NITROGEN EFFECTS ON WEEDS IN KENTUCKY BLUEGRASS

A study was initiated in 1991 to evaluate the effects of mulching either oak or maple leaves into a "Midnight" Kentucky bluegrass turf at the rate of 100 lbs of dry leaves per 1000 sq. ft. (approximately ankle height in depth). Check plots receiving no mulched tree leaves were included. A nitrogen variable was included in the study to observe if nitrogen would enhance the degradation of the tree leaves. All cool season grasses require some nitrogen to provide enough growth and density to compete with weedy species. Nitrogen was applied at 4 lbs. N per 1000 sq. ft. annually with either a spring or fall emphasis. Spring emphasis applications were applied in April, May, July, and August (1 lb. N per month) while the fall program received nitrogen in June, July, September, and October. A check plot with no nitrogen was also included. There were three replications of each treatment. Plots measured 4 feet by 12 feet. The leaf mulching portion of this study is reported by Thom Nikolai elsewhere in this proceedings. Tables 16 and 17 focus on the nitrogen variables included in the study.

August of 1995 was the last time the plots received a herbicide application. Broadleaf weed counts from 1997 are reported in Table 16. On May 22 flowering dandelions were counted on each plot. The no nitrogen plots had far greater dandelion counts than either nitrogen timing applications. Dandelions are biennials that flower during the second year. On May 23, July 15, and August 25 total broadleaf weed counts were taken. The no nitrogen plots always had the highest number. The timing of nitrogen applications had no impact on the weed population.

Table 16.

Effects of Nitrogen on Weed Populations on a "Midnight" Kentucky Bluegrass Turf - 1997

	Number of dandelion flowers.	Number of broadleaf weeds per plot		
	May 22	May 23	July 15	August 25
No nitrogen	59 a	10 a	16 a	25 a
Spring*	5 b	2 b	1 b	3 b
Fall*	3 b	1 b	1 b	3 b
lsd @ 0.05	19.0	3.7	6.6	11.5
Probability	0.00	0.00	0.00	0.00

Soil test results on these plots from May of 1997 are reported in Table 17. Applying nitrogen resulted in significant decreases in both phosphorus and potassium in spite of the fact that clippings are returned to these plots. This points out the benefit of monitoring soil tests even when clippings are returned. There was no effect on either calcium or magnesium tests, however.

Table 17.

Effects of Nitrogen on soil test results in the 0-3" depth after 6 years of treatments.

	Results from May of 1997				
	pH	Phosphorous	Potassium	Calcium	Magnesium
No nitrogen	7.5	33 a	104 a	1736	351
Spring*	7.5	22 b	60 b	1736	367
Fall*	7.4	22 b	72 b	1788	366
lsd @ 0.05	—	3.6	13.6	———	——-
Probability	n.s.	0.00	0.00	n.s.	n.s.

Means in the same columns followed by the same letter are not significantly different at the 5% level. Using the lsd range test.

BENTGRASS GREEN HIGH POTASSIUM STUDY

Studies evaluating high annual rates of potash on creeping bentgrass that were initiated in 1990 were continued in 1997. The study is located on a sandy loam to loamy sand green. There were four replications of six different treatments in the study. Plot size was 5 feet by 7 feet. All applications during the season were

made at the rate of 2 lbs. K_2O per 1000 sq. ft. per application. The soil samples reported are from October of 1996 because soil test results were not available at the time of printing the 1996 reports. Potassium and calcium soil tests are reported in Table 18. Potassium and calcium are both cations that compete for exchange sites. As observed in the past there was an increase in potassium soil tests with increasing K rates. And regardless of applying higher rates of potash there is no increase in potassium test beyond 4 lbs. potash per year. Calcium levels tend to decrease with higher potash applications, but there is some variability in the data. The final column in Table 18 gives the recommended amount of K_2O that should be applied per 1000 sq. ft. due to the soil tests results. Note there is little difference in the recommended amount of potash to apply after applying 4 or 12 lbs of potash on this sandy loam.

Table 18.

Bentgrass Green High Potassium Study. Soil K Tests Results from 0-3 Inch depth - October 1996.

Treatments	Potassium lbs/A	Calcium lbs/A	Recommended annual K_2O from soil test results.
Check (no potash applied)	64 d	1639 a	6.0
Soil Test Recommendations	101 c	1389 ab	5.5
4 lbs. KCl / M / Year	144 b	1625 a	4.5
8 lbs. KCl / M / Year	184 a	1481 ab	3.5
12 lbs. KCl / M / Year	171 a	1239 b	4.0
12 lbs. K_2SO_4 / M / Year	179 a	1556 a	3.5
Probability	0.00	0.04	
lsd @ 0.05	22.7	261.3	

OTHER STUDIES

Several other studies were conducted in 1997. The project to evaluate management practices to maintain sod grown on subsoil was continued during 1997. There are nine blocks in this study with three irrigation treatments and three replications. Kentucky bluegrass sod was laid on these plots in 1995. Treatments include: nitrogen rates of 0, 2, 4, and 6 lbs. per 1000 sq. ft. annually; core cultivation treatments applied 0,1, or 2 times annually or HydroJect treatments applied 0,1, or 3 times per year; and organic nitrogen or urea as the nitrogen source. The unirrigated plots had significant wilt on a few dates in 1997. Higher nitrogen plots tended to wilt more quickly than lower nitrogen plots. Samples have been collected to evaluate physical properties of the soil on these suhsoil plots. Rooting data are also being analyzed. Some of these analyses are yet to be completed.

In 1999, the Sod Producers International will be held on the M.S.U. campus and will be cohosted by M.S.U. and the Sod Growers Association of Michigan. The land immediately west of the Hancock Center across Farm Lane will be the site for the equipment show and demonstrations. In cooperation with sod growers and companies that serve the sod industry in Michigan, Mark Collins seeded the site with Kentucky bluegrass this past August. It will be maintained as sod in preparation for that event. We are proud to be cohosting their annual Field Day.