

Winter Injury of Putting Greens 2003

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Winter injury is nothing new to putting greens in Iowa. In fact, several known causes for winter turf injury include desiccation from open dry winters, suffocation under ice, low temperature crown hydration in low wet areas, and snow mold. Each year presents a unique combination of winter stress factors that ultimately determine the degree of turf injury. The 2001-02 winter brought 90 continuous days of snow cover that prevented desiccation by providing a protective blanket of snow, however heavy disease pressure occurred from both pink and gray snow mold. Freeze thaw cycles caused some of the snow to melt and refreeze as a two-inch layer of ice. In spite of these potential problems there was very little turf lost to winter injury on putting greens in 2001-02. Fast forward to the winter of 2002-03 and we are finding out that some courses in the central Iowa area have experienced putting green injury that ranges from 95% turf loss to absolutely no injury at all. The following is an update pertaining to observations from our research facility in Ames and from visiting twelve golf courses in central Iowa. Thanks to all the superintendents that shared their experiences with winter injury and their strategies for making the greens playable as soon as possible.

- Putting green turf was killed as the result of winter desiccation. This is a cumulative type of injury that progresses as conditions remain dry from December through March. Conditions that exacerbate the problem are: no snow cover, sunny days, windy conditions, no turf covers, and limited soil moisture from rain, snow or irrigation,
- Winter injury has been observed on putting greens containing creeping bentgrass varieties 'Pencross', 'A-4', and 'L-93'. Demonstration plots at Veenker Memorial Golf Course indicated that 'A-4' was injured more than 'Pencross'. Bentgrass varieties are typically selected based on turf quality and performance during the summer rather than their ability to tolerate winter stress. L-93 is one of the newer generation bentgrasses that have been successfully used in Iowa. It has excellent summer performance but is slow to green up and start growing after the winter. At this point there is no reason to select one variety over another based on the many types of winter injury that may occur.

Golf courses containing mostly *Poa annua* greens were also severely injured. Typically *Poa annua* is more susceptible to all forms of winter injury than creeping bentgrass. This year winter desiccation appeared to cause severe damage on both creeping bentgrass and *Poa annua*. When *Poa annua* has been severely damaged it is a good opportunity to increase the bentgrass population by overseeding.

- None of the greens that were injured used winter protection covers, however many greens that were not injured also did not use winter protection covers. At this point I have not had any reports of injured greens that were covered. Please let me know if you used covers and still experienced injured greens. This year it appeared to me that the covered greens retained more moisture in the grass mat and also kept the green from thawing out before non-covered greens. Putting green covers would have been especially helpful this year in preventing desiccation injury. Courses that can't afford covers often use a heavy layer of topdressing to somewhat bury the green and prevent excessive drying of the grass crowns. Heavy topdressing was beneficial in reducing the winter desiccation injury experienced during the winter of 2002-03.
- Winter water was tanked to some greens and applied by hand watering. Winter watering significantly increased winter survivability of greens. A single watering in January helped some greens and watering on several occasions during December, January, and March helped others that were newly established in the fall.

Irrigation systems were turned on in early April and it was soon realized that some of the grasses were not going to recover. Kentucky bluegrass and perennial ryegrass on tees, fairways, and green surrounds greened up normally with negligible turf loss. *Poa annua* on greens, and in green surrounds, and on fairways and tees exhibited various degrees of turf loss. *Poa annua* is genetically diverse and there are often hundreds of clones on a single golf course. Some clones were completely killed and others were hardly damaged.

Injured areas of *Poa annua* and creeping bentgrass often turned tan and in severe cases the grass was bleached completely white. Lower mowing seemed to increase turf injury from desiccation. Greens that allowed winter play showed the most severe injury in a 10-foot circle around the pin. After initial green up it was observed that some greens were showing as much as 50 to 90% more brown tissue than other non-affected greens. Over the next two weeks greens continued to show new green shoots emerging from the brown turf. However, most samples taken on 24 April, and placed in the green house, did not show any new initiation of turf shoots from the browned turf. In other words, most of the new green shoots that survived should already be visible by the end of April. These shoots will continue to grow and fill in. Superintendents should not anticipate that new shoots would initiate from the base of brown plants after the first of May. In the future Superintendents would be wise to sample the greens every two weeks after the ground thaws when they suspect winter injury. The cup cutter samples can be watered and placed in a warm sunny location to determine just how well the green will recover. A 2-liter pop bottle cut in half makes a perfect miniature green house for growing and observing recovery of cup cutter cores. This will help you communicate with management and prepare a strategy for reestablishment if needed.

Superintendents are using a variety of seeding techniques to quickly reestablish grass in the most severely damaged areas. Most are using multiple seeding techniques to insure

rapid and uniform turf cover. Hole punching with a solid quadra-tine followed by seeding and topdressing has produced tufts of grass on 1-inch centers. A light verticutting in two or more directions followed by seeding and light topdressing has also been effective in placing closely spaced rows of turf. Pull behind spikers provide a one inch by 1/16-inch slit for grass seed to drop into. The trick with all methods is to insure that the seed is planted within the thatch and mat so that it does not rest on the surface where it will not germinate. The seed needs to be covered by a thin layer of topdressing so that it will remain wet and germinate. Some golf courses have elected to close the greens for a few weeks while seeding and reestablishing the grass. Covers have been used to speed the establishment process on greens that are closed for play. Aerifier holes that are 2 to 3 inches apart will cause a bumpy surface that takes too long to fill in. A combination of punched holes, slicing, verticutting, broadcast seed, and light topdressing provides the best chance for providing a smooth surface in a short amount of time. Grass will establish faster if traffic is limited, however, most courses are electing to keep the greens open for play while simultaneously establishing new grass from seed. When possible limit play on the newly establishing grass. It is also not necessary to add traffic by mowing greens if they do not have enough grass to warrant mowing. Raising the mowing height will help greens recover faster.

Here are some tips to help understand and prevent winter injury by desiccation:

- Covers almost always prevent or reduce injury from winter desiccation. In the absence of covers heavy winter topdressing is the next best choice for preventing winter desiccation.
- Winter play can accentuate winter desiccation injury.
- *Poa annua* is more susceptible to winter desiccation injury than creeping bentgrass, however both species experienced severe injury this year on certain golf courses.
- Greens exposed to wind and direct sun experienced the most injury.
- The ability to provide winter watering of greens is very important in years when desiccation is prevalent.
- Sampling of the greens every two weeks after the ground thaws in late winter will predetermine the ability of the green to recover and help the superintendent develop a timely reestablishment strategy if needed.

The amount of winter injury this year has taken many of us by surprise. Please drop me an email (dminner@iastated.edu) if you have experienced winter injury this year. Here are a few things I would like to gather information on:

1. What is the extent of your turf injury? i.e. 7 out of 9 greens with 50% brown or dead turf after greenup.
2. What type of greens, sand-based or push-up?
3. What type of covers do you use? Did you have any injury under the covers?
4. What is the bentgrass variety and percent *Poa annua* in the green?
5. Describe your reestablishment strategy and any success you have had, i.e. aerifying type, seeding, spiking, etc.