

On The Research Front

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Physiological Mechanisms of Winter Injury to Plants

By **Marvin H. Ferguson**, United States Golf Association

Desiccation appears to be the most frequent cause of winter injury insofar as turfgrasses are concerned. Other physiological mechanisms of injury are associated with flooding and ice sheet formation. Deficiency of oxygen, accumulation of carbon dioxide, leaching of cellular contents, mechanical rupture of cells by ice crystal forma-

tion and dehydration of tissues are among the mechanisms which are suggested. Injury caused by late spring cold spells after grass has begun growth is common. Cell rupture and desiccation appear to be the chief causes of injury under these conditions.

Causal Agents in Winter Injury of Turfgrasses and Their Relative Importance

By **J. B. Beard**, Michigan State University

Winter injury encompasses a number of types and causes including desiccation, heaving, disease, direct low temperature kill and injury associated with ice and snow covers. Injury associated with ice and snow covers can be subdivided into oxygen suffocation or toxic accumulations under an ice sheet, leaching of vital cellular constituents when submerged in water during thaw, and direct low temperature injury to meristematic areas during spring freeze and thaw periods. The relative importance of these causal agents de-

pends on the location, grass species, hardiness of the plant, severity and type of winter, and nutritional level at which the plant has been maintained. Significant variations in susceptibility to low temperature and ice cover injury have been shown between grass species and within the bluegrasses, bentgrasses and fescues. The hardiest species tested are the vegetative bentgrasses and roughstalk bluegrass. Our current state of knowledge suggests a need for more detailed studies concerning ice crystal formation in grass plants.

Pathology of Winter-Injured Turfgrass

By **J. G. Lebeau**, Canada Agriculture Research Station, Lethbridge, Alberta

Winter killing of turfgrass is seldom due to sub-zero temperatures alone but is also caused by desiccation or attack by psychrophilic fungi. In western Canada snow mold on turfgrass is caused by an unidentified basidiomycete. Investigations on snow mold of turfgrass in Alberta showed that damage was consistently associated with accumulation of HCN in the host tissues. Snow mold on turfgrass was con-

trolled in southern Alberta by raising the temperature of the soil a few degrees during cold periods in the winter. Minimum temperatures were maintained in the plots by soil-heating cables controlled by thermostats. The temperature required for control was critical. Cold-hardy varieties of turfgrass were more resistant to snow mold than non-hardy varieties.