

WINTERKILL CAUSES:

In many areas in the northern portion of the cool-humid region of North America, extensive ice sheets were laid down early before the first snow fall for the 1996-97 winter. The depth of this ice was 2 to 3 inches (50-75 mm) in a number of areas. As a result my phone has been busy with incoming calls this winter. A number of articles written by certain turfgrass agronomic consultants have appeared relative to low-temperature kill particularly in relation to ice sheets. Some of these articles list one of the causes of winterkill as crown hydration. This is a totally incorrect concept. The term crown hydration is just now becoming widely used, but was introduced in 1973 in Turfgrass: Science and Culture.

The basic cause of direct low temperature kill in this case is a temperature sufficient low to cause lethal ice crystal formation within the meristematic plant tissues, which in many species are the crowns. The higher the water content in sensitive tissues like the protoplasm of cells the greater the potential for direct low-temperature kill. Thus, a high crown hydration level predisposes the plant to the potential for kill should sufficiently low temperatures occur, but it is not a cause of winterkill.

During the autumn hardening of grass plants, some species have an ability to lower the crown hydration level substantially, and these species typically have the greatest tolerance to direct low temperature kill. For example, normal tissue water contents are in the +85% range. During the autumn hardening period prior to entering winter dormancy, certain turfgrass species such as the bentgrass (*Agrostis*) species can lower their meristematic crown water contents to the 65 to 70% range. This contrasts with normal growing conditions wherein a tissue water content of 60% could result in death by desiccation. In contrast, other species such as the ryegrass (*Lolium*) species can barely lower their meristematic-crown water content to 80% during hardening, and accordingly tend to be very prone to direct low temperature kill.

Turfgrass and soil cultural practices that (1) cause higher tissue water contents or (2) impair surface and internal soil water drainage will result in higher crown hydration levels and increase the potential for direct low temperature kill. Cultural practices such as excessive nitrogen fertilization tend to increase the crown hydration level, while high potassium levels reduce the potential for direct low temperature kill.

UPCOMING JB VISITATIONS:

Provided for Institute Affiliates who might wish to request a visitation when I'm nearby:

- May 7 to 9 - Columbus, Ohio.
- May 21 to June 6 - England, Netherlands, Belgium, and Germany.
- June 7 to 14 - Torino and Rome, Italy.
- June 18 to 19 - Sea Island, Georgia.
- July 8 to 10, Woodstock, Vermont.
- July 17 to August 4 - Australia.

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