Protecting Turf from Winter Injury

A spring photo of a fall perennial ryegrass seeding compares a control plot (right) to one that was covered during the winter with a geotextile. Photo courtesy: John Roberts.

By John M. Roberts

The short days and cool temperatures of fall signal the start of winter dormancy for turfgrasses. Considering the heavy play most sports fields receive in early spring, it's critical that turf survives the winter. Damaged fields rarely have enough time fully to recover before the words "play ball" will be heard.

"Winter kill" is a generic term used to describe any loss or injury of turf during wintertime. From a prevention standpoint, it's helpful to break down the major causes of winter injury into more specific categories, which include the following: direct low temperature, traffic, winter desiccation, crown hydration damage (alternating freezing and thawing temperatures in wet soils), and low-temperature diseases. Ice covers are generally considered to be "indirectly" responsible for turf injury by forming a gas impermeable lens that creates an unhealthy environment for the turf below.

In a nutshell, the following preventive measures will help turf survive the winter.

High Fall Potassium Levels

Research continues to demonstrate potassium's benefit to turfgrass by improving its tolerance to various environmental and biological stresses, including drought, wear, heat and winter damage.

Potassium is highly water-soluble and easily leaches from plant tissues and sandy soils having a low cation exchange capacity. As a result, unexpected potassium deficiencies can occur. The use of slow-release potassium sources or more frequent, light applications throughout the year helps prevent this loss.

While potassium levels should remain high throughout the growing season, late fall is an especially important period for winter survival. In effect, potassium acts like antifreeze within a turf, enhancing its winter hardiness. Applying low nitrogen, high potassium fertilizers (1:2 to 1:5 ratios) in late fall continues to be popular among grounds managers to provide fields with potassium for the winter.

Low Nitrogen During Hardening

Approximately 30 to 40 days before winter dormancy, known as the winter hardening period, nitrogen (especially fast-release sources) should be used sparingly. Other practices that encourage active growth during this period are also discouraged. Unlike potassium, nitrogen during the hardening period increases tissue hydration levels and stimulates new growth, producing tissues that have thin cell walls. The net result of this overstimulated growth is turf more susceptible to freezing stress and winter diseases.

Drainage, Drainage and More Drainage

One of the key principles in reducing winter damage on sports fields is to provide rapid soil drainage. Poorly drained fields are highly vulnerable to an array of winter injuries. Unless the drainage is improved, it's usually just a question of time before large sections of turf are lost.

Both the subsoil *and* the surface need to drain freely. Installing drain lines, constructing fields with coarsely textured soils, and aerifying to relieve compaction help improve the water infiltration and percolation rates. To reduce standing water and accelerate surface runoff, fields in the northern states are often crowned (14 to 18 inches) to compensate for the impervious nature of frozen soils (even sandy textures).

Avoid Overwatering in Late Fall

Late fall irrigations should be either avoided (preferably) or, if necessary to prevent drought stress, lightly applied. A grass plant prepares for winter by undergoing a number of physiological changes, including a dehydration of its tissues. This "drying out" condition in late fall is necessary for turf stands to achieve their maximum levels of winter hardiness. Otherwise, wet or saturated tissues are especially susceptible to direct low temperature kill, winter diseases and crown hydration injury.

Increase Mowing Heights

If feasible, skip the last mowing or raise the mowing height by 1/2 inch in mid fall. This allows turf to increase its carbohydrate reserves, which are vital for winter survival. Investigators have shown turfgrasses to be particularly vulnerable to winter injury during the late winter and early spring when carbohydrate levels are at their lowest. Warning! Turfgrasses are generally

more susceptible to snow molds at higher mowing heights.

Remove Excess Thatch

Thick thatch layers tend to dry out quickly and serve as a harboring place for snow mold fungi. Winter disease and desiccation damage will be reduced if coring or thatch removal is practiced during the year. Late fall aerification may lead to desiccation around the coring holes during winters when there is no snow cover.

Traffic Control

The brittle tissues of frozen turf during the winter are prone to injury by traffic. The most severe damage seems to occur when bare or slush-covered ground exists. Snow (especially dry snow) acts like an insulator, protecting the turf below from traffic and direct low temperature injury.

Disease Prevention

Two of the most common and destructive low-temperature fungi are the two snow molds, pink and gray. Like *Typhula* blight (gray), pink snow mold can occur under snow, or is often observed in the absence of snow cover during cool (less than 50 degrees F), wet weather in fall, winter or spring. Gray snow mold is common in northern regions that receive more than 90 days of snow cover. It is particularly severe when snow covers partially or completely unfrozen ground.

A combination of fungicides and cultural practices is needed to provide acceptable levels of control in locations where disease pressure is high. Cultural practices that improve drainage, reduce thatch and maintain a balanced fertility program (moderate nitrogen levels) help reduce both diseases. In general, contact-type fungicides are used for the prevention of gray snow mold and should be applied within a few days of snowfall.

Protective Blankets, Topdressing or Straw

Protection from low temperature injury, earlier spring green-up, and reduced desiccation are just a few of the benefits synthetic covers, topdressing, straw or the selective placement of snow fences can provide. Geotextile covers are also used to protect young seedlings and speed up germination or regrowth between hash marks and around the goal mouths of soccer fields.

Unfortunately, winter covers are not a panacea and will not solve all winter problems, including ice-related damage and crown hydration injury. Unless treated, cool-weather diseases are also more damaging under covers.

Summary

A better understanding, innovative ideas, genetic breakthroughs and even small miracles might be necessary to eliminate all forms of winter injury. However, using today's "best management practices" that promote rapid soil drainage and encourage healthy, winter-hardened turf going into winter is a grounds manager's best line of defense. ❑

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