2006 Grain Processing Soil Conditioner Study

Christopher J. Blume and Nick Christians

Objectives:

The objectives of this study were to evaluate turf response, soil moisture status, and soil nutrient status in 'Park' Kentucky bluegrass turf areas treated with an experimental soil conditioner from Grain Processing Corp.

Materials and Methods:

This study was conducted at the Iowa State University turfgrass research facility. The soil on the site is a Nicollet clay loam with a pH of 6.2, 30 ppm P, and 174 ppm K. The turf on the site is a 10 year old stand of 'Park' Kentucky bluegrass maintained at a 3 in. mowing height. The study area was core aerified and cores were removed on 2 August, 2006. The treatments included an untreated control, 20 and 40 lbs. soil conditioner/1000 ft². The initial application of the soil conditioner was applied using hand-held shakers on 4 August. One week later, 11 August a 28-3-4 fertilizer was applied at a rate of 1 lb N/1000ft². Data collection began two weeks later on 25 August. The second application of soil conditioner was applied 10 October directly to the surface, without aerification.

Data collection included soil moisture content measurements using a TDR (time domain reflectometer) with a Spectrum® Technologies TDR 100 Soil Moisture Probe, turf color measurements using an NDVI (normalized difference vegetation index) turf color meter (Spectrum® Technologies TCM 500), visual quality ratings (9=best and 1= worst), and dry weight of clippings. Nutrient content of the tissue was also measured at the end of the season using combined clippings from the last two collection dates.

Results:

No differences in soil moisture were found among the treated plots during the eight weeks of data collection (Table 1). There were also no color differences as measured by NDVI during that time period (Table 2). There were no consistent differences among treatments in visual quality rating during the study (Table 3). No differences in clipping weights were observed from the collection dates (Table 4). The tissue analysis of nitrogen (Table 5) and for total nutrient content of other elements (Table 6) showed no difference between the treatments at any time during the study.

	25-Aug	1-Sep	8-Sep	15-Sep	22-Sep	29-Sep	6-Oct	13-Oct
Control	25.37	30.57	30.73	38.67	41.57	38.53	33.90	33.43
20#/1000	25.80	32.33	30.07	37.90	40.80	39.10	33.67	34.03
40#/1000	25.50	31.80	30.43	40.17	41.60	39.23	33.50	33.57
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS

Table 1. Percentage volumetric water content in the soil as measured by TDR.

Table 2. Color evaluations by NDVI, where the higher the number, the darker the green color.

	25-Aug	1-Sep	8-Sep	15-Sep	22-Sep	29-Sep	6-Oct	13-Oct
Control	0.6667	0.6593	0.6503	0.6527	0.6290	0.6133	0.6183	0.6090
20#/1000	0.6573	0.6407	0.6247	0.6397	0.6230	0.5953	0.6123	0.5760
40# /1000	0.6683	0.6553	0.6510	0.6417	0.6213	0.6157	0.6213	0.6000
LSD (0.05)	NS							

	25-Aug	1-Sep	8-Sep	15-Sep	22-Sep	29-Sep	6-Oct	13-Oct
Control	7.00	6.33	6.00	6.67	7.00	6.67	7.00	5.33
20#/1000	6.00	5.67	5.33	6.00	7.00	6.33	6.67	5.33
40#/1000	7.00	6.33	5.67	6.00	7.00	6.33	6.33	5.67
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS

Table 3. Quality ratings (9-1; 9 = best, 1 = worst).

Table 4. Clipping weights (grams).

	25-Aug	1-Sep	8-Sep	15-Sep	22-Sep	29-Sep	6-Oct	13-Oct
Control	26.71	8.69	4.21	3.99	2.08	1.71	1.00	1.12
20#/1000	24.02	8.32	3.20	3.84	2.01	1.69	0.76	1.28
40#/1000	21.73	7.37	3.78	3.89	2.03	1.69	0.80	1.23
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS

	Analysis 1*	Analysis 2	Analysis 3	Analysis 4
Control	3.16	3.34	3.60	3.67
20#/1000	3.26	3.33	3.61	3.71
40#/1000	3.30	3.43	3.61	3.90
LSD (0.05)	NS	NS	NS	0.07

Table 5. Percentage nitrogen (N) in clippings.

*Analysis based on two weeks of clippings combined for analysis.

Table 6. Nutrient analysis of clippings combined from the last two clipping dates, expressed in parts per million (ppm).

	Boron	Calcium	Copper	Iron	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Phosphorus	Sulfur	Zinc
Control 20#	24.28	4144.60	3.72	102.96	16374.09	1944.77	28.56	0.65	83.70	2482.77	1700.47	25.37
/1000 40#	23.47	4300.23	3.75	104.64	16807.32	1926.45	28.40	0.60	100.14	2582.53	1795.41	27.27
/1000	24.80	5034.76	4.24	112.46	17867.12	1969.55	36.74	0.50	103.16	2718.14	1886.65	28.85
LSD												
(0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS