TURFGRASS SOIL MANAGEMENT RESEARCH REPORT-1996

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MULCHING LEAVES INTO TURFGRASS STUDIES

The disposal of yard waste to landfills was eliminated as the Solid Waste Management Act became effective March 27, 1995. In 1991 an oak and maple leaf mulching study was initiated at Michigan State University to study the effects of mulching different types of leaves into an existing turfgrass stand. Either maple or oak leaves were mulched 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 second variable, nitrogen, was also included in the study. On improved bluegrass varieties, such as "Midnight", proper fertility is a must to maintain the desired stand of grass. 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 included to further examine the impact nitrogen had on the decomposition of the tree leaves. There were three replications of each treatment. Plots measured 4 feet by 12 feet.

In Tables 1 and 2 are the color and quality ratings taken regarding leaf type. The data give an average across nitrogen treatments (thus represents an average of nine plots for each treatment). No statistically significant differences in turfgrass color occurred in 1996. In Table 2 the maple leaf-treated plots had statistically higher quality than the check plots on three dates and higher quality ratings than oak leaf-treated plots on one date. The oak leaf plots had statistically greater quality than the check plot on one date. For interpretation of the statistical probability in these tables, when N.S. appears in the row this means there is no significant difference among the treatment averages. When a number appears such as .02, this means statistics predicts that 98% of the time the same response to the treatments will occur. When .00 appears, this means there is greater than 99% probability the same response will occur. The basis of whether a significant response will occur is based on the 95% level of probability (note LSD@.05), or 95 times out of 100 we can expect the same results.

Table 1.

Oak & Maple Leaf Mulch Study 1996

Initiated 1991

Color Ratings (9 = excellent, 6 and better is acceptable, 1 = dead)

	May 10	June 13	July 2	July 17	Aug 8	Sept 11	Nov 11
No leaves	6.2	5.9	6.1	6.9	7.4	7.1	7.0
Oak	6.6	6.2	6.8	7.1	7.3	7.2	7.2
Maple	6.0	6.3	6.4	7.2	7.5	7.0	7.2
Probability	N.S.[#]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
LSD @ .05	.87	.75	1.16	.45	.51	.46	.38

[#] N.S. - No significant difference

Table 2.

Oak & Maple Leaf Mulch Study 1996

Initiated 1991

Quality Ratings (9 = excellent, 6 and better is acceptable, 1 = dead)

	May 10	June 13	July 2	July 17	Aug 8	Sept 11	Nov 11
No leaves	5.3	5.4	4.9 b	6.5	6.7 b	6.0	6.5 b
Oak	5.5	5.4	6.2 a	6.7	6.7 b	6.5	6.9 ab
Maple	5.5	6.0	6.7 a	7.0	7.5 a	6.7	7.2 a
Probability	N.S.	N.S.	.02	N.S.	.00 *	N.S.	.03 *
LSD @ .05	.86	.88	1.18	.50	.46	.63	.48

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

* Statistical interaction between leaf type and nitrogen program.

In 1995 no weeds grew in any plots treated with maple leaves. In 1996 no herbicides were applied and broad leaf weed counts were made on four dates during the season. The broad leaf weeds were generally dandelion and plantain. One bunch of clover slowly grew into and eventually took over 25% of one of the check plots, but that data is not recorded. In Table 3 are the broad leaf weeds counts per mulching treatment. It is interesting to note that there were no differences in weed counts early in the season while in July and September, differences occurred. The major difference was the lower weed counts in the maple leaf-treated plots compared to the check and oak-treated plots. No explanation for the difference between the oak and maple plots is apparent.

Table 3.

Oak & Maple Leaf Mulch Study 1996

Initiated 1991

Broad Leaf Weed Counts (Number per plot)

	May 10	June 13	July 2	Sept 20
No leaves	3.8	4.0	4.4 ab	12.4 a
Oak	3.3	4.8	5.4 a	10.3 a
Maple	0.4	0.4	0.3 b	1.4 b
Probability	N.S.	N.S.	.08	.03 *
LSD @ .05	2.61	3.99	3.74	8.10

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

* Statistical interaction between leaf type and nitrogen program.

Tables 4 and 5 reflect data taken from the same plots regarding nitrogen timing. Plots receiving nitrogen (Table 4) had much higher quality ratings than the check as would be expected. The first ratings taken in May reflect the turf response to the April application for the spring fertilizer program. A rating taken in early April would have had higher ratings for the fall program. The spring of 1996 was again an unusually cold with slow recovery from dormancy when nitrogen was limiting. In this regard the late fall and early spring nitrogen treatments provided quicker green-up than check plots. The latter showed little improvement until into July. Even then, the check plots never achieved an acceptable quality rating during the growing season. Data in Table 5 provides proof that a good turf fertility program is a key factor in an integrated weed control program. Weed numbers continued to increase in the check plot throughout the season while there was no change in plots receiving nitrogen. This applies for both improved and common Kentucky bluegrass cultivars.

Table 4.

Oak & Maple Leaf Mulch Study 1996

Initiated 1991

Quality Ratings (9 = excellent, 6 and better is acceptable, 1 = dead)

	May 10	June 13	July 2	July 17	Aug 8	Sept 11	Nov 11
No Nitrogen	3.6 c	3.5 b	4.2 b	5.5 c	5.6 b	5.6 b	5.4 c
Spring N	6.8 a	6.5 a	6.7 a	7.9 a	7.2 a	6.7 a	7.2 b
Fall N	5.8 b	6.7 a	6.9 a	6.8 b	7.6 a	6.9 a	7.9 a
Probability	.00	.00	.00	.00	.00 *	.00 *	.00 *
LSD @ .05	.86	.88	1.18	.50	.46	.63	.48

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

* Statistical interaction between leaf type and nitrogen program.

Table 5.

Oak & Maple Leaf Mulch Study 1996

Initiated 1991

Broad Leaf Weed Counts (Number per plot)

	May 10	June 13	July 2	Sept 20
No Nitrogen	7.1 a	8.5 a	9.3 a	20.4 a
Spring N Program	0.2 b	0.3 b	0.1 b	1.8 b
Fall N Program	0.2 b	0.3 b	0.8 b	2.0 b
Probability	.00	.00	.00	.00 *
LSD @ .05	2.61	3.99	3.74	7.10

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

* Statistical interaction exist between leaf type and nitrogen program.

Three new leaf mulch studies were initiated during the Fall of 1996. One of these is located in a heavy shade area on campus. This study includes either oak or maple leaves applied at several rates, including rates as high as 450 lbs. of leaves per 1000 sq. ft. (Over 12 inches of leaves) either in one application or split over 3 applications at weekly intervals. Another study includes a mowing height variable with plots mowed at either 1.5 inches or 3 inches. Rates of leaves are up to 450 lbs. per 1000 sq. ft. in one or three applications. The objective of this study is to determine the effect of mowing height and heavy leaf rates on turf survival. Samples of leaves have been collected and are being screened to determine particle size of the leaves.

II. GOLF SPIKE TRAFFIC STUDY

On July 25, 1996 a study was initiated to evaluate the effects of different golf shoe spikes on green speed. Extra Traction Soft Spikes and Greenspikes, both plastic type spikes, were donated by the respective companies and the Michigan Turfgrass Foundation provided money to purchase three identical pairs of golf shoes. Soft Spikes were placed in one pair of shoes, Greenspikes in another, and metal spikes remained in the third pair. On 17 days of the 22 day study one individual walked the same number of times across each plot (1 foot by 17 feet) wearing the appropriate shoes. Twenty passes were generally made on the day of a stimping event (40 passes on the final day) and on non-data collection days 10 passes were made.

Data are given in Table 6. Numbers reflect the average green speed taken from 18 plots. On all four dates of stimpmeter data collection the metal spikes resulted in statistically slower green speeds than the Greenspikes, and on three of the four dates Soft Spikes were faster than the metal spiked greens. On August 9 the Greenspike-trafficked greens were approximately 3 inches faster than for Soft Spike-treated greens, a difference that would not be noticed by most golfers. Except for the August 16 data the difference between Greenspike and metal spiked greens was greater than 6 inches. Six inches is the length generally regarded as