UCRTRAC Accumulative Research Summary
Section C: Unbiased Product Testing (fertilizers, pesticides, equipment, etc.)
Project 14

Title: Test of NutriSmart on Established Tall Fescue.

Objective:

- To demonstrate the fertilizing effect of NutriSmart, which contains Y, on established turfgrass (Y contains associative nitrogen fixing bacteria and other compounds).
- Compare the effect of different dosages of Y on established turfgrass.
- Compare the fertilizing effect of Y and commercial chemical fertilizers.
- Treatments included various rates of Y and a 16-6-8 fast-release fertilizer (see Table 1 for more information).
- Measurements included visual ratings of turfgrass quality and color, clipping yield, and root mass density (see Table 1 for more information).

Location: A plot of Marathon III tall fescue that was established April 1996 and is located at the UCR Field Research Facility.

Duration: 10 months

Funding Source: CK Technologies, Inc.

Findings:

- The only treatment to significantly increase overall visual turfgrass quality was the 16-6-8 fertilizer treatment.
- The results for visual turfgrass color were similar to visual turfgrass quality.
- The 16-6-8 fertilizer, Y 0.35x + 16-6-8, and Y 0.50x +16-6-8 treatments significantly increased the overall clipping yield, relative to control treatment.
- Root mass density was not affected by treatments.

Status: A 10-month study was completed and a Final Report was prepared.

Table 1. Materials and methods outline for the NutriSmart turfgrass field trial (updated February 2002).

Objectives: To demonstrate the fertilizing effect of Y on established turfgrass, compare the effect of different dosages of Y on established turfgrass, and compare the fertilizing effect among Y and commercial chemical fertilizers.

Cultivar: Marathon III tall fescue (*Festuca arundinacea*).

Experimental site: A plot established at the UCR Turfgrass Field Research Center, Riverside, Calif. on 3 Apr. 1996. The root zone is a native soil, which is classified as a Hanford fine sandy loam. As of 1 June 2001 the soil pH=6.6; soluble Ca=429 ppm; soluble Mg=90 ppm; soluble Na=154 ppm; soluble K=40.31 ppm; SAR=2; ESP=1%; HCO_3=24 ppm; CO_3<3 ppm; DTPA-extractable Fe=31.8 ppm; CEC=12.9 meq/100g; OM=0.93%; Olsen-P=56.1 ppm; exchangeable K=166 ppm; exchangeable Na=176 ppm; exchangeable Ca=1182 ppm; exchangeable Mg=170 ppm. As of May 1997 the soil EC_e=0.98 mmhos/cm and sand=53%, silt=34%, and clay=13% (see below for detailed information regarding analytical methods).

DANR Analytical Lab. soil analysis methods: pH = saturated paste (s.p.), pH meter; Olsen-P = alkaline extraction (ext.) by 0.5 Normal $NaHCO_3$ for soils with pH > 6.5 by ascorbic acid reduction of phosphomolybdate complex and meas. by spectrophotometry; exchangeable K, Na, Ca, and Mg = equilib. ext. using 1 Normal ammonium acetate (pH 7.0), subsequent determination by atomic absorption/emission spectrophotometry; Fe = equilib. ext. using DTPA, subsequent determination by atomic absorption spectrometry; soluble (sol.) Ca and Mg = s.p. ext., inductively coupled plasmic atomic emission spectrometry; sol. Na and K = s.p. ext., emission spectrometry; HCO_3 and CO_3 = s.p. ext., titration with 0.05 Normal H_2SO_4 acid; SAR = est. calc. from Ca, Mg, and Na on s.p. ext.; CEC = barium acetate saturation and calcium replacement; OM = potassium dichromate reduction of organic carbon and subsequent spectrophotometric measurement; EC_e = semi-quantifies the amount of soluble salts in the saturation paste extract using conductivity meter; particle size analysis of sand, silt and clay determined by soil suspension by hydrometer.

Prior fertilization: 6 lb N/1000 ft^2 per year by applying 0.5 lb N/1000 ft^2 per month using a 16N-6P_2O_5-8K_2O fertilizer from April through October and 21N-7P_2O_5-4K_2O fertilizer from November through March. Last fertilization was 19 Mar. 2001.

Prior to treatment applications, all plots were core cultivated [0.375-inch hollow tines (i.d.)] with a hole density equal to or greater than 1 x 1 inch with holes approximately 3 inches deep. All plots were then topdressed with a thin layer of sand. When the product Y was applied, it was swept into the soil surface with a broom.

Experimental design: Randomized complete block (RCB) design with four replications. Plot size was 4.5 x 6.0 ft with 1 ft borders between plots. Overall ANOVA a repeated measures design with date as the repeated measures factor.

Mowing: Once per week with a walk-behind 21-inch width rotary mower set at 1.5-inch mowing height. Clippings were collected.

Irrigation: Plots irrigated to prevent visual drought symptoms and overwatering.

Treatments *(applied 25 May 2001, except as noted)*:

Treatment	Amount of Y and 16-6-8 fertilizer[z]	Application time
1. Control (check)	No Y and no fertilizer	None
2. 16-6-8 fertilizer	No Y and 0.33 lb N/1000 ft^2	Once every month
3. Y 0.35x + 16-6-8 fertilizer	35 g/m^2 and 0.33 lb N/1000 ft^2	Once at study initiation
4. Y 0.50x + 16-6-8 fertilizer	50 g/m^2 and 0.33 lb N/1000 ft^2	Once at study initiation
5. Y 1.00x + 16-6-8 fertilizer	100 g/m^2 and 0.33 lb N/1000 ft^2	Once at study initiation
6. Y 2.00x + 16-6-8 fertilizer	200 g/m^2 and 0.33 lb N/1000 ft^2	Once at study initiation
7. Y 0.35x	35 g/m^2 and no fertilizer	Once at study initiation

[z]16-6-8 fertilizer was Turf Supreme 16-6-8 (16% N, 6% P_2O_5, and 8% K_2O, by dry weight).

Measurements:

- Visual turfgrass quality ratings were taken every 2 weeks beginning 1 week after initial treatment applications, using a 1 to 9 scale (1=worst, 5=minimally acceptable, 9=best tall fescue).
- Visual turfgrass color ratings were taken every 2 weeks beginning 1 week after initial treatment applications, using a 1 to 9 scale (1=brown, 5=minimally acceptable, 9=darkest green tall fescue).
- Clipping yields were taken once every 2 weeks, beginning 2 weeks after initial treatment applications. Yields were from 7 d of growth and were collected using the same 21-inch width mower used for routine mowing with a special attachment to collect the clipping yield. A subsample of clippings was collected from 39% of the total surface area of each plot. Clippings were dried for 48 h in a forced-air oven maintained at 60 °C, and then weighed.
- Root mass density (mg/cm^3) was determined at two depths (0 to 6 and 6 to 12 inches below the soil/thatch layer) with four 21.4-mm (i.d.) cores per plot.