MICHIGAN

TURFGRASS

REPORT

WINTER 1970

Michigan Agricultural Experiment Station

Michigan State University

East Lansing

(NOT FOR PUBLICATION)

THE 1970 GROWING SEASON IN REVIEW

Winter: The 1969-70 winter was relatively mild in terms of turfgrass injury. No significant desiccation or low temperature kill problems developed, in contrast to the previous two years. This minimal degree of injury is attributed to the late winter snow covers and subsequent timely rains which minimized desiccation. A normal incidence of Typhula blight occurred during the winter period which was readily controlled by the appropriate fungicides.

Spring: Above average Sclerotinia dollar spot disease infestations occurred during the early portion of 1970 due to the cool, moist weather. The most severe Helminthosporium leaf spot attack in 10 years occurred in late May of 1970. This resulted in serious thinning of most Kentucky bluegrass turfs which did not contain a dominance of leaf spot resistant varieties. Fortunately, moisture conditions following the May leaf spot attack were favorable for turfgrass recovery. Even then, some invasion of off-type weedy species, particularly annual bluegrass, was evident in many of the thinned areas.

Summer: An above normal level of rainfall occurred from May through mid-July. This precipitation caused excessive leaching of plant nutrients, particularly nitrogen, and required the use of above normal amounts of fertilizer for the remainder of the growing season. In addition, the high soil moisture levels caused increased proneness to compaction on soils receiving intense traffic. Consequently, additional cultivation of the compacted areas by coring or slicing was required in order to correct the soil compaction problems.

The June and July rains also favored extensive germination of crabgrass seed over a longer period of time. This enhanced the development of crabgrass problems in many Michigan turfs.

After the rains ceased in mid-July, high temperatures persisted through the remainder of July and August causing severe stress conditions. Loss of annual bluegrass on intensively cultured turfs occurred, due to (a) high August soil temperatures, (b) a short root system caused by the previously saturated soil conditions, and (c) a rapid transition from moist to droughty conditions which did not permit the annual bluegrass plants to become hardened.

The rapid occurrence of a moisture stress also resulted in the development of Fusarium blight on Kentucky bluegrass. The disease was most severe on turfs lacking adequate irrigation systems or not receiving proper irrigation practices.

Fall: The fall growing season was characterized by rather cool, moist conditions. The extended period of favorable rainfall and soil moisture was quite beneficial for the establishment of new turfs or the renovation of areas previously thinned by loss of Poa annua or disease. These conditions also favored the development of stripe smut on Kentucky bluegrass and Sclerotinia dollar spot on intensively cultured turfs.

New Best Developments:

A. Stripe smut developed to a significant level in Michigan during 1970 and may be a serious problem on Merion Kentucky bluegrass in 1971.

B. The first confirmed observations of stripe smut on Michigan's bentgrass greens was observed during 1970 in the Saginaw area.

C. The first actual nematode damage to turfs was documented on greens in the Detroit area during 1970 Very high nematode populations counts were found associated with the damage areas.

Comment: The abnormally wet conditions during the past several growing seasons has permitted the professional turfmen to observe and note those areas where surface or subsurface drainage problems exist. Whenever a problem is noted, it should be recorded and future plans developed for correcting the problem through (a) surface contouring, (b) tilling, (c) slit trenching, or (d) dry wells. Future problems can be minimized or avoided by taking steps to correct drainage problems at this time. Specific budgeting should be set up where considerable work is involved.

TURFGRASS FIELD DAY

The Northern Michigan Turfgrass Field Day was held at the Traverse City Country Club in Traverse City, Michigan, on September 9, 1970. Some 242 professional turfmen attended an excellent program. The turfgrass varietal and fertility research plots were viewed during the morning sessions. Discussions on dual-purpose winter protection covers and broad-leaved weed identification and control were also discussed. The afternoon session was chaired by Mike Thomas, Extension Director of Leelanau County. This session was devoted to pesticide and turfgrass fertilization programs as they influence environmental quality.

The afternoon session was terminated by an equipment exhibit highlighted by demonstrations of triplex greens mowers, turfgrass vacuum sweepers, and sprayers.

A very special acknowledgement is given to Mr. Ed Karcheski and the Traverse City Country Club for their kind cooperation in hosting this important event. Their continual cooperation in maintenance of the Turfgrass Experimental Plots is greatly appreciated by the Michigan turfgrass industry.

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The Northern Michigan Turfgrass Field Day saw the addition of a new graduate student to the Michigan State University Turfgrass Research group. James E. Bogart will be working with Bob Shearman in Turfgrass Extension. Jim is a native of St. Joseph, Michigan. He received his B.S. degree from Michigan State University in December, 1967. Jim was well known in the Crop Science Department. He was studying turfgrass management on a music scholarship and held a responsible position as head manager of the MSU Bands. While studying towards his B.S. degree, Jim spent five summers working at Blossom Trails Golf Club in Benton Harbor, Michigan. He recently returned from a two-year tour of duty with the United States Army where he was stationed at Fort Belvoir, Virginia, and was the drum major of the 75th Army (Engineer) Band. Jim will now be working toward his M.S. degree in the area of turfgrass ecology, with additional interests in the areas of golf course design and construction.

THE 41st ANNUAL MICHIGAN TURFGRASS CONFERENCE

The 41st Annual Michigan Turfgrass Conference will be held January 26 through 27, 1971, at the Kellogg Center on the MSU campus. Program planning has been completed with the assistance of the board of directors of the Michigan Turfgrass Foundation. In addition to the well attended session of MSU turfgrass research reports, there will be a special session on turfgrass culture in relation to environmental quality. The afternoon of January 26th will see the introduction of a new phase for the turfgrass conference. Midway through the afternoon session the program will be divided into special interest sections concerning (a) golf courses, (b) lawns, and (c) parks and recreational areas. Talks by University personnel and panel discussions involving Michigan's professional turfmen will highlight these sections. The sod production section will be held the afternoon of January 27. The 40th Annual Michigan Turfgrass Conference was highlighted by a fine program, excellent speakers, and a record attendance of 512 participants. This year's conference should exceed the 1970 event.

TYPHULA SNOW MOLD CONTROL

Dr. J. M. Vargas, Jr. and Dr. J. B. Beard

Boyne Highlands, Michigan, was selected as the experimental site for this snow mold fungicide study since a uniform attack of Typhula snow mold was assured. The Penncross bentgrass turf was covered with snow from mid-November until mid-April.

The results of investigations concerning (a) the third year of fungicide evaluations for the control of Typhula snow mold and (b) the first year of a study to determine the optimum time of application for snow mold fungicides are presented in this report.

The three fungicide application dates during 1969 were September 15, October 15, and November 7. All plots were evaluated on April 12, 1970. Demosan was not available for the September 15 application so only Calo-gran, Scutl and PMAS were included. The results are given in Table I. Only Calo-gran was effective when applied at this early date.

Table I. The percent Snow Mold Present in the Plots Which Received Treatments on September 15, 1969.

Fungicide Treatment	Rate/100 $ft.^2$	Percent Snow Mold Ave.	Multiple Comparison Test
Calo-gran	8 lbs.	3.6	a
Scutl	------	78.3	b
Check	------	90.0	b
PMAS	2 oz.	91.6	b

Those treatments with the same letter are not significantly different at the 1% level (Duncan's Multiple Range Test).

Two granular and two wettable powder rates of Demosan were included in the October 15 trials in addition to the materials used in the September trials. The results are given in Table II. Calo-gran, the two granular Demosans, and the 9 ounce wettable powder Demosan all gave excellent control when applied at this early date.

Table II. The Percent Snow Mold Present inthe Plots Which Received Treatments on October 15, 1969.

Fungicide Treatment	Rate/1000 ft.^{2} A	Percent Snow Mold Ave.	Multiple Comparison Test
Calo-gran	8 lbs.	1.3	a
Demosan	3.75 lbs.	1.6	a
Demosan	2.5 lbs.	4.0	a
Demosan	9 oz.	7.6	a
Scutl	------	20.0	ab
Demosan	6 oz.	50.0	bc
PMAS	2 oz.	73.3	c
Check	------	73.3	c

Those treatments with the same letter are not significantly different at the 1% level (Duncan's Multiple Range Test).

The November 7 trials also included other fungicides which were in their third year of evaluation for effectiveness in controlling snow mold. The results are given in Table III. Again, Calo-gran, granular Demosan, and the 9 ounce wettable powder Demosan all gave excellent control. In addition, the 4 ounce rate of Calo-clor gave excellent control.

Table III. The Percent Snow Mold Present in the Plots Which Received Treatments on November 7.

Fungicide Treatment	Rate/1000 ft.^{2}	Percent Snow Mold Ave.	Multiple Comparison Test
Calo-gran	8 lbs.	0	a
Demosan	3.75	4	a
Calo-clor	4 oz.	4.3	a
Demosan	2.5 lbs.	7.3*	a
Demosan	9 oz.	11.6	a
Scutl	-----	20.0	ab
Cadminum	3 oz.	23.3	abc
Panogen	3 oz.	31.6	abc
Cadminum	5 oz.	33.3	abc
Tersan O.M.	8 oz	36.7	abc
PMAS	2 oz.	50.0	bcd
Demosan	6 oz.	53.0	cde
T.B.Z.	4 oz.	75.0	de
Check	-----	86.0	e

Those treatments with the same letter are not significantly different at the 1% level (Duncan's Multiple Range Test).

*appears to be spring infection

The present recommendation for the application of snow mold fungicides is to apply just prior to the first permanent snowfall. The preceding data indicates no difference between the percent snow mold from the October 15 applications compared to the November 7 applications of Calo-gran, granular Demosan (at both the 3.75 and the 2.5 pound rates), and the 9 ounce rate of wettable powder Demosan. If the data in subsequent years confirms these findings, it may be more desirable to apply the fungicide at an earlier date to avoid problems that may occur from an unexpected early snow.

PROTECTING TURFS AGAINST WINTER INJURY

by

Dr. James B. Beard

Detailed studies over the past eight years at Michigan State University have shown the three major causes of turfgrass winter injury to be: (a) direct low temperature kill, (b) desiccation, and (c) diseases caused by low temperature fungi, particularly Typhula blight. Each of the major causes of winter injury requires specific practices in order to minimize turfgrass damage.

GENERAL CULTURAL PRACTICES INFLUENCING WINTER INJURY

Low Temperature: Direct low temperature kill can be minimized by (a) The use of the more low temperature hardy turfgrasses such as creeping bentgrass and Kentucky bluegrass, (b) Avoiding hydration of the turfgrass crowns during the winter period by insuring rapid surface and sub-surface drainage of water, (c) Avoiding cultural practices which stimulate late fall and early winter shoot growth. Of special concern are excessive applications of nitrogen, particularly when made in the late fall. (d) Insuring a balance in turfgrass nutrition and an adequate potassium level for maximum low temperature hardiness. (e) Avoiding excessively close mowing or severely thatched conditions.

It should be noted that these cultural practices do not guarantee that a turf will not be subjected to winter injury. However, these practices will reduce the extent of winter injury which may occur. The selection of low temperature hardy, turfgrass species and avoiding winter crown hydration are particularly important practices.

Desiccation: Steps which can be taken to minimize desiccation injury to turfs during the winter period include: (a) Insuring that turfgrass soils enter the winter with an adequate level of soil moisture. (b) Avoiding over stimulation of shoot growth caused by excessive applications of nitrogen applied in late fall. (c) Avoid thatched conditions which elevate the roots and crowns above the soil surface. (d) Insure that the turfgrass plants enter the winter period with as deep a root system as possible. (e) Make applications of water to turfs where winter evaporation has lowered the soil moisture to a critical level.

Snow Mold: Typhula blight is the most widespread winter disease which occurs on Michigan turfs, particularly bentgrass and annual bluegrass. Occational incidences of Fusarium patch do occur. Where Typhula blight is a continuing problem, control can be achieved through use of the appropriate fungicide applied in the late fall.

USE OF WINTER PROTECTION COVERS

A more recent development in preventing winter injury of turfs is the use of covers of various types which can be unrolled over intensively cultured turfs such as greens, tees, and athletic fields. During the mid-sixties, Dr. James Watson demonstrated the effectiveness of a clear polyethylene cover in protecting against desiccation injury of turfs and stimulating spring green-up. The polyethylene cover proved quite effective in achieving these two goals but possessed problems such as the critical timing involved in removal of the covers in the spring as well as considerable difficulty in stabilizing the covers against damaging effects of wind.

During the past three years, Michigan State University has devoted considerable effort toward the development of a dual-purpose winter protection cover which provides protection against direct low temperature injury and desiccation as well as providing a controlled rate of spring green-up. These covers are most effectively utilized on turfs subjected to (a) minimal snow accumulation, (b) low amounts of winter precipitation, (c) severe drying winds, (d) large temperature extremes with periodic soil temperatures below 25° F, and (e) negligible winter use.

From the economic standpoint, a winter protection cover will most likely be used on intensively cultured, high quality turfgrass areas. An effective dual-purpose winter protection cover should; (a) prevent winter desiccation injury of turfs by trapping or retaining soil moisture, (b) modify extremes in low temperature which may cause direct injury of turf, (c) reduce the loss of fungicides from turfgrass leaves and crowns, (d) permit sufficient light penetration and energy exchange to stimulate early spring green-up of the turf and (e) provide a degree of temperature insulation so that there is no leathal heat build-up or the stimulation of excessive turfgrass shoot growth.

Types of Winter Protection Covers

There are a number of winter protection covers available commercially including: (a) Conwed Winter Protection Cover, (b) polyethylene (four mill), (c) Saran Shade-94 percent, and (d) Soil Retention Mat. The Conwed Winter Protection Cover, Saran Shade-94 percent, and Soil Retention Mat all provide dual -purpose winter protection against low temperature kill and desiccation while the polyethylene cover is primarily effective in preventing winter desiccation but lacks adequate low temperature insulation. In addition, the polyethylene cover is inferior to the other three because of proneness to wind displacement, a higher potential for lethal heat build-up, and excessive shoot growth during the early spring period prior to removal of the cover. Comparisons among the Conwed Winter Protection Cover, Saran Shade-94 percent, and Soil Retention Mat show the Saran Shade-94 percent is slightly inferior in low temperature protection while the Soil Retention Mat is somewhat inferior to the other two in desiccation prevention.

Guidelines for Cover Installation

The winter protection cover should be installed (a) before the soil freezes or the first permanent snowfall occurs, and (b) after the turf has ceased growth and entered a hardened state, commonly referred to as dormancy. The hardening process of turfgrasses requires approximately 3 to 4 weeks at soil temperature below 40°F.

All clippings and other debris should be removed from the turfgrass surface prior to installation of the cover. In addition, a fungicide should be applied for the control of snow mold diseases which are generally more severe under winter protection covers if a fungicide is not applied.

One additional point should be emphasized. The turfgrass area to be covered should have adequate surface and subsurface drainage. Winter injury of turfs cannot be prevented by the use of a cover if the area is subjected to periodic winter flooding followed by a rapid decline in temperature to below 20° F.

Assuming that the above precautions and steps have been taken, the cover can be unrolled across the turfgrass area. The edges should be overlapped by approximately 1.5 to 2 inches. The cover is then secured against wind or animal displacement by nailing lath with predrilled holes over the overlapping edges and at periodic intervals along each full length.

It is sometimes necessary to provide some kind of restraining fence on turfgrass areas which are prone to human traffic or snowmobile activity. The stability of these covers is such that they can be destroyed or severely damaged if subjected to uncontrolled human or vehicle activity.

Removing the Cover

Proper timing in the removal of a winter protection cover is quite important. It should be removed when there is a relatively low probability of climatic conditions occurring which are favorable for desiccation or direct low temperature injury and after sufficient spring green-up of the covered turf has occurred. In addition, the timing of cover removal is partially determined by the quantity of leaf growth produced under the cover. The cover should be removed early enough so that the initial mowing will not result in scalping of the turf.

A Final Note

The development of dual-purpose winter protection covers is a relatively recent innovation. It has been evaluated under field conditions for two winters in addition to a series of extensive cold chamber and special wind tunnel apparatus studies. This type of cover appears to

have excellent potential but could have some minor problems associated with its use which are not revealed in the tests conducted to date. Accordingly, it is suggested that individuals interested in the possible future use of dual-purpose winter protection covers might wish to utilize one on a limited turfgrass area where he can have the oppor tunity to observe its effectiveness under his own conditions and also to learn how to properly install and remove this type of cover.