

By DR. JOHN M. ROBERTS

DURHAM, N.H. — Crown hydration damage continues to be one of the most destructive yet least preventable forms of winterkill. It is a problem generally associated with turf growing in wet soils whose saturated cells rupture and die following extreme fluctuations in temperature.

Many of the specific environmental conditions required to cause damage are not fully understood. However, serious injury has been reported when warm temperatures are followed by rapid decreases in soil temperatures below 20 degrees Fahrenheit.

Golf courses in the central and northern regions of the United States are prime targets and can be damaged throughout the winter. Even so, turf in these regions is particularly vulnerable to crown hydration damage in the two- to three-week transition period during snowmelt in early spring, during which time standing water and saturated crown tissues often exist on semi-frozen soil surface.

This is especially apparent on greens that have not been contoured to allow for surface runoff. Also during this transition period, wide-ranging daily temperature changes are common, and carbohydrate levels of the turf are low. As a result, the young tissues being produced are highly susceptible to crown hydration damage at this time.

Today's Best Management Practices

Dr. John M. Roberts works at the University of New Hampshire in Durham, N.H.

Future grasses promise better tolerance to temperature changes

By MARK LESLIE

GRIFFIN, Ga. — Just over the horizon looms a whole new generation of grasses that will be much more temperature tolerant and environmentally compatible, according to Dr. Ronny Duncan of the University of Georgia.

"We are attacking [environmental issues] from all angles — from plant breeding to turfgrass management," said Duncan from his Extension Service headquarters here. "We'll see great improvement in zoysiagrass, Bermudagrass, bentgrass, seashore paspalum ... by the year 2000."

Duncan is working in particular on U.S. Golf Association-funded research on seashore paspalum. "This is really exciting," he said. "I see it as one of the most environmentally compatible grasses that we will ever have. It's salt-tolerant, drought-tolerant, can stand periodic water-logging, reduced pesticides and reduced fertilizer compared to the Bermudas or bentgrasses. And I have fine-enough textured material that we're evaluating it on greens."

Breeders are striving for overall stress tolerance, he said, "so we can reduce fertilizer and pesticides and have a lower growing habit to keep overhead costs down. We're attacking the environmental thing big-time because, like it or not, major regulations are coming down both federally and from the states."

In the meantime, he said, the golf community should get the idea that "a weed here and there is not catastrophic."

Crown hydration remains most destructive, least preventable killer

may help provide protection:

- maximizing bentgrass populations (poa greens and harsh winters often are incompatible);
- avoiding cultural practices that stimulate excessive growth during the hardening period of late fall;
- maintaining high potassium levels entering the winter;
- designing greens that allow for rapid surface runoff; and
- constructing greens with permeable soils and installing drainlines for rapid subsurface drainage.

One of the key principles in reducing

injury involves maintaining low crown hydration levels. However, under field conditions, wet soil surfaces often exist because frozen soils are impermeable, and water moves upward from the frozen soil during thawing periods. As a result, large sections of greens can still be lost despite various attempts to limit excessive crown hydration.

Field experience has indicated that following severe winters, the portions of greens (especially poa annua greens) where water collects are most often injured. This includes greens built with permeable soils and those having sub-

surface drainage.

Detecting crown hydration damage in the early days of snowmelt often is difficult. During the winter, despite having water-soaked blades, turf retains its green color under a snow or ice cover and still appears to be alive.

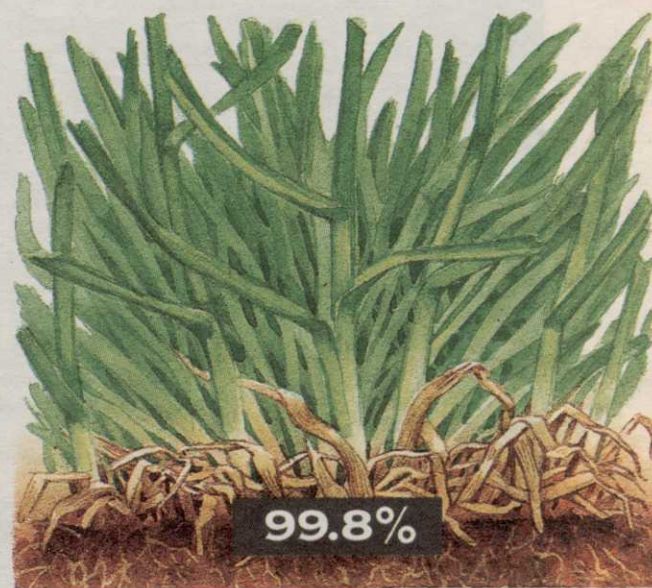
It is not until the warmer temperatures of spring arrive (generally within a few days of the course opening for play) that turf injured by crown hydration damage will begin to turn brown as the green chlorophyll pigment fades from the leaves.

The process of overseeding usually follows, and two to three months generally are needed before injured greens are fully restored. The recovery time can be particularly slow if cool spring temperatures prevail.

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