MICHIGAN

TURFGRASS

REPORT

SPRING 1971

Michigan Agricultural Experiment Station

Michigan State University

East Lansing

(NOT FOR PUBLICATION)

ANNOUNCEMENTS

Here are several important dates for you to remember. Now is the time to place these dates on your calendar.

The Sod Producers Field Day will be held jointly with the American Sod Producers annual meeting, June 29, at the Michigan State University Muck Experimental Farm.

The Michigan State University Turfgrass Field Day will be held at the Crop Science Field Laboratory in East Lansing, September 9.

Detailed information can be obtained from Robert C. Shearman, Turfgrass Extension Associate, Department of Crop and Soil Sciences, Agricultural Hall, MSU, East Lansing, Michigan 48823.

WINTER TURFGRASS CONFERENCE

The 41st annual Michigan Turfgrass Conference was held January 26-27, at the Kellogg Center. There were 510 professional turfmen in attendance for the two-day program. They heard reports on the latest turfgrass research developments at Michigan State University. Featured among these reports were: (a) nematodes as a newly documented problem in Michigan turfs, (b) control of Fusarium blight and powdery mildew on Merion Kentucky bluegrass by Benomyl, a newly released systemic fungicide, and (c) an interaction between the application of arsenic and low temperature kill. Some other reports covered the use of dual-purpose winter protection covers to prevent desiccation of golf greens, the potential use of Endothal for Poa annua control, and factors that influence the stomatal density and water use rate of turfgrasses.

The afternoon session on January 26 was divided for the first time into three special interest sessions. The individual sessions covered: (a) professional lawn care, (b) golf courses, and (c) grounds, parks, and recreational areas. These were well accepted by the attendees in each subject area. Thus, we plan to continue development of these three interest groups at future conferences.

The morning session on January 27 was devoted to the role of turf in maintaining environmental quality. The session was opened by Dr. Beard with a report indicating the positive and negative aspects of turf in maintaining environmental quality. The value of erosion control, dust stabilization, heat dissipation, noise abatement, safety, and visual pollution reduction were emphasized. The use of heavy metal fungicides and possible alternatives such as Demosan for Typhula blight control were

discussed by Dr. Vargas. Herbicide degradation was described by Mr. Alfred J. Turgeon, who reported on the role of activated-charcoal in deactivating herbicide residues and its possible use for counteracting herbicide misapplication. Dr. William Klomparens, Director of Agricultural Research and Development of the Upjohn Company, discussed the role of industry in pesticide development.

GCSAA SCHOLARSHIPS AND OUTSTANDING STUDENT AWARD

The annual turfgrass awards and honors were presented at the noon luncheon on January 26 at the 41st Annual Michigan Turfgrass Conference. The Golf Course Superintendents Association of America Scholarship awards were presented to four Michigan State University turfgrass students: Carl T. Bennett, Orillia, Ontario, Canada; Greg W. Chipley, Wilmette, Illinois; Merrill L. Fullmer, Sarasota, Florida; and Stephen A. Stewart, Ottawa, Ontario, Canada. The presentations were made by Mr. Norman W. Kramer, President of the Golf Course Superintendents Association of America. The Michigan Turfgrass Foundation Outstanding Student Award for the MSU Turfgrass Technical Training Program was presented to Mr. M. Joseph Yoder. Joe Yoder served as the president of the MSU Turfgrass Management Club for the past year.

MICHIGAN TURFGRASS MERITORIOUS SERVICE AWARD

This year's Meritorious Service Award presented by the Michigan Turfgrass Foundation was given posthumously to Mr. George A. Priestkorn, Sr. He had been very active in promoting turfgrass education and research through the Michigan Turfgrass Foundation. Mr. Priestkorn was one of the

pioneers in developing the Michigan Golf Day. The award was accepted by his son, George W. Priestkorn. Mr. Priestkorn is the fifth recipient of the award. His name will join the list of Dr. James Tyson, Mr. Charles Chapman, Mr. Clarence Wolfrom, and Dr. Kenyon T. Payne.

TURFGRASS MANAGEMENT INSTITUTE OF AGRICULTURAL TECHNOLOGY

By K. T. Payne

The two-year training program in turfgrass management was initiated in the fall of 1966. Dr. John W. King served as coordinator from that time until February, 1970. Dr. K. T. Payne has assumed responsibilities as coordinator since that time. Five men graduated as the first class in 1968.

First-year enrollments were 32 in 1968, 31 in 1969, and 40 in 1970. Second-year enrollments were 18 in 1968, 25 in 1969, and 24 in 1970, for totals of 50, 56, and 64 in the three years respectively. In 1970, it became necessary to limit the entering class to 40, because of limited classroom capacity in supporting departments. It is felt that this level will provide an appropriate number of graduates annually for the needs of the industry in the next few years. Over 50 applications and several dozen inquiries have been received for the class entering in September, 1971.

Over 90 percent of those taking the course are interested in preparing for careers as golf course superintendents. One or two in each class have sod production as their career goals. Several graduates of the two-year program with 3.0 or better academic records have gone on to the four-year option in turfgrass management, which leads to the B.S. degree at Michigan State University.

The average annual starting salary for 1971 graduates was over $8,000. Most have gone to golf course positions, with some in park management, grass seed production, and sod production. A continuing effort is being made to upgrade the courses. It is reported that the program is gaining an excellent reputation nationally.

Students work as participant-trainees on golf courses or sod farms from March to September, between their first and second years at MSU. We will be contacting courses in November and December to see whether they may have positions for trainees in 1972. About 35 will be looking for positions.

A brochure is available which describes the program, the courses, and the approximate costs.

THE INFLUENCE OF TEMPERATURE AND OTHER ENVIRONMENTAL FACTORS ON NITRATE REDUCTASE ACTIVITY OF AGROSTIS PALUSTRIS HUDS.

by Mr. John E. Kaufmann and Dr. James B. Beard

Bentgrass is grown widely in the cool-humid regions as a putting green turf. It is commonly subjected to high temperature growth inhibition, when grown under the maintenance practices required on greens. Bermudagrass is grown under these same cultural practices in the warm, humid regions. It has superior tolerance to heat stress when compared to the bentgrasses.

Nitrate reductase is an important enzyme in the pathway providing nitrogen to the plant in a reduced form, readily available for synthesis of protein. The objective of this study was to determine the influence of temperature, light, nutrient application, and cutting height on the nitrate reductase activity of creeping bentgrass (Agrostis palustris

Buds), cultivar Toronto and bermudagrass (Cynodon dactylon L.), cultivar Tifgreen. These two species have distinctly different temperature optimums for growth, 60-65° F, and 85-90° F, respectively.

When bentgrass was grown at 60° F and bermudagrass at 85° F, the nitrate reductase activity was higher: (a) in the leaf blade than in the stem, (b) following an application of nitrate nutrient solution, (c) under greater light intensities, and (d) after a period of light exposure.

Bentgrass leaves exhibited an inhibition of growth and a reduction of the nitrate reductase level when grown at 95° F to 104° F, while bermudagrass leaves were relatively unaffected. This reduction of the activity could involve an inhibition of enzyme synthesis for deactivation of the enzymes. It was found that the bentgrass enzyme preparation was also deactivated by these same temperatures.

Before heat stress of bentgrass putting greens can be effectively controlled, the cause must be identified at the biochemical level. One possible cause, outlined in this study, indicates the pathway of plant nitrogen utilization is blocked by the deactivation of the nitrate reductase enzyme. Continuing investigation concerning this problem are underway.

Summary from M.S. Thesis completed March, 1970 by J. E. Kaufmann under the direction of Dr. J. B. Beard.

INVESTIGATIONS OF TURFGRASS THATCH

by Mr. David P. Martin and Dr. James B. Beard

The objectives of the thatch investigation were to determine: (1) the chemical nature of the thatch layer obtained from three turfgrass species, and (2) the influence of several materials on increasing biological degradation of the thatch by stimulating microorganism activity.

Total cell wall, hemicellulose, cellulose, and lignin analysis were made on the thatch layer and on the leaves, stems, and roots of Toronto creeping bentgrass, Merion Kentucky bluegrass, and Pennlawn red fescue. Lignin, the most resistant plant constituent to microbial activity was found in greatest quantities in the thatch layer nearest the soil. Red fescue thatch contained higher percentages of lignin than the other two species. In comparing the living plant parts, the roots have significantly higher percentages of total cell wall constituents and lignin than the stems or leaves. Total lignin content was higher in red fescue plants than in Kentucky bluegrass and creeping bentgrass. Of particular interest was the high lignin content of red fescue stems compared to the other two species. This correlates with the observation of intact red fescue stems occurring throughout the thatch layer. From the chemical measurements of cell wall constituents performed in this study, it can be concluded that the clippings of turfgrasses contribute very little to the thatch accumulation. Visual observations of the thatch layer confirm the decomposition of clippings after a relatively short period of time.

An attempt was also made to increase biological degradation of thatch by the addition of several materials. Carbon dioxide evolution was used as an indicator of microbial activity *in vitro*. Carbon dioxide evolved

from the treated thatch compared to nontreated thatch and total cell wall determinations indicated that increased decomposition was occurring. The material used and the rate of application influenced the amount of carbon dioxide evolved. It was also found that a pH of 6 was optimum for microbial activity under the conditions of this study.

Most of the thatch research in the past attempted to find the best management program and mechanical renovation procedure to reduce thatch accumulation. The new focus in thatch research must be toward increasing biological degradation of the thatch layer. This initial study must not be interpreted as having immediate field application. Many questions remain unanswered, such as the best material to use, the proper rate, frequency of application, microbial populations as affected by pesticides, and whether this procedure will be effective in the field. It is hoped that more research will be initiated in this area in the near future and that more feasible solutions will be found than are presently available.

Summary from M.S. Thesis completed May, 1970 by D. P. Martin under the direction of Dr. J. B. Beard.

BROADLEAVED WEED CONTROL IN TURF

By A. J. Turgeon

The first step in controlling broadleaved weeds in turf is to follow recommended practices of mowing, fertilizing, and watering. In addition, the selection of an adapted turfgrass species or a mixture would be made in accordance with the environmental conditions to which the turf will be subjected.

Herbicides that are typically used for controlling broadleaved weeds in turf include: 2,4-D, Silvex, MCPP, and Dicamba. Generally, 2,4-D in combination with one of the other materials will provide a broad spectrum control of most broadleaved weeds. The use of Silvex should be restricted to cool weather periods, as turf injury may otherwise occur. Also, Dicamba may injure desirable trees and shrubs when applied in close proximity to their root systems. MCPP is generally regarded as safe for use on bentgrass turf; however, it may be more injurious to turfgrass seedlings than the other materials. New seedlings should not be sprayed with these herbicides for at least six to eight weeks. Purslane, chickweed, and other weeds occurring in new seedlings are generally killed or set back with the first frost in the fall. Hence, late summer or fall seedings rarely require the use of herbicides for control of annual weeds.

The occurrence of large weed populations in turf is often an indication of mismanagement; therefore, any attempt to control these weeds with herbicides should be part of an integrated program involving the use of sound management practices. Herbicides will not grow turf and should be used only to augment the management program.