



To Remove Ice or Not to Remove Ice — That is the Question

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Ice accumulates on someone's greens in the North Central Region every winter. Golf courses in Minnesota have been especially hard hit by ice cover and many superintendents have called the office with questions regarding the potential for winterkill. The most common knee-jerk reaction to ice cover on greens is to remove the ice as soon as possible, especially when ice develops in early winter. In response to the numerous inquiries, I drafted the following letter that was sent to about 450 courses in Minnesota through the cooperation of the Minnesota Golf Association. Several of the USGA agronomists located in northern states also contributed to or edited the letter. For those of you in Wisconsin having similar concerns, feel free to use the following response to the Minnesota ice problems.

ICE ALERT

Due to the unusual weather patterns during November and December many greens and low lying fairway areas on golf courses throughout Minnesota have become covered in ice that varies from less than one-half inch to several inches thick. In response to numerous requests for recommendations regarding the potential for winterkill to turf, particularly *Poa annua*, under prolonged periods of ice cover, the following information is being made available to as many facilities as possible with the assistance of the Minnesota Golf Association.

Ice cover on turf is not an unusual event in Minnesota, what is unusual is the length of time the ice will remain on the playing surfaces unless a midwinter thaw occurs. The most common question is: Will over 100 days of solid ice cover cause injury to *Poa* greens? Should the ice be physically removed?... There is no clear-cut answer.

The most common causes of winterkill to turf are (1) crown hydration-the injury that occurs to the growing points of grass plants during freeze/thaw events, (2) cold

temperature fungal diseases, (3) direct low temperature kill to exposed turf, and (4) desiccation that commonly occurs on elevated sites on the course that lack snow cover during windy, frigid weather. I agree with many superintendents and researchers in that both *Poa* and bentgrass can survive over 100 days of ice cover if the turf has had an opportunity to harden off properly during late fall and when the ice retains consistent snow cover all through the winter.

The "suffocation" of turf under ice probably occurs where sunlight penetrates black ice (clear ice) and causes a slight warming at the playing surface. A thin layer of free water and an increase in temperature under the ice might stimulate microbial activity and cause the turf to break dormancy — either condition could result in the buildup of toxic gases or carbon dioxide. A similar process might occur when ice forms on greens before the ground freezes. The bottom line is that there is little scientific research in turf literature to support this process. The injury to turf that is frequently blamed on ice cover probably occurs during the initial freezing process or immediately
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after the ice melts from the greens in the late winter or early spring — the time when the turf has very little tolerance to cold temperatures.

WHAT TO DO OR NOT TO DO

First, determine whether injury to turf has already occurred by chipping through the ice and removing a small plug of turf from a low lying area of the green. Grow out the plug in a warm, sunny location (a greenhouse would be ideal) to document the health of the turf. Monitor the turf every few weeks until spring.

More importantly, remove snow and as much ice as possible from greens during or just prior to the first significant spring thaw. The turf will have little tolerance to cold temperatures and be very susceptible to crown hydration at this time. Provide every opportunity for the water from melting ice and snow to move off the putting surfaces. Some superintendents apply a dark material (Milorganite, dark sand, etc.) to ice on greens during late winter to accelerate the melting process. Dark materials, though, are only effective on relatively thin ice covers of no more than an inch or two thick. The key to success is to prevent water from pooling in low lying portions of the greens during the day and then freezing at night. Again, most of the injury to turf that is blamed on ice cover probably occurs just after the ice melts, especially when cold nights follow the initial thaw.

THE RISK OF ICE REMOVAL

The ice and snow cover on your course may be a blessing in disguise considering the amount of severe desiccation that occurred on exposed turf last winter at many

courses in western Minnesota, Nebraska, and the Dakotas. Desiccation affects bentgrass and *Poa* alike, and several relatively new courses experienced significant losses of bentgrass on exposed putting surfaces that later required extensive overseeding, plugging, and sodding last spring. Consistent ice and snow cover would have prevented these losses of turf.

Furthermore, removing ice from greens during midwinter is almost an impossible task unless the greens are covered with a geotextile fabric that provides a barrier between the ice and the turf. The risk of disrupting the playing surface or removing part of the turf along with the ice is great when solid ice cover is chipped away using solid tine aerators, Verti-Drain units, or spikers—not to mention the damage this process can do to the maintenance equipment. Even if it were possible to safely remove ice from an uncovered green, the turf would be exposed to the wind and cold temperatures unless snow were blown back onto the greens. In my opinion, the questionable benefits of midwinter ice removal is not worth the effort.

There may be isolated courses where ice removal is beneficial and where the removal of ice will not create a risk of surface disruption...but as a general recommendation, the time spent removing ice would be better spent during the early spring—when the potential for winterkill is greater.

Regardless of what course of action is taken at your course, monitor the condition of the turf frequently and keep the golfers well informed as to the possibility of finding less than ideal playing conditions next spring. The USGA's Turf Advisory Service will be available from early spring throughout the season should turf related problems occur.

Good luck and feel free to contact the USGA Green Section Office in Elm Grove, Wisconsin, for further information regarding this and other agronomic questions.

Sincerely,


Robert C. Vavrek, Agronomist

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