Winterkill research yields new clues

By KEVIN J. ROSS, CGCS and ANDREW OVERBECK

One of the most difficult times of year for Snowbelt superintendents is the moment of truth each spring when they find out how well their winterkill prevention activities worked. Prior to and during winter, superintendents face numerous choices concerning ice and snow removal, free water removal and the use of covers. However, winterkill remains an enigma, because what worked one year does not necessarily work in another year.

Research on winterkill has been going on for decades and a miracle cure is yet to be found. But researchers are focusing on several aspects of winterkill causes to try and pinpoint the exact reasons why damage occurs.

In general, winter damage is defined as any injury that occurs during the wintertime period. Winter damage can be inflicted by winter turfgrasses fungi (low molds and cool season pythiums), crown hydration, ice damage (suffocation), direct low temperature kill and desiccation. Of these, only true winter diseases and desiccation are understood, while ice cover damage and crown hydration are still not totally understood.

DOES ICE COVER KILL?

For years ice damage has been associated with a gas build-up that occurs just under the ice surface. Under prolonged ice cover, oxygen is depleted from the plant that is still under very low levels of respiration and microbe activity. This results in an accumulation of toxic gases that may result in death of the plant. Superintendents generally follow the rule that Poa annua can survive under ice cover for up to 60 days, while bentgrass can survive up to 90 days. This rule, however, is being revisited.

There is a popular theory that if the ice remains on turf for too long that you end up with dead turf," said Dr. George Hamilton, assistant professor of turfgrass science at Penn State University. "Why it happens has not been shown or even if it happens because of suffocation. That is why you see devastating ice damage only once or twice a decade. If suffocation caused damage, people would get it every year because there are parts of the

Hofstetter: Overtime top budget buster

BY ANDREW OVERBECK

LAKELAND, Fla. — Former Meadowbrook Golf/International Golf Maintenance executive Greg Hofstetter has launched a consulting venture to give golf course owners maintenance support without taking over complete control of their operations. Hofstetter, who was vice president of golf operations for Meadowbrook/IGM for seven years, believes that his new firm, Agronomic Systems, fills a growing need in the golf business.

"Owners, whether they are private, municipal or daily-fee, have a difficult time giving up control to a golf course management company to outsource maintenance when they are not seeing a guaranteed return," said Hofstetter. "Even though IGM assures them they get more control, which is true, it is difficult for owners to see that and feel that. That is the biggest single selling challenge. I saw an opportunity to help courses without making them feel like they were losing control."

Agronomic Systems provides golf course evaluations that show courses where and how they could save money. So far, Hofstetter has done evaluations for 23 courses including Valdosta (Ga.) Country Club, Widow's Walk Golf Club, and many others.

White joins Mount Snow

MOUNT SNOW, Vt. — The Mount Snow Golf Club has named Bryan White its new golf course superintendent. White comes to Mount Snow from Santa Fe, N.M., where he was a superintendent at The Club at Las Campanas, a private 36-hole facility. Prior to Las Campanas, White worked at various golf clubs in Colorado, Pennsylvania and Maryland.
CARBOHYDRATES COULD BE KEY

Hamilton said his research shows that ice is far more likely to cause damage if the plant has low carbohydrate levels. "We looked at carbohydrate levels and we found a connection between levels of carbohydrates and the ability of the plant to withstand icing," he said. "Stressed turf is more susceptible to ice damage."

According to Interlachen Country Club superintendent Matt Rostal in Edina, Minn., going into winter with stressed turf may have been the cause of the winterkill he suffered on several greens, despite using covers. "We had the Solheim Cup last September and that's usually the time we are supposed to be getting everything healthy going into winter. Instead I cut them as short as I ever do and kept them lean on fertilizer, which was not preparing them for winter," said Rostal. Brendan Parkhurst at Cape Arundel Golf Club in Kennebunkport, Maine, believes his greens got damaged more severely for the very same reason.

It think it had a lot to do with drought carry-over from last summer," he said. "We didn't get a lot of rain in the fall so the plant didn't get a chance to heal up."

CROWN HYDRATION DEMYSTIFIED

The mechanisms that cause crown hydration are thought to occur when hydrated plants become subject to a rapid decrease in temperature. Crown hydration, or dehydration as is more accurate, happens from both inside the plant tissue (intracellular) and from outside the plant tissue (extracellular).

Intracellular crown dehydration is believed to happen when the water around the cells inside the plant suddenly freezes. This draws the water out of the cell, causing a dehydrated situation and resulting in death of the plant. However, there is certain debate as to when this can actually happen. James Ross, a researcher at the Prairie Turfgrass Research Centre in Olds, Alta, Canada, believes that the plant must break dormancy and begin to hydrate prior to the freeze process. According to Ross, the transition from winter to spring is the most critical for damage to occur because of the dehardening of the plant.

"Generally when the plant begins to break dormancy, it takes on water, which hydrates the crowns and reduces the simple sugars, which protect the crown through the winter and make it much more susceptible," he said. Extracellular crown dehydration happens similarly, except it is believed that ice formation outside the plant suddenly freezes. This draws the water out of the cell, causing a dehydrated situation and resulting in death of the plant.

SOLUTIONS ARE FEW

As the research continues, new theories are being developed and the impact of individual weather events is becoming more and more clear. However, with so many variables involved, it will take many years of on-course experience to ever develop a fail-safe strategy to reduce winterkill damage.