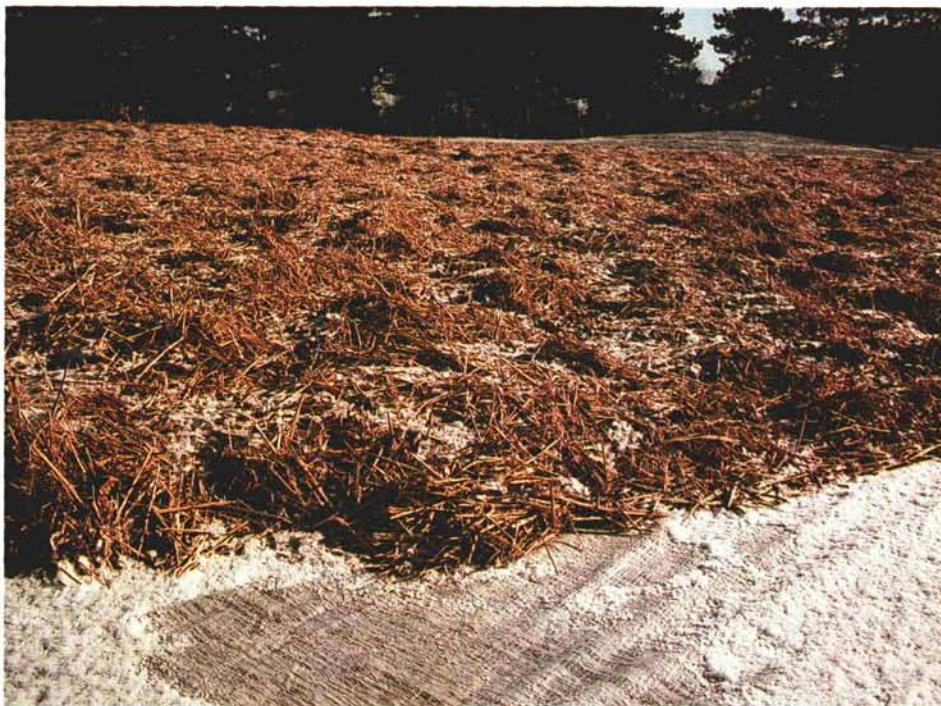


# Covering Up For Winter

by **JIM SKORULSKI**

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*An 8-12" layer of straw placed above a permeable geotextile cover is used successfully at Mt. Bruno Country Club. Many golf course superintendents cover the straw layer with an impermeable cover for added protection.*

**I**T IS NOT UNUSUAL to hear a superintendent utter during times of summer desperation, "If I only took that job in the North; anybody can grow grass up there." Well, I have come to learn that there is no region that does not offer stiff challenges to the turf manager. Granted, the challenges will take on different forms, but all can be equally taxing to one's mental stability. Crown hydration injury is one of those challenges facing superintendents in the North. Mention of the problem will make even the strongest northerners shudder in their insulated boots. Crown hydration injury is a form of ice damage that is most severe on *Poa annua*. Severely damaged greens are often unplayable until the recovery is well advanced in late spring or early summer.

The damage is thought to occur during freeze/thaw cycles when the plant becomes hydrated and then is subjected to a severe drop in temperature. The water within the

plant freezes and expands, causing physical damage to the cells. Damaged plants appear water-soaked and will often remain necrotic in spring. Ice-related injury has been severe throughout central and eastern Canada and the northern United States, where winter temperatures fluctuate widely. Ice is more likely to occur on shaded greens and areas where surface drainage is poor. Turf that has not hardened properly prior to becoming dormant is also more prone to this type of injury.

Attempts are made to mechanically remove ice and heavy snow to prevent the injury. Areas of poor surface drainage are also trenched to prevent water from puddling on the surface. These efforts can be effective; however, where labor is limited during the winter months, they may not be practical.

Superintendents also employ various covering techniques to prevent crown hydration injury from ice. Impermeable plastic

covers are popular in the Toronto area. Superintendents in the Montreal region use a different covering technique that was originally developed by Doug Meyer, superintendent at Cedarbrook Golf and Country Club. The technique utilizes geotextile covers and an insulating straw layer to minimize large temperature fluctuations and prevent plant hydration. Rick Brown and Marc DuFresne, superintendents at Mount Bruno Country Club and Beaconsfield Golf Club, respectively, have employed this covering technique, and their programs will serve as the basis for this turf tip.

The process begins in mid- to late fall, as the turf enters dormancy, with a fungicide application to prevent snow mold diseases. The covers and straw can create an ideal disease environment, so fungicide protection is important. It also is recommended to apply a rodent repellent prior to spreading the straw to prevent damage from tunneling activities beneath the covers. After the fungicides have been applied, a geotextile cover is placed over the green to ease straw removal in spring. The straw layer is installed after the cover is secured in place. A 12" layer of quality oat straw was used initially for the insulating layer. This has been reduced by both Mr. Brown and Mr. DuFresne to approximately 6-8" to reduce material costs. The 6-8" layer required 10-12 bales of straw per 1,000 square feet. The straw is often spread manually, although attempts have also been made to spread the straw with leaf blowers, mulching machines and other devices to speed the process. Large, round bales are also being used at several golf courses to help make the application easier.

After the straw has been spread, a final impermeable cover is generally installed. A popular cover for this step is the Evergreen Ice Shield. The cover keeps the straw in place and prevents it from becoming wet. Mr. Brown had success last season without the final cover over the straw layer and has chosen to omit it again this year. If the outer cover is used, it must be secured soundly around the perimeter. Mr. DuFresne purchases covers that are custom-made with

# USGA

responds  
to heightened  
environmental  
awareness



Concerns about the environment are influencing the management of existing golf courses, as well as the development of new courses. The USGA budgeted more than \$3.2 million over three years to fund 21 research projects investigating how turfgrass management impacts the environment.

Research objectives included: understanding turfgrass pest management and fertilization effects on water quality and the environment; evaluating valid alternative methods of pest control for integrated turf management systems; determining the human, biological and environmental factors that golf courses influence.

This research investment already has yielded two important publications. The *Landscape Restoration Handbook* by Donald Harker offers information to property owners and managers about naturalizing the managed landscape. *Golf Course Management and Construction: Environmental Issues* by Drs. James Balough and William Walker provides a comprehensive summary of the effects of construction and management of turfgrass systems.

Results from many of the projects were presented to the USGA Turfgrass and Environmental Research Committee in April. The findings are being reviewed and evaluated to determine what topics require additional research. The next step is to summarize the information and share it with you and others. These research results lay a solid foundation for further turf environmental research. They also provide a better understanding of how golf courses can properly select and apply products to minimize their effects on the environment.

## TRAINING AND COMMUNICATIONS PROGRAM ADDRESSES CRITICAL ISSUES

**G**olfer and non-golfer concerns generally fall into four areas: use of scarce water resources, pollution of water resources, loss of natural areas and the effects of golf courses on people and wildlife.

Completing the initial research projects is just the first step in the process of addressing the impact of golf on the environment. Under the theme, *Preserving Golf and the Environment*, the USGA is launching an extensive educational and communications program to share research results with a variety of groups including superintendents, golf officials, regulatory agency scientists, allied associations, municipalities, environmental groups and the general public.

Over the past several months the USGA has gathered input from more than 200 individuals throughout the golf industry, from superintendents to reporters to golfers to environmentalists. The purpose of this discussion was to verify the critical issues and identify ways the USGA can address them.

Based on this input the program will address five major topic areas:

- Benefits of golf to the environment
- Golf and water quality
- Golf and water use
- Golf and human health
- Golf and wildlife ecology

USGA regional agronomists will be sharing information with you, including detailed synopses of the environmental research projects and the implications research results have for your day-to-day

management practices.

The USGA also is establishing a Fact File that will include several levels of information. This file will be organized by topic area and will include a range of information from simple facts to technical research. This file will be created over the next several months, and you'll be hearing more about the information that will be available and how to access it.

This fall, materials will be available for your golf course to help golfers understand some of the key research results and the benefits of golf to the environment.

### ONGOING COMMITMENT GENERATES RESULTS

Although the USGA has devoted intensive research funding to environmental studies over the past three years, the organization's commitment to turfgrass research dates back nearly 75 years. In fact, other USGA Green Section activities have strong links to the environmental studies just being released. Ongoing turfgrass research is focusing on development of new varieties that require fewer inputs such as water, pesticides and fertilizer.

The Audubon Cooperative Sanctuary Program for Golf Courses is another excellent example of USGA efforts to encourage responsible management practices that will help to preserve golf and the environment.

More than 1,100 golf courses across the country are already participating in the program.

## USGA SUPPORTS 21 ENVIRONMENTAL PROJECTS

### PESTICIDE & NUTRIENT FATE

- **Cornell University**—Mass Balance Assessment of Pesticides and Nutrients Applied to Golf Turf
- **Michigan State University**—Groundwater Contamination Potential of Pesticides and Fertilizers Used on the Golf Course
- **University of California, Riverside**—The Fate of Pesticides and Fertilizers in a Turfgrass Environment
- **University of Nebraska & Iowa State University**—Pesticide and Fertilizer Fate in Turfgrasses Managed Under Golf Course Conditions in the Midwestern Region
- **Washington State University**—Quantification and Fate of Nitrogen from Amended and Trafficked Sand Putting Green/Tee Profiles
- **University of Nevada, Reno**—The Effect of Salinity on Nitrate Leaching from Turfgrass
- **Pennsylvania State University**—Mass Balance Assessment of Pesticides and Nutrients Applied to Golf Turf (Runoff Segment)
- **University of Massachusetts**—Mass Balance Assessment of Pesticides and Nutrients Applied to Golf Turf (Volatilization and Dislodgeable Residues)
- **University of Florida**—Mobility and Persistence of Turfgrass Pesticides in a USGA Green
- **University of Georgia**—Evaluation of the Potential Movement of Pesticides Following Application to a Golf Course

### ALTERNATIVE PEST MANAGEMENT

- **University of California, Riverside**—Investigation of Turf Disease Decline for Potential Development of Biological Control Methods
- **University of Florida-IFAS**—Pathogenicity and Biological Control of *Gaeumannomyces*-like Fungi
- **Cornell University**—Microbial Basis of Disease Suppression in Compost Applied to Golf Course Turf
- **Iowa State University**—Potential for Physiological Management of Symptom Expression by Turfgrass Infected by *Bipolaris sorokiniana*
- **USDA, Rutgers University, University of California**—Biological Control of Golf Course Turf Pests: Isolation and Evaluation of Nematode and Bacterial Pathogens
- **University of Kentucky**—Damage Thresholds, Risk Assessment, and Environmentally Compatible Management Tactics for White Grub Pests of Turfgrass

### GOLF COURSE BENEFITS

- **Texas A&M University**—Quantification and Validation of the Beneficial Contributions of Golf Course Turfgrasses
- **The Earth Fund**—*Landscape Restoration Handbook*
- **The Institute of Wildlife and Environmental Toxicology, Clemson University**—The Effects of Golf Course Activities on Wildlife
- **Texas A&M University**—Human Benefits of Golf Course Views: Emotional Well-Being, Stress and Performance

### OVERALL RESEARCH QUALITY ASSURANCE

- **Dr. Bill Walker**—Quality Assurance/Quality Control

grommets fastened along the cover's edge at 24" intervals. Large 12"-long spikes are fastened through the grommets and the covers, which are left in place through winter.

Removing the covers and the straw is the most labor-intensive aspect of the operation. Nearly 600 hours of labor were required last season to remove and dispose of the straw at Mt. Bruno Country Club. The covers and straw are removed in late winter or very early spring. The straw can be pushed off the green manually or with a small tractor equipped with a straight blade. The turf may be chlorotic initially, but it soon recovers after exposure to the sun. The straw debris is stockpiled in an adjacent rough or greenside bunker, where it can be removed at a later date.

As with any covering technique, care must be taken to avoid scalping injury and possible frost damage to the succulent turf after the covers are removed. Therefore it is important to keep the permeable covers at hand so they can be reinstalled if necessary. A fungicide application also is highly recommended immediately following the removal of the covers to extend protection against snow mold diseases.

The primary disadvantages with the straw covering system include labor and material costs, and possible disease injury. Costs for this technique range from \$18,000 to \$19,000. The cost of covering 19 greens at Mt. Bruno Country Club was approximately \$19,000 (not including covers), but the costs will probably lower as application and re-

moval techniques are refined. Ask Mr. Brown or Mr. DuFresne if the covering technique is worth it, and their answer is a resounding "Yes." The greens are playable four to six weeks earlier in spring, and the turf is stronger for the upcoming season.

Is this covering technique for you? That is a decision only you and your course officials can make. Ideally, problems of inadequate surface and internal drainage and poor growing environments should be addressed to provide a long-term solution to the ice problem. However, the straw cover technique provides a viable option, especially for those few problem greens prone to crown hydration injury. The technique's costs will quickly be forgotten when golfers can better enjoy greens free of winter injury.

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# HAVE AN "ICE" DAY

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by **ROBERT C. VAVREK, JR.**

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**W**INTERKILL of turf in low-lying, poorly drained areas of the golf course is an annual concern of many superintendents located in the northern tier of states and Canada. Crown hydration is considered to cause the most serious losses of turf, but the injury that occurs under prolonged periods of ice cover and, to a lesser extent, wind desiccation, can also cause significant damage.

Ensuring adequate surface drainage is one good defense against crown hydration and ice injury. Eliminate or minimize water-holding hollows/swales on the golf course and there simply is little potential for standing water to cause problems during the winter. The time to design an appropriate amount of drainage into the course is during construction. Once the course is in play, altering surface drainage patterns involves a considerable amount of inconvenience to golfers. The installation of subsurface drain tile, sumps, and surface drains will facilitate the rapid removal of excess water from the course during spring through fall, but subsurface drainage is practically useless when the ground is frozen.

Even where adequate surface drainage exists, the right combination of weather conditions during winter can turn portions of

the golf course, especially greens, into ice skating rinks. Just how long cool-season turf can survive under ice cover is not well understood. Very little research has been undertaken regarding ice damage, and the most widely accepted study, by Dr. James B. Beard, was done almost 30 years ago (Beard, J. B. 1969. Winter Injury of Turf-grasses. Proc. 1st Inter. Turf. Res. Conf. 1:226-234). He concluded that turf can survive under ice for 50 to 60 days and that *Poa annua* will be the first species to winter-kill. Recent research by Dr. John Roberts at the University of New Hampshire suggests that the length of time turf can survive under ice can vary significantly, depending on the quality of ice (clear or cloudy), the presence of snow cover, the physiological condition of the turf just before freezing, and many other factors.

Enough of theories. Let's say that several of your greens have been covered with 6-8" of ice for about two months with no thaw in sight. What are the options for ice removal? Some superintendents have spread "darkening agents" such as Milorganite, charcoal, soot, or other materials over greens to collect the heat from sunlight and melt the ice. The results range from complete success to little effect. Obviously, darkening agents depend

upon sunlight, something that can be in very short supply during winter in many parts of the country.

Physical removal of snow and ice from greens has been attempted at many courses with varying degrees of success. The following "recipe" for ice removal comes courtesy of Randy Witt, CGCS, of the Oneida Golf and Riding Club, Green Bay, Wisconsin. He has fine-tuned a technique for eliminating thick ice from greens through trial and error. He utilizes a Ryan GA-30 aerator and a Turf Cat 72-inch rotary mower equipped with a sweeper.

First of all, *use common sense*. Operating any equipment on a slick, ice-covered green can be risky, especially on a severely contoured putting surface. This technique is best suited for relatively flat greens. The GA-30 travels forward on ice surprisingly well, but it is nearly impossible to operate in reverse, so plan your pattern of travel across the green accordingly. Mr. Witt uses homemade, blunt-tip, 5/8-inch-diameter solid tines on thick ice cover. The tines are cut from a length of 3/8-inch rolled steel rod. Standard 1/2-inch-diameter solid tines have relatively sharp points and are used after most of the ice has been removed or on thin ice covers. The smaller, sharper tines are used to minimize