PART ONE OF A THREE-PART SPECIAL SERIES

Plant Health Report

They are two of the golf course maintenance industry's biggest buzz words: plant and health. And, yes, they go together like spaghetti and meatballs. That's why *Golfdom*, in partnership with BASF Professional Turf & Ornamentals, has embarked on this plant health series.

PART ONE covers the modern concept of plant health and turf-disease management — from cultural practices to fungicide use — and what golf course superintendents should do to achieve the highest success rate to control diseases such as dollar spot and anthracnose, among others.

PART TWO, running in April, focuses on fungicide management in accordance with plant health. We'll speak with superintendents and other experts on how they get the best out of their fungicide programs as they relate to plant health.

THE FINAL STORY will look into the future and examine how superintendents will manage turf in 2025. We'll speak with superintendents and other experts to get their thoughts on how plant health will best be achieved 15 years from now.

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From Research to **Reality**

BY
THAVY
STAAL

In the last several years, golf course superintendents have struggled more and more with wise use of water, unpredictable weather patterns and disease control. These issues have shed more light on the emergence of technology that can deliver plant health to turfgrass and mitigate these issues.

So when *Golfdom* approached BASF with the idea of a series on plant health that was to be based in research, with input from leading superintendents as well as turf pathologists from around the United States, we signed on immediately.

At BASF, we've been studying plant heath benefits for more than 10 years. The beginnings of this were in the early 2000s, when BASF launched several fungicides into the crop market that were based on its proprietary active ingredient pyraclostrobin.

Like many products developed, you don't often see their true potential until they're adopted by the marketplace. As they were used, growers noticed additional benefits to using these fungicides for disease control, and BASF researched and developed these plant health benefits.

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Growers using these fungicides reported higher yields in many crops, such as wheat, corn and soybeans. Corn stalks were stronger, leading to more efficient harvests. Crops were also better able to tolerate stresses such as heat, drought and cold than those that weren't treated with a fungicide.

Further research by BASF indicated that plant health effects delivered by the pyraclostrobin-based fungicides included increased plant efficiency via more efficient photosynthesis and better use of nitrogen. This research also uncovered evidence of increased plant tolerance to stress through a decrease in ethylene production and an increase in antioxidant activity.

So on the crop side, the plant health evidence was, well, evident. The next step fell to BASF Professional Turf & Ornamentals in determining whether its pyraclostrobin-based products could deliver improved plant health in turf and provide additional management assistance to superintendents and other turf professionals.

A naïve researcher might say, "Well that's easy. Aren't superintendents like farmers that grow grass instead of row crops?" Of course, we know that's untrue. After all, the idea isn't to increase the turf yield. We don't want superintendents and their crews to have more grass to cut. But that other benefit our research uncovered, that of stress tolerance? If we could show this is also true for turf, we might have something there.

So that has been the focus of our research in turf in addition to better disease control. Can BASF products deliver tangible and real, not cosmetic and imagined, plant health benefits to superintendents? Lack of water, unusual weather, aerification recovery times, recovery from tournament conditions — it all matters to them.

BASF has been looking at various stresses on turf and working with superintendents, turf pathologists and physiologists in the field and with our experts in the lab. And I'm pleased to report this research points to evidence of improved plant health in turf when treated with pyraclostrobin-based fungicides.

The turf is less stressed during heat and drought conditions, the aerification recovery times are reduced and root mass has increased. BASF expects to share specifics on the above points and more information later this year.

And as we edge closer to that moment, the icing on the cake of this journey now includes taking part in this series to learn what others have seen and how superintendents can benefit from proven plant health benefits on their golf courses.

I'm confident we will all learn and benefit from the discourse. ■

Thavy Staal is marketing manager for BASF Professional Turf & Ornamentals.

A THINKING MAN'S APPROACH TO Disease Management

Superintendents share their philosophies on using everything in their arsenal — from fungicides to cultural practices — to control dollar spot and other pathogens for the sake of healthy turf

BY JOHN WALSH, CONTRIBUTING EDITOR

When it comes to managing turf disease, golf course superintendents take different approaches because each course is unique. They factor in many aspects of turf maintenance: turf type, soil, microclimates, weather, fungicides, fertility, water, cultural practices, golfer expectations, budgets and disease severity. Yet, all of those factors seem to fall in line with two broader principles that most superintendents operate by: to save as much money as possible and be as environmentally friendly as possible.

Jeff Corcoran, manager of golf courses and grounds at the private, 36-hole Oak Hill Country Club in Rochester, N.Y., maintains a bentgrass/*Poa annua* mix on playing surfaces. Dollar spot, brown patch and summer patch are the three main diseases he manages. Some years, he'll deal with pythium, which can be

Continued on page 36

ILLUSTRATION BY: ISTOCK INTERNATIONAL INC.

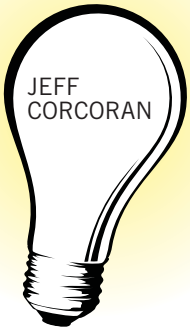
Continued from page 35

severe. In the past, Corcoran spent between $40,000 and $50,000 on three wall-to-wall applications in the years that pythium reared its ugly head.

"I don't factor that cost into the budget every year, but I let the green committee know it's a possibility based on the weather," says Corcoran, noting that Oak Hill is far enough North that the course doesn't see pythium every year.

Of course, weather is the fundamental cause for fungicides and dictates what's going to happen.

"I try to put together the best plan possible," Corcoran says. "There are some fungicide applications I know I'll need to make every year, but it depends. A lot is dictated on budget and the threshold level of the members. What are they willing to accept?"



"There are some fungicide applications I know I'll need to make every year, but it depends. A lot is dictated on budget and the threshold level of the members. What are they willing to accept?"

The threshold at Oak Hill is low, and because of that Corcoran (who was preceded at the course by Paul B. Latshaw, the certified superintendent of Muirfield Village Golf Club in Dublin, Ohio) applies a lot of fungicides preventively. But if a superintendent knows the history of the course he manages, that will help prevent him or her from randomly applying fungicides.

"I try to balance everything when attacking disease: Mother Nature and members' expectations and couple those with the cards I'm being dealt when weather arises," says Corcoran, who fundamentally adopted Latshaw's fungicide program. (Latshaw is the certified superintendent of Muirfield Village Golf Club in Dublin, Ohio.) "Mother Nature is dictating it, keeping in mind I need to put out a certain level of conditioning every day."

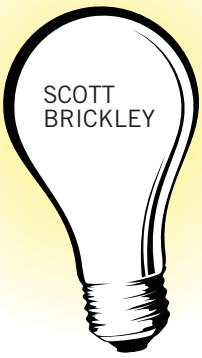
When the weather is humid and hot, superintendents who manage cool-season turf tend to spray preventively. In the fall, they tend to spray more curatively.

Scott Brickley, superintendent at the public, 18-hole Bunker Hill Golf Course in Medina, Ohio, manages a bentgrass/*Poa annua* mix on

Continued on page 38

PHOTO (TOP) BY: MARY CORCORAN; PHOTO (BOTTOM) COURTESY: SILVERADO COUNTRY CLUB & RESORT

At the Silverado Country Club and Resort, superintendent Bill Hamilton verticuts and topdresses regularly to keep the turf healthy, which helps fend off disease.



"Timing is key, and you need to look at weather conditions for that. The keys for mapping disease are looking for its location and time of year, and turf conditions."

Continued from page 36

the greens, tees and fairways. Brickley's first step to managing disease was mapping the diseases and collecting data because none existed when he arrived at Bunker Hill 15 years ago. This information helped start his integrated pest management program.

"The first step was understanding the course, which took five years," he says. "I started from scratch. It's important to look at data, or start collecting it yourself. Timing is key, and you need to look at weather conditions for that. The keys for mapping disease are looking for its location and time of year, and turf conditions."

Bunker Hill hasn't had a bad outbreak in several years, Brickley says. The last one was pythium on some fairways. Since then, Brickley has reduced the amount of fertilizer on those fairways because of thatch. The fairways contained high organic matter that was creating nitrogen naturally. He also core aerified the fairways.

Bill Hamilton, superintendent at the 36-hole Silverado Country Club and Resort in Napa, Calif., verticuts and topdresses regularly to help keep the turf healthy, which, in turn, makes it better able to fend off disease when pressure arises. There haven't been any outbreaks lately. But if he sees something coming, Hamilton will deal with it. He says he's not worried about severity or a disease spreading quickly.

In Florida, Joe Boe, superintendent at the 18-hole semiprivate Windermere

Continued on page 40

THE BIG THREE

There's no competition when it comes to the disease most superintendents are trying to get under control. When asked in a recent *Golfdom* survey what disease they use fungicides to control, an overwhelming 53 percent said dollar spot, distantly followed by brown patch (13 percent) anthracnose (8 percent) and snow mold (6 percent).

Based on a survey of 350 Golfdom readers

PHOTOS COURTESY: JOE RIMELSPACH, THE OHIO STATE UNIVERSITY

Continued from page 38

Country Club, deals with disease primarily on greens because there's not much disease on the fairways and tees. He manages bermudagrass on all playing surfaces — the old Jensen variety on greens.

"I had brown patch in fairways awhile back, but I just let it run its course and the turf overcame it," he says. "I let members know what we were doing — that it wasn't a threat, that we were saving money and being environmentally friendly, and that if it had appeared on the greens, we would treat it."

Putting it out

Superintendents' fungicide applications methods vary. For example, Hamilton tinkers with compost teas with worm castings and an organic fungicide, so to speak. However, he realizes this method is not a panacea.

"I'll use a chemical fungicide in a heartbeat," he says.

Ted Cox has been superintendent at the public, 36-hole Running Fox Golf Course in Chillicothe, Ohio, for about 20 years. Because of his longevity there, Cox senses when diseases are coming and sprays before they do come.

Brickley's summer stress program, which he uses throughout the year, includes applications of fosetyl-aluminum or O-ethyl phosphonate, and chlorothalonil rotated with iprodione. "This is the program that allows me to sleep at night," he says.

Brickley tank mixes foliar fertilizer with fungicides to reduce the amount of time he's on the spraying rig.

Boe's main two concerns disease-wise are fairy ring and fusarium blight. While high humidity and hot weather encourage these two diseases, Boe doesn't treat preventively.

There are two greens at Windermere that tend to get disease before any others. Boe used to spray all greens when disease appeared on the two. A few years ago, Boe had a new crew member spraying, and he ran out of product with one green left. So Boe waited to see what happened.

MONEY MATTERS

Reduced budgets force superintendents to alter pesticide programs

Of the many aspects factored into managing turf disease, one of the biggest is a golf course superintendent's maintenance budget. And lately, an increasing number of superintendents are dealing with smaller ones.

According to a recent *Golfdom* survey of more than 500 golf course superintendents, 65 percent of superintendents had to reduce their maintenance budgets in 2009. Forty-one percent of those who reduced their budgets did so by 5 percent to 10 percent.

Scott Brickley, superintendent at the public, 18-hole Bunker Hill Golf Course in Medina, Ohio, had his normal budget of about $400,000 cut by 11.5 percent in 2009. He says the reduction caused him to reduce pesticide rates and try some generic products.

"But my concern [in doing so] is that because we had the best growing year in a while, it doesn't reflect a typical year because we didn't have the outbreaks we typically have," he says.

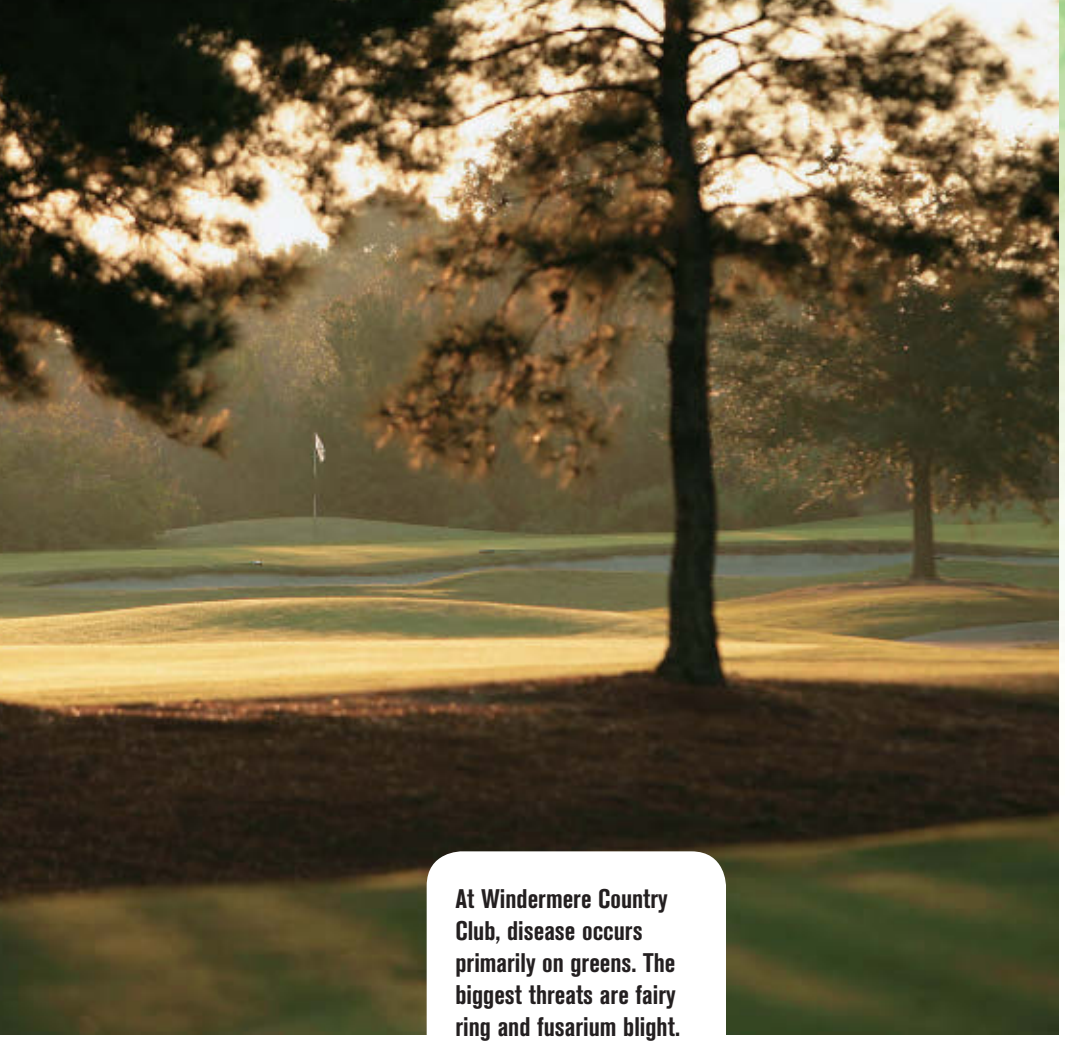
Ted Cox, superintendent at the public, 36-hole Running Fox Golf Course in Chillicothe, Ohio, has a low maintenance budget. As a result, the course's bentgrass fairways haven't been treated at all the past four years. Cox does spray the course's ryegrass/bluegrass tees three or four times a year with chlorothalonil.

"I've had to cut back," Cox says. "I'm spraying less area than I used to. I used to spray the green surrounds, but I don't anymore. I also don't hit the tees as much as I used to."

Bill Hamilton, superintendent at the 36-hole Silverado Country Club and Resort in Napa, Calif., maintains the two courses with a $2.4-million budget, which has been flat for several years. Even though Hamilton tries to save a dollar here and there, the economy hasn't affected the way he approaches managing turf disease.

"We're known for our greens, and I don't want to jeopardize that," he says. "I will cut somewhere else if I have to. There's no tolerance for not being smart about greens maintenance. Greens don't go unwatched." — *John Walsh*

PHOTOS COURTESY: WINDERMERE COUNTRY CLUB; (TOP); ISTOCK INTERNATIONAL INC.



At Windermere Country Club, disease occurs primarily on greens. The biggest threats are fairy ring and fusarium blight.

Nothing did, so he scaled back applying fungicides on all greens and just applied product on the ones with disease and the two greens on either side of affected ones. Now he just treats affected areas and their surroundings and then watches closely to see if any disease spreads.

"We were wasting product and didn't need to spray all 18 greens," Boe says. "Fifty percent of the time, we don't treat the entire course. Other times, after two days of seeing disease, we have to treat other greens. If no disease appears elsewhere in two days, we're OK."

Boe estimates he has saved between $2,000 and $5,000 per year on product and manpower because of this wait-and-see approach, which was implemented about a year and a half ago. The fairy ring treatment alone [pyraclostrobin and flutolanil is $2,000 (to treat all greens). Boe uses thiophante methyl for the fusarium blight but doesn't rotate it that much because the disease doesn't appear as much.

Boe also applies chlorothalonil (targeting blue-green algae) once a month to help dry the greens. He applies it every two weeks during the rainy season (May through September).

Additionally, Boe's use of beneficial soil microbes, which he mixes with water and sprays on greens, helps combat fairy ring. Since he's applied the microbes, he hasn't had to treat for fairy ring.

Equipment, too, factors into a well-rounded disease-management approach. Corcoran has tweaked his equipment to get the biggest advantage to maximize each fungicide application. He switched from rain-drop nozzles to flat-fan nozzles about five years ago.

"Equipment is a huge part of our disease management program," he says. "We make sure the spray rig is calibrated every day before it goes out on the course. That aspect of a disease management program is commonly overlooked."

Don't overdo it

In addition to fungicides, fertility goes hand in hand with disease management, helping superintendents manage disease better and affecting how well turf combats stress that causes disease. The healthier the plant, the better it will fend off disease.

Brickley has changed his approach throughout the years. He used to apply fertilizer at a higher rate than he does currently. Now on the lean side, his smaller rates in the fairways are one-tenth to two-tenths of a pound per 1,000 square feet.

"Be sure to check your organic matter so you know what you're dealing with," he says. "Curtail your fertility program based on that."

Brickley previously used more granular fertilizer when he started at Bunker Hill. Now he spoon-feeds greens more to make sure the plant doesn't get stressed, applying 2 pounds to 2.5 pounds of nitrogen a year.

"I like the use of foliars for better control of my program," he says.

Hamilton spoon-feeds about every two weeks and hand-waters his greens to keep them lean. He applies ammonium sulfate, molasses and compost teas for microbial growth. He monitors clippings daily.

"If I put food out, the plant will wolf it down," he says. "Spoon-feeding helps the overall vigor of the grass, so it'll be more resistant to stress. Sometimes you can make your own hell and create an environment for disease by over-fertilizing and over-watering."

Boe reduces water and fertilizer application signifi-

Continued on page 42

"Fifty percent of the time, we don't treat the entire course. Other times, after two days of seeing disease, we'll have to treat other greens. If no disease appears elsewhere in two days, we're OK."

Continued from page 41

cantly when disease flairs up to harden the plant a bit. He spoon-feeds the greens, totaling between a quarter and half a pound per 1,000 square feet a year.

Fertility and some diseases are more closely related. For example, anthracnose is directly tied to fertility levels. However, you can't counter anthracnose without applying a fungicide, Corcoran says.

Cox says he could increase fertilizer amounts to combat dollar spot, but that would make pythium and brown patch worse. He applies about 2 pounds of nitrogen on the greens annually.

H2 no

Much like fertilizer, water use is tied to turf disease. Brickley, for example, hand-waters more than he did in the past because it makes a significant difference — saving water and growing healthier turf.

Corcoran, like Hamilton, warns superintendents about over-watering because it can provide an environment for disease to thrive.

"I like to have dry greens in the morning as quickly as possible," he says.

Watering greens depends on when they need it and the weather. For example, watering every other night is likely during the middle of summer. Watering deep and infrequently is recommended typically.

Hamilton aims to keep greens as dry as possible for as long as possible. He waters in the late night and early morning.

"Too much water will get you into too much trouble," he says.

For Boe, some greens at Windermere can go a week or more without irrigation and others need watering every night because they're out in the open, are mounded and have high sand content.

Lessons learned

Over his career, Hamilton has learned he doesn't have to overprotect the turf.

"If it's struggling, I'm here to help," he says. "I'll just hit it with compost tea and molasses."

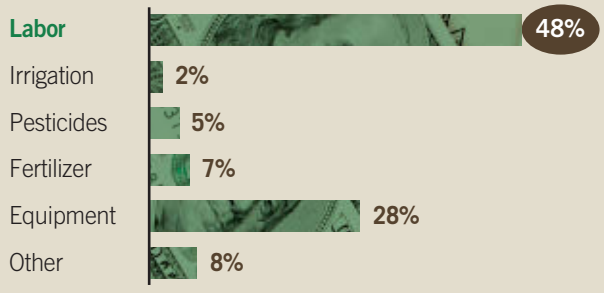
When Hamilton was younger and the superintendent of a Texas course with bentgrass greens, he was so protective of his course's turf that he applied fungicides every week. Now, Hamilton says that's unnecessary.

"The grass will tell you if it needs help," he says. "I pay attention to it. I let it do its thing. But I'm not willing to jeopardize my employment." ■

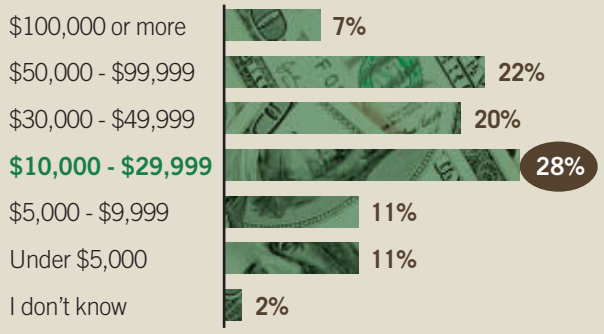
Walsh is a contributing editor to Golfdom and a freelance writer from Cleveland.

PESTICIDES & YOUR BUDGET

What is the area of your budget you're most likely to cut if asked to do so?



What was your total budget for fungicides in 2009?



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