Maine turf talk

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• Increasing potassium (K) applications, generally using an application rate of 1:3 N:K, to lower water-potential levels.

• Reducing irrigation.

• Using turfgrass species and cultivars that start the hardening process early. "Grasses that start hardening off in early September versus those that start in early October are going to have a foothold, able to accumulate more carbohydrates," he said. "For instance, ryegrasses generally don't start to harden until October, whereas bluegrasses begin in September, so blues have much more potential to resist freezing stress."

Cool-season grasses adapt to cold areas because of the natural process called hardening off — which allows them to get ready for the cold, freezing temperatures, Torello said. The external changes are decreased shoot growth and deeper green color. The more important internal changes are an increase or peak in photosynthesis, a decrease in overall respiration rate (the use of carbohydrates as energy for growth or just to stay alive), and accumulation of high levels of reserve carbohydrates in crown tissues.

Most important are the carbohydrate levels in the crown, since high levels reduce water potential. Less water means lower temperatures to freeze those tissues, he said.

Because the plant lives off reserve carbohydrates during the winter, "the more energy stored during the fall, the better off the plant will be," Torello said. "Photosynthesis is very slow, if at all, in the winter. Respiration must continue, albeit slowly."

The two major types of freezing stress are direct ice crystal formation inside the cell, which he said seldom happens but is "the kiss of death" when it does; and indirect ice crystal formation, which occurs when ice forms between cells within the dormant crown.

"This occurs in all cool-season turfs at the onset of freezing temperatures," Torello said. "This causes extreme drying of cells. The net effect is actually drought stress.

"If the cells are well hardened, with a lot of carbohydrates, the turf is more resistant to indirect freezing stress injury."

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Citing ice-cover injuries and stress as another turf killer, Torello suggested that superintendents faced with this situation punch holes or crack the ice at 1- to 3-foot intervals; apply dark granular organic materials which absorb heat and form holes in the ice; or combine the two methods.

"The injury to the turf is due to lack of gas exchange," he said, which cuts off oxygen and builds up hydrogen cyanide and carbon dioxide.

A test for dormant Bermudagrass

By PATRICK O'BRIEN

It is very difficult to detect the viability of dormant and overseeded Bermudagrass after extreme cold temperatures. Superintendent David Stone at The Honors Club has used a technique for many years that he learned from Dr. A.J. Powell at the University of Kentucky to determine the winter survivability of his Bermudagrass areas.

A plug removed from sites that typically are susceptible to winter damage can be assayed quickly using the following method:

• Use a 4-inch cup cutter to remove a Bermudagrass plug from a "protected" and "unprotected" area for comparison purposes.

• Wash off the soil from the plug and remove the old dormant top growth.

• Expose the rhizomes and stolons by pulling the plug apart.

• Place the separated rhizomes and stolons in a Ziplock clear plastic bag, along with a wet paper towel.

• Place the sealed bag in a window or under a grow lamp.

• Create "instant summer" by maintaining a temperature near 90 degrees.

• Rewet the paper towel as needed to keep the rhizomes and stolons from drying.

• Within two to five days, green-up of the winter-surviving tillers should happen.

"This essay method will take much longer if you leave the plug intact," according to Powell. Powell usually samples sites prone to winter injury during January, mid-February, and early March with this technique. Late-winter sampling will help a superintendent determine if late freezes affected the Bermudagrass.

Correlation over the last two years with spring green-up has been 100 percent with this method. According to Powell, this test is also valid to check the viability of zoysiagrass, but it takes a few days longer for the results because of zoysia's slower growth rate.