CHARTER

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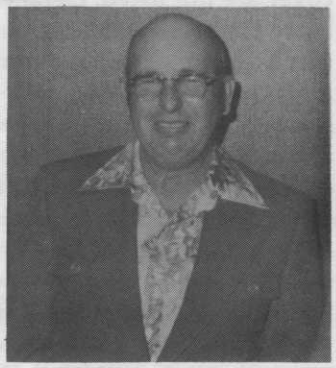
April Meeting

The April 11 meeting will be held at the Talbot Country Club, Easton, Maryland. Your host Ralph MacNeal, was born and raised in Talbot County and was a dairy farmer before going to work at the Country Club in June 1963. Ralph being a farmer and a hard worker, knew how to make things grow. Through self education in the turf field, and the services USGA, he has done an outstanding job.



RALPH MacNEAL

The golf course was originally a nine-hole course and was opened in 1910. In 1962 the services of Ed Ault were acquired to rearrange the old nine holes and add nine more to complete the layout as it is now. The work began in 1963 and the course was open for play in Spring 1964. All work was done through a local contractor by Ralph MacNeal. The greens run from 9,000 to 10,000 sq. ft. of Pencross and are cut at 3/16 of an inch. The fairways and fees are a mixture of bluegrass and fescue and a little bit of bermuda. The entire golf course has a manual irrigation system.

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PRESIDENT'S MESSAGE

Fellow Members:

I'm sure all of you are aware that 1978 marks the 50th year of the Mid-Atlantic Association of Golf Course Superintendents. Golden anniversaries are generally celebrated with "Gusto" and it is the feeling of your Board of Directors that the Mid-Atlantic's be no exception.

Wayne Evans, our illustrious newsletter editor, has been appointed chairman of the 50th Anniversary "Gusto" Committee. I'm sure you have good ideas on how we can best celebrate our anniversary, so let Wayne hear from you. Let's have a celebration we'll long remember, one that our younger members will be able to tell our replacements about when they make plans to celebrate the 100th anniversary of Mid-Atlantic in 2028.

Ralph MacNeal, Superintendent of Talbot Country Club in Easton, Maryland, is hosting our April 11th meeting. Ralph and Talbot Country Club always roll out the green carpet for the Mid-Atlantic. Make plans now for a day of good golf, good fun, good food and a great meeting. See you there.

Yours for finer turf for better golf.

Bill Emerson

Ten Years of Research on Winter Injury on Golf Courses; Causes and Prevention

by Dr. James B. Beard, Michigan State University

Winter injury of turf is difficult to understand because it results from the interaction of a number of environmental, soil, and cultural factors. Before a golf course superintendent can initiate the appropriate cultural program to prevent winter injury, he must determine the particular type or types of winter injury that occur most frequently at various locations on the golf course. This involves a study of the particular symptoms, including time of occurrence, soil type, topography, drainage characteristics, traffic patterns, and the probability of environmental stress. Such information is assembled over a period of years, and a

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Winter Injury—Causes and Prevention

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specific program is established on the golf course in order to minimize the probability of winter injury.

CAUSES OF WINTER INJURY

The four major types of turfgrass winter injury that most commonly occur are presented in Table 1, along with the symptoms and causes of injury. This information has been assembled over a 10-year period of extensive research at Michigan State University. The major types of winter injury are:

Desiccation
Direct low temperature kill
Low temperature diseases
Traffic effects.

Not that ice sheet damage caused by oxygen suffocation or toxic gas accumulations underneath an ice cover are not listed. Detailed investigations at Michigan State University indicate that this type of winter injury rarely occurs. This is in contrast to the many articles by individuals indicating that this is a serious problem. Unfortunately, these earlier writers had essentially no information on which to base their comments other than data from research with alfalfa. The winter injury most commonly associated with extended periods of ice coverage occurs during freezing or thawing periods when standing water increases the crown tissue hydration and subsequent injury of the turfgrass plants when temperatures drop rapidly below 20°F.

PREVENTING WINTER INJURY

Cultural steps can be taken to minimize the potential for injury in the future once the cause or causes of winter injury on specific turfgrass areas on the golf course have been established. The first prerequisite in minimizing all types of winter injury is a healthy turf with adequate carbohydrate reserves and recuperative potential. This phase of winter injury prevention is accomplished during the normal growing season, particularly in the late summer—early fall period. Practices to prevent or at least minimize the potential for turfgrass winter injury can be divided into cultural practices, soil management, and specific winter protectants.

The specific practices utilized in each of these categories are summarized in Table 2. It should be noted

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WAYNE'S PLACE

Last month I wrote an article, a rather pointed one, about the University of Maryland's problem of keeping good personnel. I focused most of the attention on the agronomy department and the loss of Drs.' Hawes, Hall and Powell. I did not mean to single out the agronomy department over any other department in the University. I only used the agronomy department as an example because of the fact that we deal so closely with them, and we are affected by their problems. I felt that the problem of losses of good professors was in fact a problem experienced all through the University. My thoughts were confirmed by a letter from Dr. James Miller. Dr. Miller's letter is printed in this issue, and it explains very well the situation at the University.

Dr. Miller has explained that we really can only help to change this situation by working with the elected officials in Annapolis. Since Dr. Miller wrote to me I've sent many newsletters to many individuals in the state capitol. I hope that we in the Superintendent's Association and our colleagues in related organizations can work together to show Annapolis the necessity of having qualified college professors.

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Bob Shields has suggested that we form a transportation committee. This committee would be made up of people throughout the different areas in the Mid-Atlantic section. They would coordinate car pools for fellows needing rides to the meetings. Bob tells me that this used to be standard procedure. He also told me that not only is it less expensive to travel, but also a great way to increase the camaraderie amongst fellow superintendents.

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Anyone interested in hosting the Pro Superintendents tournament? Due to a schedule problem Washington Golf couldn't host the tournament and we need a place to have it "PDQ." The date is May 9, and if you can host it, please contact Sam Kessel.

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As Bill mentioned in his President's Message, I have been appointed chairman of the "50th Anniversary Celebration." In January 1979 the Mid-Atlantic will celebrate its 50th birthday. Anyone wanting to work on this committee should contact me ASAP. I really need the help from some of the members that have been around awhile. So far all that has been established is that whatever we do should include ladies, not be *too* formal, should be something that all members will like, and will be a memorable occasion. Now you see why I need help. Please contact me at my office if you'd like to help.

Wayne Evans

Winter Injury—Causes and Prevention

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that a number of them apply to more than one type of winter injury. In some cases, the practice that is effective in preventing one type of winter injury will actually increase the probability of damage from another type. For example, snow covers or winter protection covers used to prevent winter desiccation will also maintain temperatures near 32° F which will enhance the probability of snow mold disease activity. This means that when such a practice is in use, steps should also be taken to apply a preventive snow mold fungicide

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application to the turfgrass area prior to installing the winter protection cover.

From a cultural standpoint, the proper control of plant and soil water relations is the most critical factor affecting all phases of turfgrass winter injury. Techniques to adjust the soil-water status must be achieved during the summer period. Finally, it is quite obvious that selection and planting of the appropriate turfgrass species and cultivar can be critical in minimizing the degree of turfgrass injury that may occur. Annual bluegrass is very prone to all types of winter injury. The bentgrasses are considerably less susceptible to injury, and also have a greater recuperative potential from existing vegetative plant parts.

IN SUMMARY: This article gives a brief summary of a great deal of research conducted at Michigan State University over the past 10 years. Portions of it were supported by the U.S.G.A. Green Section Research and Education Fund.

THE AUTHOR; Dr. James B. Beard is a Professor of Turfgrass Science in the department of crop and soil sciences at Michigan State University, East Lansing, Mich. 48823. He has conducted pioneering research in all phases of turfgrass winter injury. In 1971 he was the youngest recipient ever selected to receive the highest honor of Fellow in the American Society of Agronomy. He has authored a new textbook entitled "Turfgrass: Science and Culture" published by Prentice-Hall of Englewood Cliffs, N.J.

TABLE 1. Types, symptoms, and causes of winter injury that most commonly occur on golf course turf

Type of winter injury	Symptoms	Cause of injury	
		External forces	Internal plant effects
A. Desiccation			
(1) Atmospheric	Leaves turn distinctly white but remain erect; occurs most commonly on higher locations that are more exposed to drying winds; can range from small irregular patches to extensive kill of large areas.	A drying atmospheric environment including high winds and low relative humidity; in addition, soil water absorption is reduced at low temperatures or may be inoperative because the soil is frozen.	Desiccation of the plant causes skrinkage and collapse of the protoplasm that results in mechanical damage and death.
(2) Soil	Leaves turn distinctly white and are semi-erect; the tissues including the crown are very dry; commonly occurs in a more extensive pattern over the turf than does atmospheric desiccation.	Extended periods of soil drought due to a drying atmospheric environment and lack of precipitation or irrigation.	(Same as above)
B. Direct low temperature kill	Leaves initially appear water-soaked, turning whitish-brown and progressing to a dark brown; the leaves are limp and tend to lay as a mat over the soil; a distinct, putrid odor is frequently evident; occurs most commonly in poorly drained areas such as soil depressions; frequently appear as large, irregular patches.	A rapid decrease in temperature, particularly the adjacent soil temperature; kill most commonly occurs at soil temperatures below 20°F during the late winter—early spring freezing and thawing periods; may be associated with thawing of an ice cover that occurs from underneath.	Large ice crystals form within the plant tissues causing mechanical destruction of the frozen, brittle protoplasm; the higher the water content of the tissue, the larger the ice crystals and the more severe the kill.
C. Low temperature diseases:			
(1) *Fusarium* patch (pink snow mold)	Pink mycelium on leaves; 1 to 2 inch, tan, circular patches; or white mycelial mass on leaves, white to pink circular patches up to 2 feet in diameter.	*Fusarium nivale;* favored by turfgrass temperatures of 32 to 40°F and moist conditions.	Parasitic action.
(2) Spring dead spot	Appears in the spring as irregular, circular dead sports of up to 3 feet in diameter; shoots, rhizomes, stolons, and roots within the spot will be killed; affected spots commonly reoccur in the same location each year and may gradually enlarge.	Causal organism has not been identified; favored by turfgrass temperatures below 50°F and wet conditions.	Unknown
(3) *Typhula* blight (gray snow mold)	Light gray mycelium on leaves, especially at the margins of the advancing ring; whitish-gray, slimy, circular patches of up to 2 feet in diameter; brown sclerotia are embedded in the leaves and crowns, ranging up to 1/8 inch in diameter.	*Typhula itoana, T. idahoenis,* or *T. ishikariensis;* favored by turfgrass temperatures of 32 to 40°F, especially under an ice cover or during its thaw.	Parasitic action
(4) Winter crown rot	Light gray, matted mycelial growth may be evident on the leaves; irregular shaped patches initially appear yellow and gradually deteriorate to a straw color; individual patches up to 1 foot in diameter may coalesce causing damage over a large area.	Unidentified low temperature *Basidiomycte;* favored by turfgrass temperatures of 28 to 32°F, especially under a snow cover.	Injury results from hydrogen cyanide gas produced by the saporphytic fungus; subsequently the fungus invades the host plant.
D. Traffic			
(1) On frozen turfgrass leaves	Erect, white to light-tan dead leaves appearing in the shape of the footprints or wheels where they have been impressed onto the turf.	Pressure of the traffic (shoes or wheels) on the rigid, frozen tissues; the problem most commonly occurs during the early morning hours.	Disruption of the frozen, brittle protoplasm that has ice crystals surrounding and extending into the plant cell.
(2) On wet, slush covered turf	Leaves initially appear water-soaked turning whitish-brown and progressing to a dark brown; the leaves are limp and tend to lay as a mat over the soil; appears in irregular shapes associated with previous patterns of concentrated traffic; soil rutting may also be evident.	Snow cover thaws to a slushy condition causing increased hydration of the turfgrass crowns; traffic, including snowmobiles, force the wet slush into intimate contact with the turfgrass crowns; kill most commonly occurs if this event is followed by a decrease in temperature to below 20°F.	Not completely understood, but related to the direct low temperature kill mechanism.

TABLE 2. Practices available to minimize winter injury on golf course turf

Types of winter injury	Practices that minimize injury		Specific protectants	Turfgrass species most commonly affected
	Turfgrass cultural	Soil management		
A. Desiccation:				
(1) Atmosphere	Moderate nitrogen nutritional levels. Elimination of any thatch problem.	Do not core in late fall and leave the holes open.	Conwed Winter Protection Blanket Polyethylene (4-6 mil) Saran Shade Cloth (94%) Topdressing (0.4 yd^3/ 1,000 sq. ft.) Windbreaks such as snow fence, brush, or ornamental tree and shrub plantings. Natural organic mulches.	Annual bluegrass
(2) Soil	Moderate nitrogen nutritional levels. Irrigation or hauling of water to critical turfgrass areas.	(Same as above)	(Same as above)	Annual bluegrass
B. Direct low temperature kill	Moderate nitrogen nutritional levels. High potassium nutritional levels. Higher cutting heights. Elimination of any thatch problem. Avoidance of excessive irrigation.	Rapid surface drainage by proper contours, open catch basins, and ditches. Adequate subsurface drainage by drain tile, soil modification with coarse textured materials, slit trenches, and dry wells. Cultivation, especially coring and slicing, when compaction is a problem	Conwed Winter Protection Cover Soil Retention Mat Enhancing a snow cover with a snow fence or brush. Natural organic mulches such as straw. Soil warming by electricity.	Bermudagrass Annual bluegrass Red fescue
C. Low temperature diseases				
(1) *Fusarium* patch	Moderate nitrogen nutritional levels. High potassium and iron nutritional levels. Moderate to low cutting heights. Elimination of any thatch problem.	Avoiding neutral to alkaline soil pH's	Cadmiums Benomyl Daconil Mercuries	Annual bluegrass Bentgrass
(2) Spring dead spot	Avoid excessive winter irrigation. Elimination of any thatch problem.	Provide good surface and subsurface drainage. Cultivate when compaction is a problem.	Nabam, time the applications to be present when soil temperatures are below 50°F and the soil is water saturated.	Bermudagrass
(3) *Typhula* blight	Moderate nitrogen nutritional levels. Moderate to low cutting heights. Elimination of any thatch problem.	Provide good surface and subsurface drainage. Cultivate when compaction is a problem.	Cadmiums Chloroneb Mercuries	Annual bluegrass Bentgrass
(4) Winter crown rot	Elimination of any thatch problem.		Mercuric chloride (2 applications)	Annual bluegrass Bentgrass
D. Traffic:				
(1) On frozen turfgrass leaves	Apply a light application of water in early morning; this is most effective when the soil is not frozen and the air temperatures are above freezing.		Withhold or divert traffic from turfgrass areas during periods when the leaf and stem tissues are frozen.	
(2) On wet, slush covered turf			Withhold traffic on turfgrass areas during wet, slushy conditions, especially if a drastic freeze is anticipated.	Annual bluegrass