One-Year Evaluation of Pacific Technical Services Biofeed® Products Applied on Tall Fescue in Riverside, California: 1996-1997

Final Report

SUBMITTED BY:

Grant Klein
Janet Hartin
Eliseo Baltazar
Francisco Merino
Scott Blackwood
Robert Green

SPONSORED BY:

Pacific Technical Services

and

University of Califomia, Riverside

October 31, 1997

UCR
TURF
1996-97

1996-97 PACIFIC TECHNICAL SERVICES PROJECT ON TALL FESCUE

G. Klein, J. Hartin, E. Baltazar, F. Merino, S. Blackwood, R. Green
University of California, Riverside

Objectives:
To evaluate the performance of Biofeed® fertilizers when applied to tall fescue for one year, in terms of visual quality ratings, clipping yields, clipping elemental analyses, root mass density, and soil elemental and physical analyses.

Cultivar: Bonsai tall fescue.

Experimental Site:
A mature plot established at the UCR Turfgrass Field Research Center, Riverside, CA on September 28, 1993. The root zone is a native soil which is classified as a Hanford fine sandy loam. See soil analyses tables for soil conditions during the study (all analyses were conducted by the DANR Analytical Laboratory).

Experimental Design: Randomized complete block design with four replications. Plot size 6.5 x 10.0 ft. with 21.0-inch borders. Overall analysis of variance (ANOVA) conducted via a repeated measured design with fertilizer treatments forming main plots and date of measurement forming subplots.

Mowing: Once per week with a walk-behind rotary mower set at 1.5 inches. Clippings collected.

Irrigation: Plots irrigated to prevent visual drought symptoms. Please see separate page for irrigation water analyses.

Fertilizer Treatments *(see protocol for specific dates)*:
- Annual N rate set at 6 pounds / 1000 ft^2.
- Test ran from May 1996 to May 1997.

Measurements:
Visual turfgrass quality ratings were estimated once every two weeks beginning two weeks after initial fertilizer treatment applications, using a 1 to 9 scale (1=poorest, 5=minimally acceptable, 9=best tall fescue).

Clipping yields were collected once every two weeks beginning three weeks after initial fertilizer treatment applications. Yields included seven days of growth, and were collected with the same mower used for routine mowing. Clippings were dried for 48 hours in a forced-air oven maintained at 60°C, then weighed on an analytical balance. Clippings collected represented a 27% subsample of the 65.0 ft^2 plot.

Clipping tissue samples for elemental analyses were collected on selected dates (see measurement schedule) with the same mower used for clipping yield collections. Sufficient tissue was collected to provide a minimum of 20 g of dried clipping tissue. Samples were dried for 48 hours in a forced-air oven maintained at 60°C, then ground to pass through a 40 mesh sieve. Analysis of total S, Na, Ca, Mg, Cu, Fe, Mn, N, P, Mo and Zn was conducted by the DANR laboratory (see DANR protocol information sheet for more specific information about how these analyses were conducted). Please note that since there was insufficient growth on the no-fertilizer check plots for the May 1997 collection date, samples from these plots were collected five times over the course of six weeks (1-2 weeks apart), until there was approximately 15 g of dried clipping tissue per plot.

Root mass density was determined on selected dates (see measurement schedule) from four cores per plot and two depths. Core diameter was 2.28 inches; depths were 0-3 inches and 3-6 inches. Total volume of each six-inch-deep core was 24.5 in^3 (402.6 cm^3). Total volume for each root sample (four 3-inch cores pooled together for each plot) was 49.0 in^3 (803.2 cm^3). Root samples were washed, placed into a forced-air oven maintained at 60°C for 48 hours, then weighed on an analytical balance. Root mass density reported as mg dried roots/cm^3 soil for both the 0-3-inch and 3-6-inch deep soil zones.

Soil physical and chemical element analysis was determined on selected dates (see measurement protocol) from four cores (pooled together) per plot. Core diameter was 2.28 inches and core depth was 3.0 inches. Soil samples were dried for a minimum of 72 hours in a forced-air oven maintained at 60°C, then ground to pass through a 32 mesh sieve until a minimum sample of 300 grams was obtained. Analysis of pH, SAR, EC, ESP, particle size analysis, OM, CEC, soluble Ca, Mg, Na, B, Cl, HCO_3, CO_3, and exchangeable potassium, calcium, magnesium, sodium, Fe (only for May 1997), and Olsen-P was conducted by the DANR laboratory (see DANR protocol information sheet for more specific information about how these analyses were conducted).

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Findings:

1. The difference among treatments for visual turfgrass quality ratings were significant. The Bio-Feed treatments performed very well through January 1997. However, after the application of the Micro-H along with the regular Bio-Feed application on January 24, there was a dramatic decline in visual turfgrass quality. Given that the plots required two months to recover from this decline, the overall quality ratings were substantially lower than they would have been if the trend from the first eight months of the study had held. Even taking this into account, however, the Bio-Feed treatments still performed as well as the UCR Check B treatment, and had a very good overall rating of 6.8.

2. There were, for most sample dates, significant differences among the treatments for clipping yields.

3. There were no significant differences among the treatments for root mass density.

4. There were very few differences in terms of soil salinity measurements, soil physical characteristics, and soil fertility measurements among the treatments in May 1997 (and none at all in September 1996). The exceptions in May 1997 were for Cl, OM, and exchangeable Mg.

5. There were no significant differences among treatments for plant tissue elemental analyses in September 1996, but there were in May 1997. In May 1997, all but Total Na and Cu had significant differences among treatments. These data suggest that the Bio-Feed treatments allowed the plant tissue to absorb significantly greater amounts of N, P, S, Ca, Mg, Zn, Mn, Fe and Mo.