MANAGING bentgrass dise

Various control methods can help keep your bentgrass looking its best.

By David McPherson

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Golf fans watching the 2011 Open Championship on TV were surprised to see large, dark green round rings on some of Royal St. George's greens. For North Americans used to watching the pristine greens in high-definition on their big-screens at Augusta each April, this was a shock.

What were these strange circles? For superintendents, the appearance of these blights on greens for all the world to see – especially at one of golf's majors – was viewed as a positive since it gave the media a chance to educate the average fan and a global audience on one of the many diseases superintendents combat daily to get their putting greens in top playing shape.

This excerpt from "The Open Championship: a Guide to the Environmental Management of the Links, further educates the average golfer of what these strange rings were all about:

"Observant spectators at The Open may spot rings and arcs of darker coloured grass to some greens and fairways at Royal St George's. These 'fairy' rings are veteran living organisms that may be hundreds of years old. Fairy rings were once believed to be meeting places where fairies came together to dance but are actually caused by fungal mycelia (fungal roots) which grow in circular patterns beneath the soil."

Fairy rings can vary in size from a few inches to 200 feet in diameter and suppression is the most practical way to manage them. The theory is that fairy rings will thrive less where the turf is well irrigated and fertilized. This control method involves a combination of core aeration, deep watering and proper fertilization. As Dr. Peter Dernoeden, turfgrass specialist at the University of Maryland – an expert in creeping bentgrass management – points out, these diseases may be caused by any one of 60 species of fungi, which makes chemical control more unpredictable.

"Control of fairy rings is made extremely difficult due to the hydrophobic nature of the infested soil," says Dernoeden. "Chemical control is difficult because the fungus grows deeply into the soil and lethal concentrations of fungicide do not come into contact with the entire fungal body."

Fairy rings are just one of several bentgrass diseases superintendents are seeing on their greens. Together, turf researchers and agronomists are working diligently to stay ahead of these pathogens to keep those greens green for golfers, but it's no easy task. Many of these pathogens attack thatch, but depending on the growing conditions and climate, each region tends to see different diseases.

Darin Bevard, senior agronomist for the USGA for the mid-Atlantic region, says soilborne pythium diseases are also becoming more of a problem; these pests are often caused by the maintenance practices that today's golfers demand.

"The decline of the grass associated with these diseases generally occurs when the grass is being mowed low with intense mowing and rolling schedules," he explains. "However, this is not always the case. In general, the biggest problems we see are when the greens are being pushed for fast speeds under stressful weather conditions. That's when one of these 'diseases' shows up. Is it the disease or is it the physiological stress of intense maintenance? The answer is both. The grass has limits, and to date, Mother Nature is undefeated. When the weather is poor for cool season grass management, the golfers need to realize that we have to back-off on maintenance or suffer the potential negative consequences."

TAKING IT ALL AWAY. Thatch management is a key to combating bentgrass diseases and keeping these pests at bay says Katerina Serlemitsos-Jordan, an associate professor at the University of Guelph, in the school's plant agriculture department. She recently completed research on this topic. In her region (southern Ontario, Canada), take-all patch is the worst issue. Last spring, when it was very cool and wet, this bentgrass disease was rampant on many courses.

"It's partly the climate because we have extended periods of cool and wet weather, but take-all patch pathogens also do well in soils with high pH levels … anything above 6.5," she says. "The soil pH levels in south-

ern Ontario are probably around 7.5 and sometimes get as high as 8, so we tend to see take-all patch visible for extended periods of time. It's a problem that usually attacks new greens, but if the conditions are right, we will sometimes see take-all patch on 10 to 15-year-old greens too."

So, how do superintendents battle take-all patch and make sure it doesn't become an intrusive invader? Serlemitsos-Jordan says fertilizers such as ammonium sulphate are one option. "Some go as far as acidifying their irrigation source, but I don't know how effective that is," she adds.

The best way to prevent these unwanted guests from making a home on your greens is by managing the thatch – increasing the health of the turf, so these pathogens never have a chance to establish themselves in the first place.

"Thatch-management is huge," says Serlemitsos-Jordan. "Anything we can do to promote healthy root growth such as core aerification, even solid tine aerification just to open up the channels where the roots can actually grow, is beneficial. One of the best ways to manage this disease is to keep the plant as healthy as possible, but you can also change the environment.

"The other thing superintendents can do is to monitor their irrigation," she says. "There are still guys out there that water 10 minutes a day. What that creates is a three-prong negative effect. First, it increases thatch levels; studies show that shallow, frequent watering will increase thatch levels. Second,

Pythium, like several bentgrass diseases, can usually be at least slowed by keeping turf well-drained and aerated.

it also promotes shallow rooting because you are constantly keeping the top three to five centimeters of the root zone moist, so the roots have no need to grow any deeper as they are happy in those shallow layers. Finally, by keeping the soil moist, you are creating a very conducive environment for the pathogen because they like moisture."

Meanwhile, out in California, where courses often deal with dry conditions, Pat Gross, says all is "quiet on the western front." The director for the USGA, southwest region, who joined the Green Section staff back in 1991, advises courses in his region on current agronomic trends, sharing practical information on golf course maintenance issues to greenkeepers in California, Nevada and Mexico.

"If there was something moving through I would be hearing about it and my phone would be ringing off the hook," he jokes.

While there are no major issues or trends when it comes to bentgrass diseases in his region, one new disease that popped up at a few locations in 2011 is something Gross says superintendents need to monitor closely. The disease, called thatch collapse, or artillery or cannonball fungus, decomposes areas of thatch and can be deadly to a greens' playability.

"It shows up in round circles the size of a coffee cup and it becomes depressed," explains Gross. "This disease really impacts the putting quality. What's most concerning about thatch-collapse is that there is very little known as to why this pathogen has arrived."

The only research conducted to date is by academics in New Zealand. These findings were first described in the May, 2011 issue of the New Zealand Turf Management Journal. The article describes how this disease was discovered at several courses down under in 2009 on both New Zealand's north and south islands. The name artillery fungus comes from the fungus' ability to propel spore masses as far as three metres. Since the publication of this journal article, turf researchers from around the globe have become interested in learning more about this fungus as it has been spotted at several courses in the United States. The disease is most notable for its activity well into the winter months.

"Most thatch collapses occur in the summer, so this makes artillery fungus quite unusual," according to the article.

Other than this nasty, mysterious new predator, are there any other bentgrass disease trends Gross is seeing in the southwest?

"Not much that is causing widespread damage," he says. "What I can tell you is that the newer courses with bentgrass greens or courses that have rebuilt their greens with creeping bentgrass generally have far fewer disease problems. I'm making frequent visits to the Olympic Club in San Francisco, Calif. in preparation for the 2012 U.S. Open and they haven't sprayed a fungicide this year."

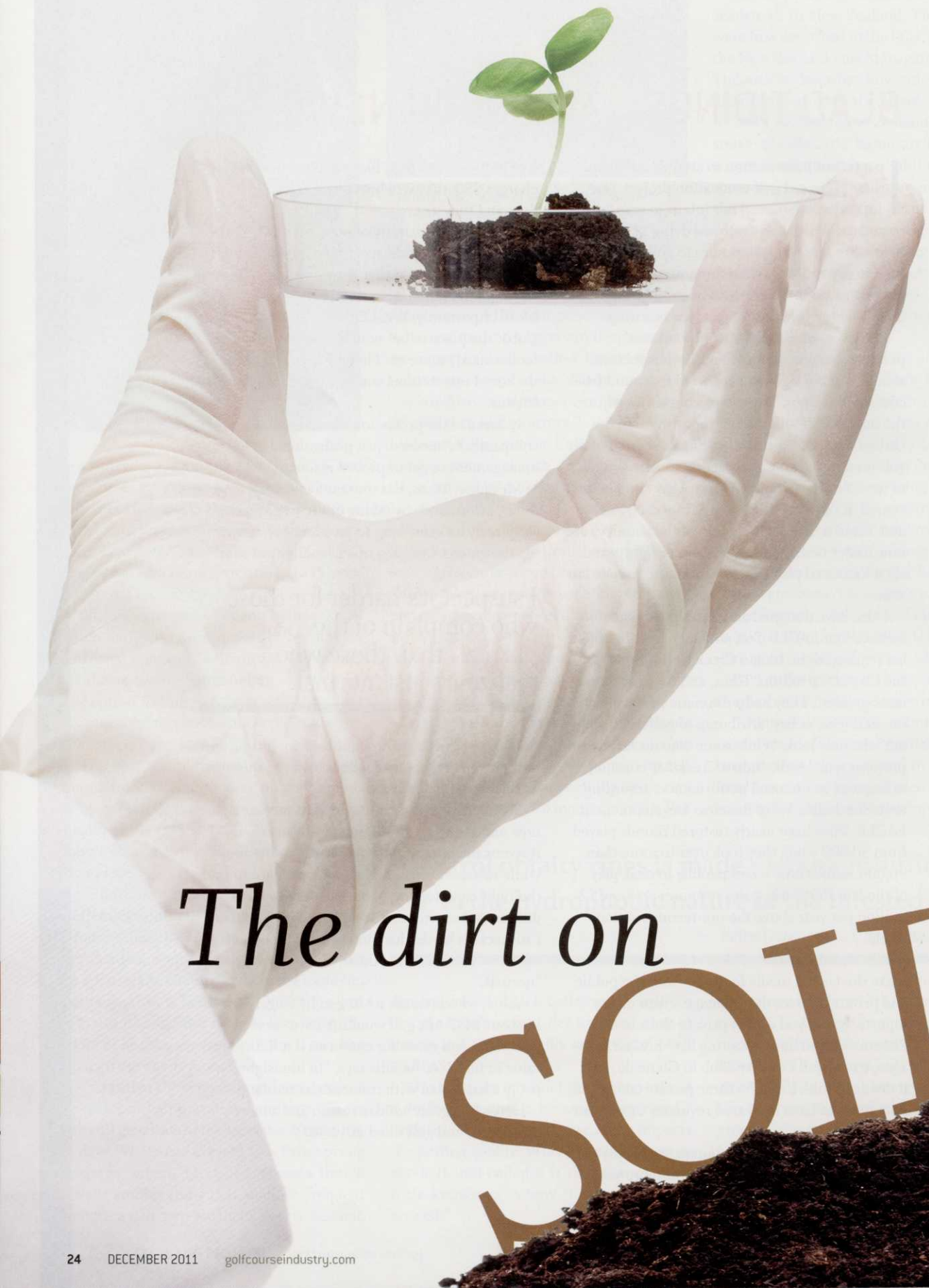
Back in the Midwest, Darin Bevard offers a couple comments about bacterial wilt.

"One problem that continues to be discussed more often is the decline of creeping bentgrass on greens caused by bacterial related organisms," he concludes. "There is not total agreement in the academic community about these problems, but something is going on. The USGA has committed significant research to fund this issue. The term used is bacterial wilt. We see yellowing, elongated growth of individual bentgrass tillers and this is often associated with thinning grass, especially under hot, wet conditions." **GCI**

"Control of fairy rings is made extremely difficult due to the hydrophobic nature of the infested soil."

— Peter Dernoeden, University of Maryland

LEFT: MARY ANN HANSEN, VIRGINIA POLYTECHNIC INSTITUTE; RIGHT: CLEMSON UNIVERSITY - USDA COOPERATIVE EXTENSION SLIDE SERIES



The dirt on SOIL

THINKSTOCK

DOWN AND DIRTY

An understanding of the basic tenets of proper soil testing gives turf a solid base to grow. by Sam Ferro

Soil testing reports can be the turf manager's best ally when evaluating the golf course, or it can be a confusing jumble of numbers and charts.

To ensure you get the most out of your soil tests it is important to understand some of the basics tenets of proper soil testing.

Whether performing routine testing for fertilizer recommendations, diagnosing turf problems, or anything in between, the most important role of the turf manager is to ensure proper samples are taken.

We recently worked with a golf course that was having problems with poor drainage. They couldn't understand why their new greens weren't draining, even though they had test results showing a sand with high drainage rates. Turned out the sand that was purchased by the golf course was different than the sand that they had test results for. Appropriate sampling and testing of the actual sand delivered to the golf course would have allowed the golf course to reject the sand prior to placing it.

Proper sample collection procedures vary based on the type of material being tested and the location of the material during sampling. In order to get a truly representative sample, a composite sampling technique is most desirable. A composite sample is comprised of material obtained from multiple locations that are combined to create a single sample.

Golf greens should be divided into sampling subunits based on topography or directional areas. If there is concern about an entire green, the green can be divided into four to eight segments. Subsamples are then taken from each of the segments. The subsamples can be collected with a cup cutter, soil probe or shovel and combined in a plastic bucket. The combined sample is then mixed thoroughly to create the composite sample.

Large sample areas, such as fairways, should be divided into separate sampling units based on topography, vegetative cover, previous use, soil color and other visual differences. Small, non-uniform areas such as wet, rocky or eroded spots should always be a separate sampling unit.

When purchasing bunker sand, topdress sand or any high volume material that is stored in a stockpile, the stockpile should be tested before delivery to the golf course. A composite sample should be comprised of at least eight sampling locations. The eight locations should vary from the top to bottom and all around the pile. At least half of the samples should be taken from the lower third of the stockpile.

Most tissue samples are collected from mower clippings. To help prevent contamination wait at least two weeks from the last top dress application before sampling. Samples should be collected on actively growing turf. If growth patterns (yellow to lighter green color) are apparent, sample separately from "normal" growing areas. Let samples dry overnight to remove excess moisture before packing. Tissue samples should be shipped to the laboratory as soon as possible.

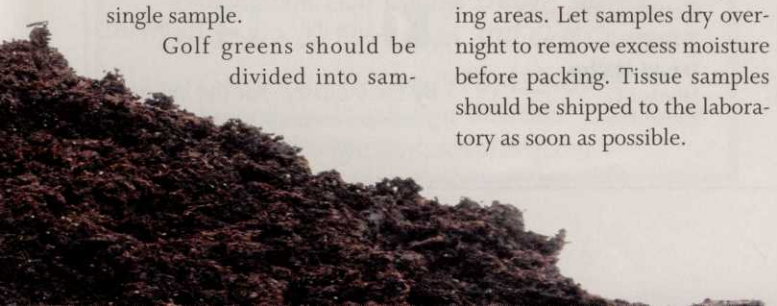
Once samples have been obtained, they should be labeled and a record of the samples should be kept by the golf course. The record should include sample locations and depths, and a map of sample locations. Sample names and identification should be written in permanent ink on the outside of each sample bag, bottle or container.

Sample submissions should include a letter or testing request form. Most laboratories can provide sample submittal forms and shipping labels that will help insure the sample submission process goes smoothly. Communicating with the lab can often help the lab to better tailor tests and reports to address golf course needs or concerns.

Lab test reports typically include an explanation of tests results and recommendations for action. Therefore, samples should be sent to laboratories that specialize in the demands associated with growing and maintaining a golf course.

With proper sampling techniques and lab testing, you can be confident that the information contained in the test reports accurately reflects the conditions of the material that was sampled. The information gained from the report can then be combined with on-site observations to make knowledgeable golf management decisions. **GCI**

Sam Ferro is president of Turf Diagnostics & Design (TDD), an accredited soil physical testing laboratory serving golf, sports turf and landscapes world-wide.



LIST OF INGREDIENTS

Soil content affects soil behavior, including the retention capacity for nutrients and water. By Chris Wilczynski

Each and every golf course that exists is this world has some form of vegetation. Vegetation comes in many different forms: turfgrasses, trees, agricultural crops, etc. One element all vegetation requires for establishment is soil. There are many soil types, but for growing purposes there are three main soil compositions: sand, silt and clay. Soil content affects soil behavior, including the retention capacity for nutrients and water.

Clay soils are heavier and tend to stay wet. Sandy soils

are lighter and dry out quicker. Silt is more or less a combination of sand and clay, the ideal growing medium for vegetation. The soil composition plays a very important role in the health and success of the plant. The care for the plant can vary widely depending on the type of soil that exists.

Golf courses typically have 25-30 acres of tee, fairway and green grasses and another 40-60 acres of rough and native grasses. Some golf courses are treeless, but most have several different coniferous and deciduous tree species. Anyone who cares for such a diverse landscape knows how much the soil effects the day-to-day maintenance and health of the plant. The more consistent soil, whether it is sand or clay, the better. Having multiple soil compositions throughout any landscape will test the best of any agronomic professional. Having one or two soil types on a golf course that are consistent from the first to the 18th hole is the goal.

When completing golf course construction projects, whether constructing a new golf course or renovating an existing golf course, one of the most critical steps to success is to manage the existing topsoil. The goal is to have a consistent growing medium throughout the entire project site upon the completion of the project. Prior to any excavation, grading or shaping, 4 to 6 inches of topsoil should be stripped from the affected area and stockpiled away from the area in which the construction work will take place.

Upon the completion of the construction, the same topsoil that was removed should be replaced prior to the seedbed preparation work and grassing. Again, the intent is to have consistency throughout the entire managed turfgrass area. This effort takes time and money, but it also creates positive results and success.

In the fall of 2010 my firm and Eagle Golf Construction completed a four-hole renovation project at Wanakah Country Club in Buffalo, N.Y. Wanakah sits just a few hundred feet away from the shores of Lake Erie. The soil at Wanakah is heavy clay, typical western New York soil. It is not the ideal growing medium but the golf course superintendent, Gale Hultquist, who has managed the grounds at Wanakah for over 30 years, knows the soil and knows how it needs to be managed. The first step of the renovation project following the removal of the existing turfgrass was to strip 6 inches of topsoil from all of the areas that were to be disturbed and graded. The topsoil was stripped and stockpiled along the sides of the affected areas.

Upon completion of the project, the same topsoil that was stripped was replaced over all of the disturbed and graded areas. The goal was to create a consistent 6-inch depth of topsoil. What did this create? Consistency! Can you imagine trying to grow turfgrass on the varied composition of the subsoil? In some areas we made 3 to 6-foot cuts into the heavy clay, and the deeper we cut the worse the clay became. This patch-quilt effect

of different soil compositions would be endless if the existing topsoil was not stripped and replaced. Just think how much fun it would be to manage the new turfgrass within all of the different soil compositions. This area needs a little bit of water but not much fertilizer, this area doesn't grow anything and this area needs a lot of fertilizer and four to five aerifications per year to loosen the soil. This is what it can be like with varying, inconsistent soil types. I have seen it first-hand.

In the early 2000's I worked on a new golf course construction project with Arthur Hills in Yorba Linda, Calif. The golf course is called Black Gold Golf Club and it was developed by the City of Yorba Linda, Calif. and the Aera Energy Company. The property was an old oil field that was managed by Shell Oil. The project included an 18-hole golf course and an upscale residential development that was developed by Toll Brothers. The area that the golf course and residential development was to be developed was rugged and severely undulating. For the entire project, 13 million cubic yards of soil were excavated. 3 million cubic yards were moved on the golf course. In some instances, there were 60- to 80-foot cuts into the existing soil and 50- to 80-foot fills. We strongly recommended that the existing topsoil be stripped and stockpiled, and replaced within the golf course. But, for whatever reason this never happened. The golf course turned out great and the residential development was very successful due to the timing of the real estate market. But, the golf course turfgrass has suffered from day one because of the inconsistent soil composition. Just about every soil type that exists can be found throughout the golf course. In the heat of the summer the cool season grasses really struggle. The heat plays a factor in this but the inconsistent soils play a larger factor. The golf course turfgrass will struggle into the foreseeable future. The cost to maintain the turfgrass on the inconsistent soil will eventually far exceed the initial cost to strip and replace the topsoil. In hindsight, everyone knows what should have happened.

The two projects that were cited vary greatly in scope and cost. But, the one thing that should have taken place regardless of the type of project was to strip and replace the existing topsoil. Let's face it, managing a landscape and hundreds of acres of turfgrass is not easy, especially given the crazy weather that most regions experienced in 2011. Let's not make it any harder than it has to be. Let's do the right thing and start off with a good consistent foundation. Just like the importance of a foundation to a home or building, the soil is the foundation for the vegetation. The foundation needs to be consistent. **GCI**

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