



The first spring of the golf course being open at Riverside Casino and Golf Resort was one to forget. The flooding of '08 is now what all other floods are compared to. Holes 4-8 are part of the floodplain along the Iowa River. When the river was at its crest the only areas that stayed above water were the greens on those holes. We planted mowers prior to the flooding and took a boat out to mow and apply fungicides. The area was under water for six weeks. Our renovations will begin in early September and hopefully be playing all 18 holes in the spring. - Mike Nelson, CGCS.



Greenseth Golf is currently shaping a golf course in Busan, Korea. In the crew picture is Cliff Hamilton from Onamia, Minn, Scott Greenseth and our interpreter Yung Seo Park. - Scott Greenseth



July 31 storm at The Crossings at Montevideo. - Jeremiah Niebolte



F5 tornado damage in Parkersville, Iowa. - Jerry Deziel

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PEER-TO-PEER: BETTER TURF THROUGH NETWORKING

MGCSA Superintendents were asked:

Considering the oddities in winter weather that our region experienced last year, what were your spring observations and will you change your program for the upcoming winter?

At **Deer Run Golf Club** we came through winter pretty good, but if I had any idea how long it was going to take for our damaged areas to fill in this year I would have used more seed/soil and sod.

- Barry Provo
Deer Run Golf Club, Victoria

At **Marshall Golf Club** we had relatively no snow cover during the better part of the winter season of '07 and '08. We experienced minor turf loss on No. 14 green and our driving range green, both of which are fully exposed to harsh winter conditions. I use leafshield and apply my winter protection chemicals as late as I possibly can. This approach has worked exceptionally well for us, and gives me some extended protection into early spring. With close monitoring of the weather and its drastic changes during late fall we have been successful in this approach. I think the only thing I may do is to strengthen my leafshield applications on a few of these areas and maybe add a snowfence of about 2' in height in these areas.

- Kurt Hovaldt,
Marshall Golf Club, Marshall

At **Heritage Links Golf Club** I will be seriously considering some type of cover for our putting green. The past winter's severe cold caused some small low temp damage to this one location.

- E. Paul Eckholm, CGCS
Heritage Links Golf Club, Lakeville

Last season at **Bully Pulpit Golf Club**, due to tournament scheduling, we did a later aerification than I like to do, and we lost some turf partly because of that, and a warmer winter than usual. That will be moved up significantly to alleviate any open wounds or thinned turf on putting greens. As far as the rest of the course goes, we'll be trying to put it to bed as dense and wet as every other year. I will definitely be changing the number of greens we cover this fall. We're going to again be using wood fiber mulch applied through a hydroseeder, but this time, we'll cover all greens that came through poorly over the past winter. Other things we'll be doing is moving a few applications forward to harden them off a bit more. And, we'll be watering as much as possible to limit the drying of crowns and canopy to

much.

- Kyle Fick
Bully Pulpit Golf Club, Medora, SD

Yes, with the long winter we experienced this past winter at **Ely Golf Club**, I plan on spending copious amounts of time chasing around (See photo below).

- Justin Gustafson
Ely Golf Club, Ely

At **Montevideo Country Club** I had some desiccation on a few greens. I will probably use an antitranspirant. I might even try to use some brush to help keep some snow on the greens out in the open. We get a lot of wind out here.

- Jeremiah Niebolte
Montevideo Country Club, Montevideo

Besides re-routing some of the ski trails at **Como Golf Course** I will stay with the same program I have used in the past. We came out of winter in good shape. We treat the greens for snow mold with Instrata in October and in November we use PCNB and an anti-desiccant as late as possible. We topdress greens rather heavily, fence in the greens to keep out the skiers. We then spray the tees with anti desiccant and fence off some areas of the tees to control skiers. I also cover a few areas on the tees and greens that have been desiccated in the past. As for the spring the skiing delayed spring green up, somewhat, but only on areas with a lot of Poa.

-Stephen R. Dinger
Como Golf Course, St. Paul



Justin Gustafson, Superintendent at Ely Golf Club, knows what he plans on doing this winter.

Highlights of What You Can Expect at the U/M/MTGF Field Day on September 11

By Jack MacKenzie, CGCS
MTGF President

The Minnesota Turf and Grounds Foundation (MTGF) and the University of Minnesota annual Field Day provides turfgrass and related professionals an opportunity to learn about new research being conducted at the Turfgrass Research, Outreach and Education (TROE) Center. Leading researchers will demonstrate their projects and how they directly benefit turfgrass and related industries.

The following summaries are what you can expect at the U of M/MTGF Field Day on September 11.

Genetic Improvement of Prairie Junegrass for Use as a Turf

*Matthew D. Clark, Research Assistant
Department of Horticultural Science
University of Minnesota*

Prairie Junegrass (*Koeleria macrantha* (Ledeb.) Schultes), also known as junegrass, is a perennial, short-grass prairie species distributed throughout the Northern hemisphere. Until recently, the species has received little attention as a low-input turfgrass. However, North American germplasm demonstrates early green-up which suggests that native ecotypes may provide improved turfgrass traits. *Koeleria macrantha* represents a diverse natural range that provides the breeder with a broad genetic base from which to select important traits including turfgrass quality, color, density, mowability, growth habit, drought tolerance, disease resistance and seed production. This species is known to require fewer inputs than other cool-season turfgrasses and it demonstrates tolerance to many environmental stresses found in Minnesota.

At this session, attendees will learn about the genetic improvement to native prairie junegrass will result in top-performing turfgrass varieties. These varieties should reduce water, fertilizer and pesticide inputs and result in environmental benefits and reduced costs.

Breeding and Evaluating Perennial Ryegrass Cultivars for Minnesota

*Nancy Jo Ehlke, Eric Watkins, Don Wyse,
Donn Vellekson and Andrew Hollman
University of Minnesota
Department of Agronomy and Plant Genetics
and Department of Horticultural Sciences
St. Paul, Minnesota 55108*

Improvements in perennial ryegrass (*Lolium perenne* L.) turf quality traits such as color, density, texture, mowability, disease resistance and stress tolerance have played an important role in the popularity of perennial ryegrass. However, many improved turf-type cultivars do not have adequate levels of winter hardiness for the northern USA and Canada.

At this session, attendees will learn about new sources of winter hardiness that have been identified in public collections of perennial ryegrass. Topics include newly developed perennial ryegrass breeding populations, herbicide tolerance and rust resistance.

The University of Minnesota's perennial ryegrass breeding program has been highly successful. It has released four cultivars to date: PolarGreen, Ragnar, Ragnar II and Arctic Green, and is looking forward to additional releases.

2005 National Kentucky Bluegrass Trial

*Eric Watkins, Andrew Hollman,
Brian Horgan*

The University of Minnesota has a long history of breeding Kentucky bluegrass. The first variety "Park" was released in 1957 and is still in seed production in northern Minnesota. Park is a variety characterized as having excellent seedling vigor, but has dramatically lost market share due to poor disease resistance and turf quality.

At this session, you will learn about a number of new varieties and selection of Kentucky bluegrass that do well in Minnesota and the northern United States when grown under medium and high maintenance conditions. These new vari-

eties should be available to seed producers and turf managers within the next two years.

Participants will also learn about the University of Minnesota's participation in the National Turfgrass Evaluation Program (NTEP) and how test results generated by the program can be used by industry, extension specialists, turf managers and plant breeders to determine a variety's adaptation across a wide range of environments and levels of turf maintenance.

Converting Kentucky Bluegrass To Low Maintenance Turfgrass Species

*Matt Cavanaugh, graduate student,
Horticultural Science*

The majority of golf course rough in Minnesota is planted with Kentucky bluegrass which requires heavy maintenance. However, the cost of maintaining a golf course is on the rise. Fertilizer, pesticides, labor and fuel cost involved in maintaining golf courses continue to stress superintendents' maintenance budgets. Average prices for major fertilizer nutrients reached the highest level on record in April 2008 at 228 percent higher than the January 2000 level, according to the U.S. Department of Agriculture. Fuel costs have risen by 269 percent since 1992. Water restrictions are also increasing throughout the United States and golf courses are often scrutinized for their water use as golf is thought of as a luxury expenditure. Increasing maintenance costs and water restrictions have caused superintendents to rethink the proportion of their golf course that will be heavily maintained. Transitioning heavily maintained rough areas to low maintenance turfgrasses will allow golf course superintendents to reduce fertilizer and pesticide use, water use and labor costs required for mowing and additional maintenance.

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Field Day-

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At this session, attendees will learn about various methods for successfully converting Kentucky bluegrass to low maintenance turfgrass species which will result in significant cost savings for golf course superintendents.

Phosphorus Runoff from Turfgrass - Research Update

Carl Rosen, Brian Horgan, Andrew Hollman, Matt McNearney, and Peter Bierman
Department of Soil, Water, and Climate
and Department of Horticultural Science
University of Minnesota

Even though statewide restrictions on applying phosphorus (P) fertilizer to turfgrass went into effect in 2005, there is still interest over the impact that this legislation has on water quality and turfgrass health. In order to determine the horticultural and environmental effects of restricting P in turfgrass fertilizer, a dedicated research facility was established at the

Turfgrass Research, Outreach, and Education (TROE) Center on the St. Paul Campus at the University of Minnesota during the 2004 growing season. An ongoing study is evaluating the effects of P fertilization and clipping management on P runoff from turfgrass.

At this session, attendees will learn about the results of the first three years of this study. Topics will include:

- The extent of P runoff following turfgrass fertilization
- + How clipping management affects P runoff
- + Various management practices on turf health
- + Best management practices to minimize movement of P from turfgrass

Grounds Track

Horticulture Display and
Trial Garden Tour
Campus Landscape Design
and Plant Material
Walk and Talk
TRE Nursery Tour

James B. Calkins, Education Specialist,
Department of Horticultural Science
Jeffrey H. Gillman, Associate Professor,
Department of Horticultural Science
Chad P. Giblin, Assistant Scientist,
Department of Horticultural Science

The Grounds Track features a tour of the Department of Horticultural Science Display & Trail Garden located on the St. Paul Campus. The Garden is used for teaching, research and extension activities and most of the design, planting, maintenance, and installation is performed by horticulture students. It provides an excellent opportunity to see some unique plants and observe landscape design principles and installation techniques. An important purpose of the Garden is to test new plant materials, and this year's trails include a variety of annual landscape grasses.

The tour will also feature a visit to the TRE Nursery and a tour of the St. Paul Campus Mall where different plants and landscape design and maintenance principles will be addressed.

- See you there!

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The advertisement features a background image of a lush green golf course with a yellow flag on a green, set against a backdrop of mountains. On the right side, there are three distinct logos for turfgrass products. The top logo is for 'X-treme DOMINANT Creeping Bentgrass Blend', with 'X-treme' in a stylized font and 'DOMINANT' in large, bold letters. The middle logo is for 'SR 1119 Creeping Bentgrass', with 'SR' in a square and '1119' in large, bold letters. The bottom logo is for 'TYEE Creeping Bentgrass', with 'TYEE' in a stylized font and 'Creeping Bentgrass' below it. At the bottom right, there is a logo for 'Seed Solutions™' with the tagline 'Seeds for Growing Success'.

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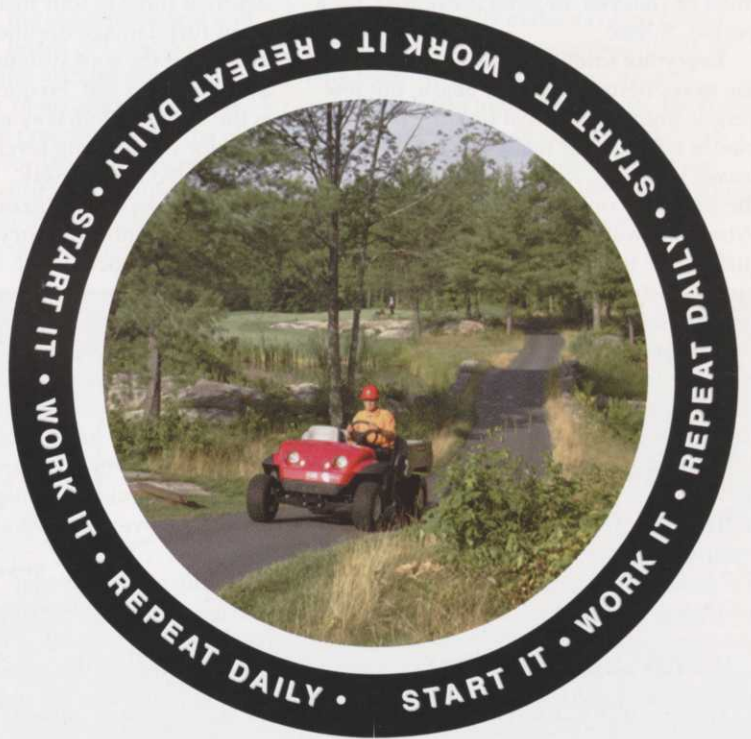
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Count on it.

Playing Par with Jack Frost

By CHARLES B. WHITE

Director, Southeastern Region, USGA Green Section

Reprinted from the USGA Green Section Record, 1984 Sept/Oct Vol 22(5): 8

As winter begins, the golfer lays aside his clubs for a time and settles down to watch football. But, loving the game, our minds quickly return to golf, and our bodies avidly follow. Thus we encounter an age-old problem: morning delays to allow the frost to clear or enable the green surface to thaw. Often a confrontation arises between the golf professional and/or the superintendent on one side and club members on the other. Consider the problems of playing greens in the winter when frost or freezing occurs, and why play must be delayed, or even prevented, for a period of time.

Everyone knows frost must clear off the grass before play can begin, but few people know why. Frost on the grass blades tells us that the water inside the leaves is frozen. Remember that water is the primary component of plant tissue. When this water is frozen, traffic on the turf causes the ice crystals in the cells to puncture through the cell walls, killing the plant tissue. Little damage is done to the crowns (growing points) or roots if only a light frost appears; however, when the frost is heavy, cell disruption may occur at the crown, thus killing the entire plant. Frost damage symptoms include white to light tan leaves where traffic has passed.

Traffic damage can be minimized by melting the frost with a light syringing of the greens when soil and air temperatures are above freezing. The simplest approach is to avoid traffic until the frost melts.

Another dangerous situation exists when the soil is completely frozen to the surface but the grass blades have thawed. Provided there is no frost or ice on the grass under this condition, then limited foot traffic creates little damage, if any.

At these times, heavy traffic or golf carts should be restricted from greens, tees and even fairways. This is the most favorable winter condition, because when the soil is frozen it does not allow as much penetration of compaction and spikes, thus preventing damage to the grass roots. Since the blades are not frozen, they retain the resiliency needed to withstand light foot traffic.

Traffic damage on frozen turf areas usually occurs during periods of freezing or thawing. The most devastating situation occurs when the grass blades and the

upper one-half to one inch of soil has thawed, but the ground beneath their level remains frozen. Traffic will create a shearing action of the roots, rhizomes, and crown tissues at this time. This is comparable to cutting the plant tissue from the underlying root system with a sod cutter. Complete kill of leaves, crowns and rhizomes can occur if the temperatures soon drop below 20° F. Symptoms from this severe injury include whitish to dark brown leaves that may mat on the surface.

Once temperatures allow thawing to a depth of three to four inches, the probability of turf damage declines since about 75 percent of the root system is in the upper four inches of soil. Frequently soil probing is the only positive way to effectively monitor the freezing level. Traffic should be adjusted accordingly.

Preparing the turfgrass for winter dormancy or semi-dormancy is a continuous, year-round process, but, unfortunately, winter preparation is often forgotten until fall. If summer and winter extremes were never experienced, there would be no need for careful and judicious programs involving the proper balances of pesticides, fertilizers and cultural practices. But these two extremes are realities, and proper management is essential to maintain good turf covers throughout the stress periods.

Fertilization in the late summer to early fall, using a high-potassium and low-nitrogen material, will not only insure a good foliage growth rate, but it will also maintain vigorous rhizome and root development to begin the hardening off process for winter. Adequate potassium in the late summer encourages hardening off of the grass in the fall, a condition that increases storage and assimilation of carbohydrate reserves. Nitrogen overfertilization in the fall prevents adequate carbohydrate reserves from being stored and stimulates excessive foliage growth. This adds to thatch buildup and produces a lush turf that is very susceptible to cold weather damage.

Phosphorus and potassium, a blend of minor and micronutrients, along with the lower rates of nitrogen, balance the nutrient requirements of the grass and provides maximum winter hardiness. Remember, one of the functions of potassi-

um is to improve winter hardiness of the grass, because potassium tends to reduce the amount of water in the plant cells and acts as an antifreeze to lower the freezing point of the plant. This is very beneficial in reducing low-temperature stress or damage that can quickly occur on turf. The use of heavier potassium applications in the fall is based on already proper soil nutrition levels, which should be tested annually. Regardless of the nutritional condition of the grass, no fertilizer application can offset winter damage imposed by traffic.

Several factors influence a particular grass strain's tendencies for winter injury or death. These include (a) hardiness of the plant, (b) freezing rate and (c) length of time frozen. Usually the more rapidly the freezing occurs, the higher the temperature at which kill is observed. If a sudden severe cold front develops, the turf will be damaged to a much greater extent if this hardening off process is not fully encouraged. A perfect example of this is the winter of 1983 - 1984.

Another important winter preparation is late summer or early fall aeration of cool-season grasses to establish a proper soil-to-air-to-water ratio in the soil and to remove compaction so that growth rates of rhizomes and roots are at their highest level. Growing conditions for the root system should be as favorable as possible in the spring and fall so that maximum root elongation and branching allow the grass to build up the necessary root system for surviving stress periods. Coring in the late summer or early fall, along with vertical mowing and topdressing of cool-season grasses, will check thatch and re-establish the best growing conditions. Initiation of new plants through rhizome and stolon activity occurs, therefore, at one of the optimal times of the year.

The importance of developing a strong and adequate root system for the winter months has already been mentioned, but its importance should be re-emphasized through the function of the root system during the low-temperature stresses of winter. When adequate carbohydrate reserves are developed in the root system, the turfgrass plant has a reserve

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Jack Frost-

(Continued from Page 18)

food supply that can be used when the grass plant is not able to conduct photosynthesis. If a root system is not developed in the fall, or if the grass plants are sheared off from the root system by play on partially thawed greens in the winter, it is unable to use the stored carbohydrates, and the plants starve to death. As better growing conditions develop again in the spring, whatever carbohydrate reserve is left in the healthy grass plant will be used to initiate new growth. Many turfgrasses now die if the root system has been removed from the crown portion of the plant or if an inadequate supply of carbohydrates was stored in the fall.

Another problem with playing partially thawed greens is the tremendous tracking or footprinting created by heavy action at the frost line in the soil. Since soils do not thaw or freeze uniformly throughout the putting surface, some areas on the greens may be softer than others, thus accentuating the effects of tracking or footprinting. Footprinting is further enhanced when a frozen subsurface disrupts water percolation, leaving a

wet layer on top.

Now the superintendent is faced with a real dilemma and a difficult decision. Should such greens be removed from play (using alternate winter greens if they're available) until complete thawing occurs, or should the regular greens be aerified in the early spring to check upper profile compaction and improve the soil-to-water-to-air ratio in the root zone? If they are aerified in the early spring, the superintendent and members can anticipate an increased crop of *Poa annua* on the greens later in the spring and summer (with all of its attending problems)! It's not an easy choice. Many other circumstances must and will influence the final decision. For example, what percentage of the members play in the late winter and early spring and how important is that play compared to quality putting surfaces later in the year? It's a decision to be shared by the green committee, the superintendent and perhaps even the Board of Directors.

Many letters and articles are published every year in an attempt to educate golfers to the potential problems of playing on frozen or partially frozen turfgrass areas. Golf course superintendents or club officials should educate golfers in the fall regarding the problems with play-

ing frozen greens so the golfers themselves have a better understanding of the damage that occurs when traffic is imposed on frozen or partially frozen turf. In most cases, informing golfers of suspended play due to frozen greens is inadequate and sounds more like an excuse than a reason. However, if care is taken to educate members through a seminar, newsletter in the golf shop, or a handout distributed directly, it will help members understand exactly what happens when foot traffic is placed on frozen and partially frozen putting surfaces, and it also informs them of winter traffic damage to the turf in general. Perhaps most important of all, it gives the membership, through the green committee, the opportunity to decide if alternative winter greens should be provided and are economically justified under their conditions.

If the golf course superintendents and other club officials make a concentrated effort to educate their membership as to why traffic is not allowed on the golf course on particular winter days, they will gain support and will eliminate the current Saturday morning standoffs at the pro shop and the descriptive name-calling sessions which inevitably arise.



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