WINTERKILL OF TURFGRASSES: Causes and Prevention

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Winterkill, an all encompassing term used to describe winter-related turf loss, accounts for most of the dead turf that we see during the year on golf courses in Colorado and the Rocky Mountain region. Winter-related turf injury, more specifically, results from the actions of, winter desiccation, direct low temperature injury, low-temperature fungi, or winter-active mites. In order to control or prevent the problem effectively, it is important to recognize the conditions under which these modes of winter injury occur.

Winter desiccation is basically drought stress that occurs during the winter, Suboptimal soil moisture level, combined with environmental conditions that promote evaporation, create a situation under which the plant begins to dehydrate. Intense sun, high/constant wind, and low relative humidity are the types of climatic conditions which increase the severity of winter desiccation. Other factors which predispose turf to this type of injury include: compacted soil, frozen soil, excessive thatch, late core cultivation which results in open holes during the winter, and design aspects which increase exposure to drying winds and promote excessive drainage/runoff (elevated tees and greens, bunker edges, hills, etc.). With the exception of frozen soil, the same conditions cause dehydration and wilt during the growing season. At that time, we irrigate accordingly, either to prevent drought stress from occurring or to relieve wilt conditions as we recognize their occurrence. Unfortunately, the symptoms of winter desiccation are not as obvious as those for summer drought stress.

While certain parts of the plant can withstand rather intense dehydration (crown, stolons, rhizomes), other parts may quickly die under less than severe drying conditions. For example, leaves

are most sensitive, and we recognize the seasonal browning of turf during the winter as natural. Turfgrass plants can easily regrow new leaves during the spring, as long as the growing points in the crown that produce new leaves are not similarly desiccated. When winter drying conditions become severe enough, even the resistant crowns, rhizomes, and stolons will die. At this point, there are no growing points left to regrow new plants and leaves, and the turf has "winterkilled."

The most obvious way to prevent winter desiccation is to maintain adequate moisture in the root zone of valuable turf areas (tees, greens), and on those areas which, predictably, winterkill when not supplied with some winter irrigation. This is often done via the use of frost-free lines or by using large tanks or sprayers. A few timely applications of water over the course of an especially dry winter can make the difference between live and dead turf the following spring.

Windbreaks, either natural (trees and shrubs) or artificial (snow fences), can be quite helpful in decreasing wind speed and by allowing snow cover to remain for longer periods of time. Sensitive sites can also be covered with brush, evergreen limbs, etc., which ameliorate wind effects and promote snow accumulation. The brush can be easily removed in the spring. On greens or tees that will not be used during the winter, superintendents often see success with a late-fall top dressing (0.4 cubic feet per 1000 square feet) that is not dragged or raked into the turf.

Of course, the most sophisticated protection involves the use of synthetic covers. While expensive, weigh the cost of covers against turf replacement costs and lost revenues, not to mention unhappy golfers and green committee members! There is a great deal of variation in material composition, thickness, durability, etc., that should be considered before purchasing covers. Talk to others with experience in this area to better ascertain which type is likely to perform best in your situation.

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Before applying any type of protective layer or covering to a green or tee, it is important to make the appropriate applications of fungicides for snow mold control. The coverings, while protecting the turf, also create a microenvironment that is conducive to the development of the snow mold diseases.

Even adapted. acclimated turf can be killed by low temperatures, however. if the turf is extremely thatchy. The thatch does not retain heat as well as the more dense soil, and the effects of extreme cold on the turfgrass plant are not as well-buffered. Thatchy turf is also likely to become desiccated, thus subjecting the grass plants to two forms of potential winter injury.

Frequent and/or heavy traffic on frozen turf can also cause injury or death. This is a type of low temperature injury because the traffic causes ice crystals, that have formed inside the dormant plant to puncture cells and destroy tissue. This is similar to the damage that occurs following traffic on actively-growing, frosted turf in the fall or late spring.

Finally, a winter-related problem that few superintendents seem to be aware of is that of the winter mites. I believe that much of what is attributed to "winterkill" or winter desiccation is actually caused by the activities of these small mites. The mites feed heavily on turf during the late winter and spring, causing the turf to become bleached and desiccated, generally resulting in death. It is not surprising that mite injury is mistaken for winter desiccation. They are most active on south or west-facing slopes, along the south or west-facing sides of buildings or walls, and around the bases (especially the south side) of evergreen trees (especially spruces). Their populations skyrocket on drought-stressed area. They can be found on any species of turf, and are most easily seen feeding on the tips of grass leaves late in the afternoon on sunny days. Irrigation seems to reduce mite populations significantly; variable levels of control are seen with Diazinon (not on the course!) and Dursban, Talstar 10W, a miticide that is quite effective against these critters, has a 24c registration in Colorado that allows use on turfgrass. Apply 2 to 4 tablespoons per 1000 square feet in 1 gallon of water, and do not irrigate in. This is highly toxic to fish and use near water is prohibited. ■

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Fireside Chat with Bruce Williams
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of its affiliates. Future programs Bruce discussed that the GCSAA will offer its members are very promising indeed, from an on-line continuing education program to be unveiled at the 1997 Conference and Show in Las Vegas to computer terminals for each chapter for communication uplink between chapters and the GCSAA. The success of these progressive programs relies heavily on chapter affiliation, and thus on member involvement.

Discussing these and other issues with Bruce Williams leaves us with several lasting impressions, the most apparent being that our Association—the GCSAA—is poised to continue its growth and pro-active nature, and that it could not be in better hands than those of our own Bruce Williams. ■

Urbanization Affects Tree Longevity
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more. Use of smaller or slower-growing varieties, and exceptional attention such as careful watering, fertilization, pruning, etc., may prolong the usefulness of trees beyond what might be expected. Inevitably, these trees will take increasing amounts of attention and eventually will require replacing.

Even though the lives of trees planted in adverse situations will be shortened, this in no way means that such trees should not be planted. Such trees fill a vital need, softening the harsh urban environment, providing shade or screening, or just providing something attractive to look at.

When trees are used in such a manner, it is important that everyone involved recognizes that these are temporary plants and will need to be replaced periodically. If the condition in which the trees are being used is understood in advance, and if replacements are anticipated and budgeted, there will be far less trauma when the plants begin to outlive their usefulness and replacement becomes necessary. ■

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