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## **LOW TEMPERATURE Kill Causes**

**Low Temperature Kill** is caused by ice crystal formation in plant tissues that fatally injures the protoplasm in cells. The extent of kill increases at higher tissue water contents and low carbohydrate reserves. All the leaves and roots may be killed, but the turf will survive as long as the meristematic tissues in the crown of plants and in the nodes of lateral shoots survive.

The above type of winterkill is distinctly different from two other types: (a) winter desiccation and (b) low temperature diseases. Also, direct low temperature kill occurs at temperatures below 32°F (0°C); while low temperature leaf discoloration, or chilling injury, occurs at tissue temperatures between 55 and 60°F (13-15°C) with a resultant loss of green color. Do not confuse these types.

### **Low Temperature Kill Is Increased By:**

#### **A. Environmental Stress Conditions:**

1. Wet, saturated surface soil.
2. Rapid rate of freezing or thawing.
3. Repeated freezing and thawing.
4. Shaded site.

#### **B. Unfavorable Cultural Practices:**

1. Poor surface and subsurface drainage.
2. Close cutting height.
3. Low potassium (K) level.
4. Excessive nitrogen (N) level.
5. Thatch accumulation.

#### **C. Susceptible Plant Physiology Status:**

1. Active shoot growth.
2. High tissue hydration (succulence).
3. Lateral shoots (stolons & rhizomes) elevated above protective soil, such as by excessive thatch.

#### **D. Poor Plant Species and Cultivar Selection.**

## **UNDERSTANDING TERMINOLOGY:**

- **Winter dormancy** - The cessation of growth and subsequent death of the leaves of perennial grasses at low temperatures.
- **Winter overseeding** - Seeding cool-season turfgrasses onto warm-season turfgrasses at or near their start of winter dormancy; used in mild climates to provide green, growing turf during the winter period when the warm-season species are brown, dormant and prone to wear stress.
- **Low-temperature chill discoloration** - The loss of chlorophyll and associated green color that occurs in warm-season turfgrasses at low-temperature chill stress of 55 to 60° (13-15°C).
- **Direct low temperature kill** - The death of turfgrasses caused by either intercellular or extracellular ice crystal formation at temperatures below 32°F (0°C), that kills the living cells in the protoplasm of cells. It is most severe in plants that are highly hydrated, that is high in water content in the critical meristematic areas of the plant crown and nodes on rhizomes and stolon.
- **Spring greenup** - The initial seasonal appearance of green shoots as spring temperature and moisture conditions become favorable; thus, breaking winter dormancy.

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## **UPCOMING JB VISITATIONS:**

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

- January 8 to 14 - La Manga, Spain.
- Jan. 16 to 20 - East Lansing, Michigan.
- January 21 to 28 - Harrogate, England.
- January 31 to Feb. 2 - Columbus, Ohio.
- February 3 to 7 - Brandenton, Florida.
- February 8 to 10 - Orlando, Florida.
- February 21 to 27 - San Francisco, Calif.