MOWING, THATCH, AND NITROGEN FERTILIZATION PRACTICES AS RELATED TO TURFGRASS QUALITY AND DISEASE INCIDENCE

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The objective of this paper is to review the progress and results of selected turfgrass physiology and ecology research projects at Michigan State University during the past year. The investigations reported were partially supported by grants from the Michigan Turfgrass Foundation and the O.J. Noer Research Foundation as well as through donations of maintenance equipment, chemicals, fertilizers, and irrigation equipment by numerous turfgrass equipment and chemical companies throughout the state.

REEL VERSUS ROTARY MOWER COMPARISONS

The effects of reel and rotary mowing at four heights of cut were compared over a period of ten years. The four cutting heights were 0.5, 1.0 and 2.0 inches. The experimental plots were mowed twice per week with clippings returned. Precautions were taken to ensure that the mowers were properly adjusted and sharpened at all times. The turfgrass species utilized was Kentucky bluegrass with a split plot design of three replications in which one-half was composed of Merion Kentucky bluegrass and one-half Delta Kentucky bluegrass. Results of this ten-year study can be summarized as follows.

Mowing with a reel type mower resulted in a better appearance and quality of cut than a rotary mower. The impact action of the rotary mower resulted in a macerated, browned tissue at the upper most tip of the cut leaf that was not evident on the reel type mower which has a truer cutting action. The degree of injury from a rotary type mower was most evident at (a) the lower heights of cut, (b) at times of the year when the turf was growing rapidly, and (c) at higher levels of turfgrass culture, particularly the nitrogen level and irrigation frequency.

The height of cut has a significant effect on the shoot density of turfs as shown in Table 1. As the cutting height was lowered from 2 to 0.5 inches the shoot density was increased by 36%.

Table 1. Influence of four cutting heights on the shoot density of a Kentucky bluegrass turf.

Cutting height (inches)	Shoot density (per sq. dm)
0.5	348
1.0	291
1.5	257
2.0	224

No comparable effect on shoot density was obtained between reel and rotary mowed plots of the same cutting height. There was a tendency however for the turf mowed with the rotary type mower to be more prone to penetration and infection by certain diseases, particularly stripe smut. These results have been confirmed by a duplicate study conducted by the turfgrass researchers at Ohio State University in Columbus, Ohio. The MSU experiment was terminated on August of 1971.

MOWING AND DETHATCHING PRACTICES INFLUENCING TYPHULA BLIGHT INCIDENCE

The experiment was established in 1962 on a Merion Kentucky bluegrass turf. The objective was to determine the turfgrass cultural system which would minimize the rate of thatch accumulation. The treatments were initiated in a randomized block design of four replications as follows:

1. Cutting heights of (a) one, and (b) two inches.

2. Clippings either (a) removed, or (b) left at the time of mowing

3. Vertical mowing (a) none, and (b) annually in October.

4. Nitrogen fertility levels of (a) four, (b) six, (c) eight, (d) ten (e) twelve, and (f) fourteen pounds per 1000 sq. ft. per year.

The various cultural practices were utilized in all possible combinations of 192 treatments.

During the winters of 1969-70 and 1970-71 distinct differences in the incidence of Typhula blight on the Merion Kentucky bluegrass turf were noted among the various mowing and dethatching treatments. These are summarized in Table 2.

Table 2. Influence of cutting height, clipping removal, and dethatching by vertical mowing on Typhula blight incidence.

Cutting height (inches)	Clippings: R-removed L-left	Thatch: D-dethatched N-not dethatched	Percent of area infected with Typhula blight
1	L	N	0.7
1	L	D	2.3
1	R	N	12.3
2	L	D	13.7
2	L	N	14.3
1	R	D	16.3
2	R	N	35.0
2	R	D	60.0

The two most striking effects observed during both winters resulted from the height of cut and whether the clippings were removed or returned. The one-inch cutting height with clippings returned resulted in a negligible amount of Typhula blight whereas the plots cut at 2 inches with clippings

removed had from 35 to 60% of the area infected with Typhula blight. Although the effect was not as consistent, the annual dethatching practice involving vertical mowing did tend to increase the incidence of Typhula blight. Finally. the degree of Typhula blight injury tended to increase with the level of nitrogen fertilization, although this effect was not as striking as the effect of cutting height and clipping removal. These results indicate that the degree of Typhula blight development can be reduced significantly by the proper selection of turfgrass cultural practices.

INFLUENCE OF NITROGEN FERTILITY LEVEL ON THE DEVELOPMENT OF TRICHOLOMA FAIRY RING IN MERION KENTUCKY BLUEGRASS

Nitrogen-potassium nutritional studies were initiated in 1967 on a mature Merion Kentucky bluegrass turf. Included were nitrogen levels of 0, 4, 8, 12, and 16 pounds per 1000 sq. ft. annually and potassium levels of 0, 2, 4, 6, and 8 pounds per 1000 sq. ft. applied annually. These treatments were utilized in all possible combinations in a randomized block design of three replications. Apparent differences in the incidence of fairy ring across the nitrogen levels became evident within two years. These responses are summarized in Table 3. Nitrogen levels of 8 pounds per 1000 sq. ft. or above definitely increased the incidence of Tricholoma fairy ring. No differential responses were associated with the level of potassium nutrition.

Table 3. Influence of five nitrogen fertility levels on Tricholoma fairy ring incidence in a Merion Kentucky bluegrass turf.

Annual nitrogen application (lb/1000 sq. ft.)	Number of fairy rings
0	0a
4	0a
8	3 b
12	5 c
16	6 c

This type of nitrogen response has subsequently been observed on several Kentucky bluegrass sod fields within the state. The actual causal organism was identified by Dr. Joe Vargas who has subsequently found that this particular fairy ring causing organism is quite wide-spread throughout the state and is one of the most common fairy ring diseases.

In the past it has been a common practice to make a nitrogen application when fairy rings develop in an attempt to mask the darker green ring. In the case of this particular fairy ring it could actually cause an increase in the incidence of the disease. Thus, one should be cognizant that there are over 30 different species that can cause fairy ring and that they may respond differently to various cultural and control practices.