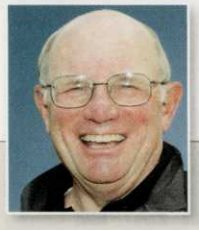
MEET THE NEW LIGHTWEIGHT CHAMPION.

The new Toro® Reelmaster® 3550-D floats effortlessly over contours in fairways and green surrounds. With a productive 82-inch cutting width, turf-friendly tires, the superior traction of a Series/Parallel 3-wheel drive system, and a weight of less than 2,000 pounds,* the Reelmaster 3550-D is engineered to make a big impression…without leaving one.

Reelmaster® 3550-D

*Gross vehicle weight for standard configuration, including five 18-inch cutting units, with no optional accessories.

TORO® Count on it.



Monroe Miller retired after 36 years as superintendent at Blackhawk CC in Madison, Wis. He is a recipient of the 2004 USGA Green Section Award, the 2009 GCSAA Col. John Morley DSA Award, and is the only superintendent in the Wisconsin Golf Hall of Fame. Reach him at groots@charter.net.

AN ASSIST FROM LEOPOLD AND THOREAU

When politicians talked incessantly last year about falling off the fiscal cliff, superintendents, farmers and anyone else involved in production agriculture were worried about the moisture cliff we actually did fall off. Drought covered vast areas of the country and wild weather developed everywhere. It was the second costliest year for weather disasters ever, second only to 2005 (Katrina). This year we had Sandy, which was three times larger. Some places even had record flooding and 2012 was the warmest year in America since we started keeping track of such things.

In our town we've had a lot of snow this winter, including a storm that dropped 21.5 inches in one shot. But the water equivalent of snow will not begin to mitigate the moisture deficit we were left with when last year ended. Around here we are beginning to wonder if 2013 will be like 1988.

The velocity of weather changes is what is troubling to me. It happens so quickly – record flooding in 2011; record drought in 2012. The extremes are crazy. Recently, a comedian joke that 90 percent of us believe there are changes in the climate, and the other 10 percent are D.C. politicians! Gosh, even I am starting to realize the weather isn't like it has been most of my life. Maybe global warming is for real. I am not ready to blame it all on America, however.

Four scientists – one from Wisconsin, two from Boston U and one from Harvard – are using their own phenological data along with that from two renown naturalists – Aldo Leopold and Henry David Thoreau – to study the ecological effects of climate change. I am especially interested in their paper; I did a phenology study as part of a course in landscape plants nearly 45 years ago. Phenology is the study of the blooming or flowering date of plants, and my project required two daily trips to the UW arboretum that spring. What I feared was a major pain in my neck became a fascinating and educational experience.

Leopold, author of "A Sand County Almanac," and Thoreau, author of "Walden," were meticulous record keepers. Thoreau's records on blooming dates around Concord, Mass., were made in the middle 1800s. Leopold's flowering dates were taken near his shack in south central Wisconsin, not far from where I live, between 1935 and 1945. His daughter resumed his work in 1977 and continued it until 2011.

The authors used that information to predict some blooming dates last spring when the temperatures were way above normal. Their predictions were right on the mark.

The take home from that exercise is that these early plant flowering dates were due to the warmer spring temperatures. The record temperatures of late spring led to some record early blooming times.

Out east, around Concord, the study concluded that in an average year some flowers will bloom 11 days earlier than when Henry Thoreau was living in his cabin at Walden Pond. A dramatic example from Leopold's data involves the black cherry (we had two of this large trees on our golf course). In 1942 the mean spring temperatures was 48 degrees F. and the black cherry bloomed on May 31st. Last year the mean spring temperature was 54 degrees F. and the black cherry bloomed as early as May 6th. That's almost a month early.

Before this study was published, plant scientists didn't know if plants could keep blooming earlier and earlier as global warming increased. Controlled warming experiments like those conducted in a growth chamber or a biotron tended to under predict blooming dates when compared to what actually happens in outdoor or natural settings. Now they do know, because of the extreme weather of 2010 and 2012 and especially because Leopold and Throeau.

Phenology may be less important to superintendents than orchard owners, unless you are working at a course like Augusta National Golf Club. For us, beautiful flowers might appear before the course is open, but the game itself won't be affected.

However, if fruit trees bloom early and before the bees arrive, there won't be any pollination or fruit. Also, early blossoms are very susceptible to damage by a subsequent frost, something that happened in Door County, Wis., and Traverse City, Mich., last year. The cherry crop was destroyed.

The study I reference here used flowering dates over a 161-year period in the eastern half of the U.S. I have opening day data that covers the last 40 years at my former golf course. I wonder if the warm springs have resulted in earlier openings?

The question might require some statistical analysis . . . GCI

Phenology may be less important to superintendents than orchard owners, unless you are working at a course like Augusta National Golf Club. For us, beautiful flowers might appear before the course is open, but the game itself won't be affected.


PROFESSIONAL
VALENT
PRODUCTS
Products That Work, From People Who Care® | www.valentpro.com | 800-89-VALENT (898-2536)
Read and follow the label instructions before using.
Tourney and Products That Work, From People Who Care are registered trademarks of Valent U.S.A. Corporation.
©2011 Valent U.S.A. Corporation. All rights reserved. AM24189.13
Learn more about Tourney on tough diseases. Use the smartphone ScanLife App or text a picture of the code to 43588.
WHEN IT COMES TO FIGHTING TOUGH DISEASES,
TOUGHNESS IS A VIRTUE.
Nothing takes out tough diseases like Tourney® Fungicide. Superintendents can handle the toughest diseases throughout the season with Tourney in the tank. It's the go-to solution for controlling a broad spectrum of tough diseases. Learn more at www.valentpro.com/tourney.
Tourney®
FUNGICIDE
Tough made easy.
ANTHRACNOSE | BROWN PATCH | SUMMER PATCH | TAKE-ALL PATCH | FAIRY RING
DOLLAR SPOT | NECROTIC RING SPOT | GRAY LEAF SPOT | SNOW MOLD | OTHER PATCH DISEASES

Don't be fooled. Identify the tell-tale signs of spring dead spot early on so it doesn't become a season-long scourge.

By Rob Thomas

It has been a long, cold winter. Spring has sprung, turf is exiting dormancy and golfers are chomping at the bit to play. Unfortunately, your course is dotted with unsightly blemishes – spring dead spot (SDS) has reared its ugly head.

Spring dead spot is most common in the transition zone where Bermudagrass is grown and subjected to periods of cold temperatures that induce plant dormancy, says Dr. Nathan R. Walker, professor of turfgrass IPM/turfgrass pathology at Oklahoma State University. Depending on location in the United States, the causal agent is a soilborne fungus known as, *Ophiosphaerella korrae*, *Ophiosphaerella herpotricha* or *Ophiosphaerella narmari*.

"For example, in the Southeast and Atlantic coast states, *O. korrae* tends to be more common, while in the plains, *O. herpotricha* is more common," Walker says. "It is not uncommon to have regions where two or three of the species can all be found."

Symptoms of SDS are fairly diagnostic – patches from 6 inches up to 18 inches, or even several feet in diameter are present at spring green-up, says Dr. S. Bruce Martin, Jr., professor of entomology, soils and plant sciences at Clemson University.

"Superintendents can probe the soil to examine roots and rhizomes in the affected patches; dark brown to black rotten roots, stolons and rhizomes will be observed, even without a hand lens," Martin says.

SDS is most common in the transition zone or in environ-

MANAGE YOUR LIQUID ASSETS

ADMIRAL®

BLUE LAKE COLORANT

Ponds, lakes and streams within a golf course help determine aesthetics and more importantly, feed into the overall botanical health of a golf course. Keep your water bodies free of noxious plant growth and algae with Admiral lake colorant. With the highest pure dye content of all EPA registered lake colorants, Admiral imparts a natural, rich blue color on your water bodies, enhancing the aesthetics of your course by providing the differentiating factor that will keep golfers coming back.

For your convenience, both liquid and WSP® (water soluble packets) formulations are available.

Scan to learn more.

800-232-5907 • beckerunderwood.com

BECKER UNDERWOOD
Inventing the Future

Spring dead spot is most common in the transition zone where Bermudagrass is grown and subjected to periods of cold temperatures that induce plant dormancy.

ments where Bermudagrass tends to go semi- to completely dormant, Martin says. In areas where winters are cold enough for Bermuda to go completely dormant, SDS tends to be more severe than in climates with warmer winters.

"Symptoms are prevalent in the spring, but infections actually occur the previous summer and fall and perhaps some infection occurs in the spring," he says. "However, the summer and fall infections are probably the most important as they weaken Bermuda as it is going into dormancy, and this weakened, infected grass is what is ultimately injured or killed by low-temperature stress."

Different turf types are more susceptible to SDS, Walker adds. "It is important to remember the disease triangle here – host (grass), environment and pathogen – all are factors that determine the presence or absence of disease," he says. "Like many diseases, when a plant is grown outside its region of adaptation we see stress and disease. The damage SDS causes can range from low to very severe on different cultivars of common and interspecific hybrid Bermudagrasses. Generally speaking, cold tolerant Bermudagrasses are more tolerant and cold intolerant are more susceptible.

"So take Ultradwarf Bermudagrass, which is becoming more common in the northern region of the transition zone in Oklahoma, we will likely see more SDS on these grasses as they are grown farther north," Walker adds. "So within all the different types of Bermudagrasses there are differences, and these differences can be affected greatly by where and how the grass is grown."

The highest maintained hybrid Bermuda grasses are generally the most susceptible, says Blake Garrett, agronomist at FarmLinks in Sylacauga, Ala. Hybrid Bermudagrasses, which tend to produce excessive thatch, are the most prone to spring dead spot. Conversely, Bermudagrass variet-

PHOTOS COURTESY DR. BRUCE MARTIN

WARNING: DON'T BE FOOLED

Superintendents can't be too quick in diagnosing a patch of dead turf as spring dead spot (SDS). It is often confused with pink snow mold because, according to Blake Garrett, agronomist at FarmLinks in Sylacauga, Ala., the two share some similar symptoms, such as bleaching of turf in sunken circular areas that occur after the disease has affected the turf. In addition, both appear after the turf is transitioning out of winter dormancy.

Going beyond the naked eye, any competent diagnostician should be able to differentiate the diseases easily through microscopy, says Dr. S. Bruce Martin, Jr., professor of entomology, soils and plant sciences at Clemson University. "Pink snow mold or michrodochium patch produces abundant two-celled curved spores on infected leaves, while SDS has no spores typically associated with it, but abundant ectotrophic darkly pigmented fungal hyphae on roots, stolons and rhizomes," he says.

"Look at roots, stolons and rhizomes with a good hand lens for the typical rotting associated with SDS," Martin advises. "If they have a microscope, they can incubate foliage overnight in a refrigerator, which should allow growth of microdochium mycelia and spores, then observe through a microscope for the typical curved spores. Otherwise, send an untreated sample to a diagnostic lab. An answer should be forthcoming quickly."

MARY ANN HANSEN, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY, BUGWOOD.ORG

A ring of salmon- or pink-colored growth is present on the outer edge of pink snow mold patches when the disease is actively developing, Garrett adds. The infected leaves within the patches are usually collapsed and matted down upon themselves.

"Fungicides are effective for control of pink snow mold," he says, if that's what the issue turns out to be. "In the case of pink snow mold, apply fungicides before snow cover to prevent disease development. Mapping and spot-treatment of areas where pink snow mold is most severe can significantly reduce fungicide expenditures. In regions where prolonged snow cover does not occur, apply fungicides when symptoms of microdochium patch are first observed."

Apply early and the party's over for pests.

A single application of Acelepryn® insecticide in April or May gives you season-long control of all key white grub species, plus excellent control of turf caterpillars, European crane fly, annual bluegrass weevil, billbugs and other key turf pests. To learn more about how to use Acelepryn for optimal control of annual bluegrass weevil, visit **WeevilTrak.com**.

Acelepryn® Insecticide

syngenta®

For a special program offer, scan the QR code or visit **GreenCastOnline.com/Acelepryn**

Symptoms of SDS are fairly diagnostic – patches from 6 inches up to 18 inches, or even several feet in diameter are present at spring green-up.

ies with improved cold tolerance are more resistant to SDS. Guymon, Midlawn, Midfield, Midiron, Yukon, Mirage and Sundevil have been shown to have improved resistance to SDS, whereas Arizona Common, Cheyenne, Jackpot, NuMex Sahara, Oasis, Poco Verde, Primavera, Princess, Sonesta, Shanghai, Tifton 10, Tifway, Tifgreen, Tropica, Vamont and Sunturf are all susceptible to SDS.

Based upon its name, one might believe SDS is a season pathenogen, but Garrett says that's not the case... and can present problems for years.

"Initial signs and symptoms are visible in the spring, but once the affected Bermudagrass roots and stolons are severely rotted, patches are sunken, generally well defined and circular," he says. "Severely damaged areas may have symptoms that last well into the summer [and] the turf may not recover before fall dormancy.

"They may enlarge over three to four years, often developing into rings and then disappear," Garrett adds. "These spots usually reoccur in the same location over several years if disease-management practices are not put into place."

Unfortunately, the likeliness of SDS appearing is fairly high if conditions are favorable for disease. "It is difficult to avoid the disease, but management practices such as selecting a resistant cultivar, not conducting activities that delay dormancy or spread the fungus can reduce the severity of the disease and likely slow the spread of the disease," Walker says.

Superintendents should be vigilant for early warning signs, Martin says. "Perhaps the appearance of the dull or bleached turf in a patch pattern in fall; however applying a fungicide for control once symptoms appear will be less effective typically than earlier applications, but still may be helpful in late fall, especially on putting greens," he says.

Too late... the disease has been spotted. What now?

"If symptoms occur in a particular spring, then they are more likely to recur the following year if not controlled," Martin says. "Most of my work has been on putting greens where

PHOTOS COURTESY DR NATHAN WALKER

TURFCO®

THE LEADER. SINCE 1961.

INTRODUCING THE WIDESPIN™ 1550.

Topdressing is no longer a guessing game. With the new WideSpin™ 1550, you're in complete control of your topdressing program. You'll get the application rates you want, when you need them...without leaving the seat.

- **NEW CONTROLLER** allows you to calculate your rates while also giving you a wider range of rates to choose from. Lock in your favorites using the controller's four presets.
- **NEW HYDRAULIC SYSTEM AND SPINNER DESIGN** makes the patented WideSpin technology even more versatile while delivering a consistent, even spread. Go from a new, superlight application to heavy, and everything in between.
- **NEW HOPPER** has 30% greater capacity and the widest opening in the industry—you'll refill faster and spill a lot less when you do.

Whether you use a tow-behind or truck-mount, see why the WideSpin 1550 is the new standard in topdressing. Give us a call and we'll arrange for a head-to-head comparison with your current topdresser.

3 YEAR WARRANTY

CALL 1-800-679-8201 for a FREE on-site demonstration, or **VISIT WWW.TURFCO.COM**

the tolerance of the disease is very low. On fairways, a superintendent frequently will opt not to bother with fungicides because control can be expensive and incomplete. This all depends on the budget and tolerance of the damage.

"Preventive approaches with fungicides usually include two applications of fungicides with known efficacy," he adds. "These have included Rubigan (being phased out), Torque, Banner Maxx and Eagle, primarily. Heritage has worked in some cases but not well in other cases, with the same inconsistent results from thiophanate methyl. However, rotations or tank mixes with t-methyl and Torque have shown improved efficacy over Torque alone, in my trials on putting greens."

Patience and smart agronomic practices are factors in winning the war against SDS, Garrett says.

"Spring dead spot can be managed with a multi-pronged approach, implemented over a period of several years," he says. "Management practices that improve the cold-hardiness of Bermudagrass are therefore very effective for SDS management.

"Preventative fungicide applications are an option in high-value areas or where cultural practices alone do not provide adequate control. Of the fungicides that are labeled for spring dead spot, fenarimol (Rubigan) is most effective," Garrett adds. "The timing of fungicide applications does not appear to be critical, as long as they are made in the fall before soil temperatures dip below 60 degrees (F).

> "They may enlarge over three to four years, often developing into rings and then disappear. These spots usually reoccur in the same location over several years if disease-management practices are not put into place."
>
> — *Blake Garrett, FarmLinks*

For best results, applications should be made at higher water volumes or watered-in with 0.25 inches of irrigation immediately after application in two gallons $H_20/1000\ ft^2$."

Walker points to timing. "Depending on the situation, it is best to avoid practices that can spread the fungus while soil temperatures are cool or delay normal cool temperature-induced plant dormancy," he says. "There are several studies where different fertilizer nutrients or formulations of the nutrient when used decreased the severity of the disease. Excessive nitrogen fertilization can increase the severity of the disease. Lastly, one can use fall applications of fungicides to suppress the disease."

Once diagnosed properly – in-house or via a lab – sound agronomic practices are always the best course. GCI