TURFGRASS SOIL MANAGEMENT RESEARCH-1998

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Irrigation Study on Kentucky Bluegrass

A Kentucky bluegrass management irrigation study was initiated on a sodded Kentucky bluegrass site during the summer of 1996. The soil is a native sandy loam/sandy clay loam. Three irrigation treatments were included in the study: .1 inch daily; 1.0 inch irrigation upon the appearance of wilt; and no irrigation.. The irrigation blocks were 40' x 40' with three replications of each treatment. Within each irrigation block were a series of nitrogen, herbicide, insecticide, and fungicide treatments as given in Table 1.

Broad leaf weeds counts were taken on several dates during the 1998 season. Most weeds were dandelions with some plantain. Clover had not been observed on the plots. In Table 1 all plots receiving herbicide applications had few to no broadleaf weeds and there were no statistical differences regardless of irrigation treatment. The daily irrigated plots with no nitrogen had significantly greater numbers of weeds than the other treatments for both dates reported. There was no difference in weed numbers on either date between the non-irrigated and irrigation upon the appearance of wilt plots. These data reflect the importance of proper irrigation techniques. On Kentucky bluegrass lawns susceptible to necrotic ring spot (NRS) it is recommended that light daily irrigation coupled with monthly applications of slow release fertilizers are important for an integrated approach for management of NRS. On these plots, however, there were greater weed numbers on plots receiving daily irrigation. It may be that providing daily irrigation provides ideal conditions for germination of weeds. This may be counteracted on many lawns by higher turf density due to adequate moisture provided by daily irrigation that could reduce weed numbers. On several occasions over the years unirrigated turfs that go dormant due to lack of moisture have had significant weed numbers after a good rainfall. Turf density was low due to dormancy so there was space for the weeds to germinate.

Also of interest in Table 1 is the 16 September data regarding the three fertilizer carrier treatments that had no herbicide application. The urea had statistically fewer weeds than the Milorganite and Ringer's products. This could have been due to the quick release of nitrogen from urea that may result in a denser turfgrass canopy.

In Table 2 turfgrass ratings for this study are given. These are means for all treatments. Note that on 10 June is the only date that the wilt plots received a rating that was not acceptable for a Kentucky bluegrass lawn. This indicates that at some times waiting for wilt symptoms as a basis for determining when to irrigate a home lawn is too stressful for consistently maintaining a high quality lawn. The data from 24 November in Table 2 are interesting in that the irrigation on wilt and non-irrigated treatments received higher quality ratings than the daily irrigated plots. This was likely due to the greater amount of weeds on the daily irrigated plots.

Table 1. Broadleaf Weed Counts. Kentucky bluegrass mamagement study.

			April 27, 1998 Irrigation Timing			September 16, 1998 Irrigation Timing		
N Source[1]	**N Rate[2]**	**Herbicide[3]**	**Daily***	**Wilt****	**None**	**Daily***	**Wilt****	**None**
none	——	none	20 a	12 bc	10 cd	70 a	22 cd	18 d
Urea	0.5 lb.	biannual	3 e	0 e	0 e	4 e	0 e	0 e
Urea	1.0 lb.	biannual	1 e	0 e	0 e	3 e	0 e	1 e
Urea[4]	1.0 lb.	biannual	0 e	0 e	0 e	2 e	0 e	0 e
Urea[5]	1.0 lb.	biannual	0 e	0 e	0 e	0 e	0 e	0 e
Urea[4,5]	1.0 lb.	biannual	0 e	0 e	0 e	0 e	0 e	0 e
Urea	1.0 lb.	none	12 bc	0 e	1 e	16 d	1 e	1 e
Milorganite	1.0 lb.	none	18 ab	3 de	3 e	35 b	7 e	4 e
Ringer's	1.0 lb.	none	14 abc	0 e	1 e	31 bc	1 e	3 e
Probability				0.02			0.00	
LSD at 0.05				6.9			7.7	

Means for the same date followed by the same letter are not significantly different using the LSD mean separation test.

1. Nitrogen applications were applied 23 April, 12 June, 23 July, 9 September, and 24 November.
2. Pounds of nitrogen per 1000 sq. ft. per application.
3. Pendimethalin applied on 1 June and Trimec applied on 30 July at their highest labeled rate.
4. Dursban applied on 29 July at highest labeled rate.
5. Chipco 26019 applied on 28 July at highest labeled rate.

* Approximately 1/10 inch of water per day from May through October at 4:00 a.m.

** Approximately 1 inch of water applied at the onset of wilt.

Table 2. Irrigation Timing Effects on Quality Ratings (9= excellent, 6 and above is acceptable, 1 = chlorotic or brown.)

Irrigation Treatment	24 April	10 June	21 July	24 November***
.1 " Daily	6.4	6.7 a	6.9 a	5.3 b
Onset of Wilt	6.4	4.7 b	6.2 b	6.2 a
None	6.6	4.3 c	5.4 c	6.4 a
probability	n.s.	0.00	0.00	0.00
LSD @ 0.05	——	0.3	0.4	0.2

Means in columns followed by the same letter are not significantly different at the 5% level using the LSD mean separation test.

*** An interaction exists with fertility treatments on this day.

Bentgrass Green High Potassium Study

A study evaluating high annual rates of potash on creeping bentgrass that was initiated in 1990 was concluded in 1997. The study was located on a sandy loam/loamy sand putting green. There were four replications of each treatment. Plot size was 5 feet by 7 feet. All applications during the season were made at the rate of 2 lbs. K_2O / 1000 sq. ft. per application. The soil tests reported in Table 3 are for samples taken in November of 1997 and were not available at the time of printing the 1997 reports. Potassium tests are typically higher in the thatch layer than in the soil. This is due to the lower density of thatch. Potassium levels in the 0-3 and 3-6 inch layers are similar to those found in previous years, reflecting the increase in soil potassium levels with increasing potash applications. In spite of the very high potassium applications (12 lbs. potash per 1000 sq. ft. annually) there is a maximum amount of potassium this soil will hold. Further, even though the soil potassium levels are low, there has never been any appearance of potassium deficiency symptoms. These plots have not been subjected to intense traffic or other stresses, however.

There was no influence of potassium rate on calcium tests. However, magnesium tests were in the 0-3 inch depth was reduced by the high potash levels. This effect of reducing exchangeable magnesium is marginal on these plots, likely because the irrigation water contains both calcium and magnesium. For this reason, it is important to take soil samples annually from sandy putting greens to monitor all nutrients including calcium and magnesium.