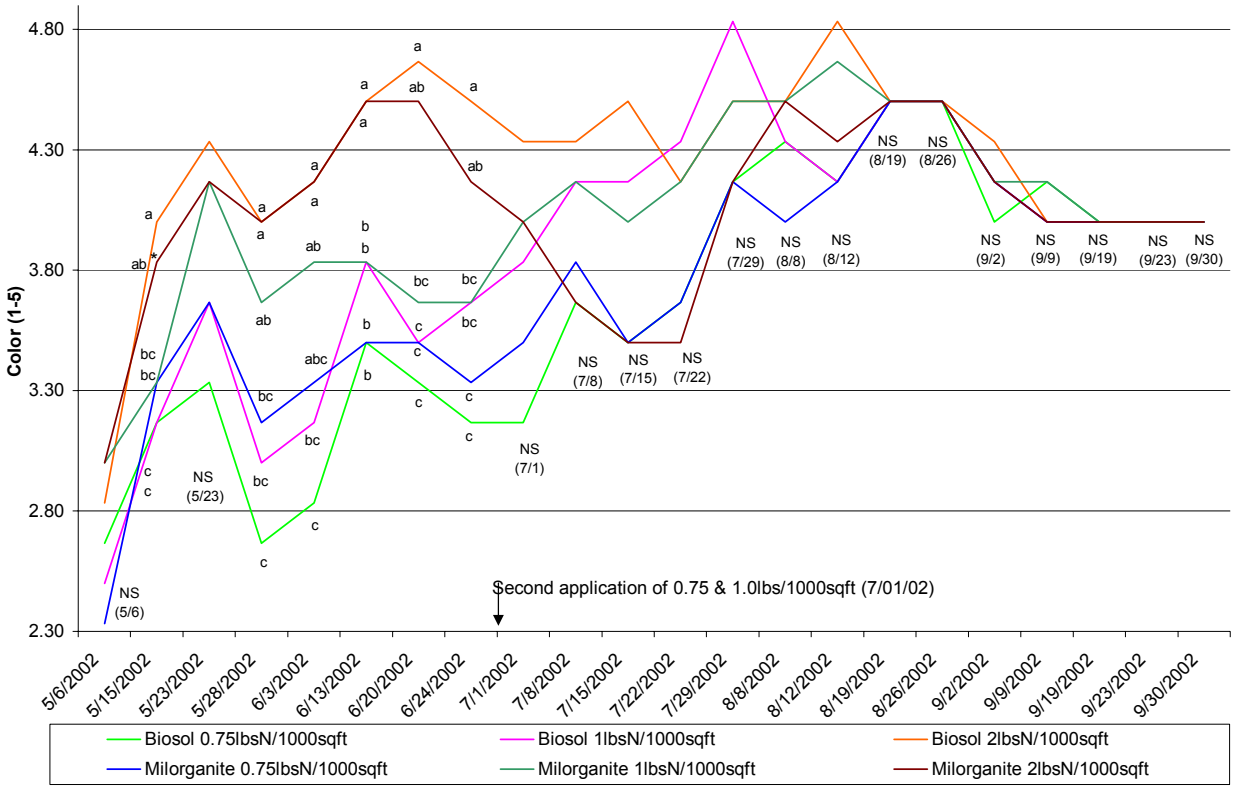

Figure 1. Average color ratings for the duration of the study

*Means with the same letter within a rating date are not significantly different according to Duncan's New Multiple Range test with p = 0.05. NS indicates no statistical difference for that rating date.

After the second application of the 0.75 and 1.0 lb N/1,000 sq ft treatments were made, there was no significant differences between either product at any application rate. This indicates that a single 2 lb N/1,000 sq ft application of Biosol or Milorganite provided a more even color response over 16 weeks than split applications of 0.75 and 1 lb N/1,000 sq ft.

Yield

Clipping yield responses were very similar to the color responses (Fig. 2). One WAT, all treatments provided significantly higher clipping yields than Milorganite at 1 lb N/1,000 sq ft. For most rating dates from 5 WAT through 8 WAT, the 2 lb N/1,000 sq ft rate of Biosol and Milorganite provided significantly higher yields than all other treatments.

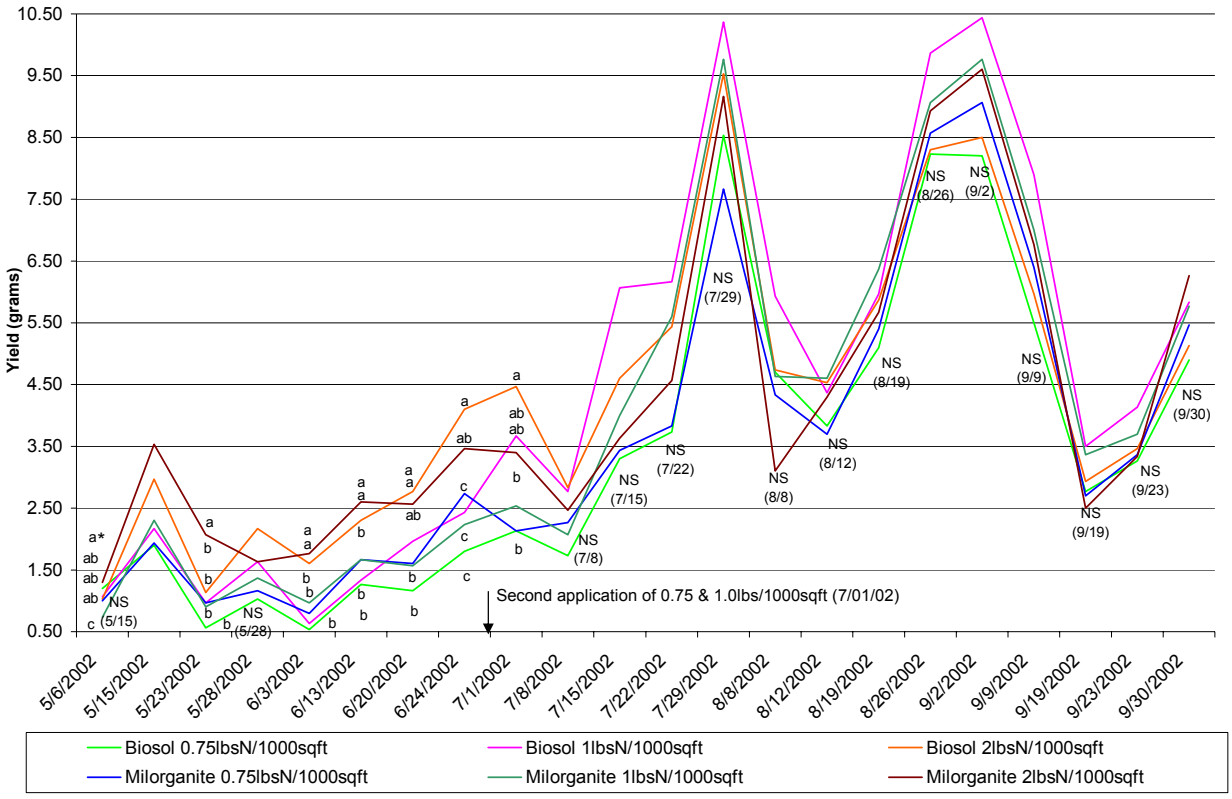

Figure 2. Average clipping weights for the duration of the study

*Means with the same letter within a rating date are not significantly different according to Duncan's New Multiple Range test with p = 0.05. NS indicates no statistical difference for that rating date.

The week following the follow-up applications of 0.75 and 1.0 lbs N/1,000 sq ft, was the only rating date where there was a significant difference for the second 8-weeks of the experiment. Biosol at the 2 lb rate provided a significantly higher yield than Biosol at the 0.75 lb rate and Milorganite at the 0.75 and 1.0 lb rate.

Conclusions

Applications of Biosol and Milorganite at 2 lbs N/1,000 sq ft provided a more uniform color and yield response on creeping bentgrass fairway turf as compared to split applications of 0.75 and 1.0 lb N/1,000 sq ft rates. Biosol provided similar color and yield responses as Milorganite over the duration of this study. Decreasing the particle size of Biosol should decrease the amount of fertilizer loss due to mower removal. Biosol provided acceptable color and yield responses for the rates and application frequencies used in this experiment.