

**PLANT
HEALTH:**

THE ROOT OF THE MATTER

**PART TWO OF A
THREE-PART SERIES**

No one in this industry is afraid to get their hands dirty. Digging in the dirt is just part of the job. And those who are averse to getting a little dirt behind their fingernails have surely found a new career by now.

When taking a core of turf, superintendents always take a long look at their root systems. The health of their turf is reflected in its roots. If the roots are weak, so is the turf. But strong roots? That means strong turf, ready for the punishing summer months and hoards of golfers.

Golfdom, in partnership with BASF Professional Turf and Ornamentals, is proud to once again bring readers the three-part Plant Health Series. In this issue we present Part Two of the series, with the final part coming next month. For Part One, visit www.golfdom.com and click on the April issue. Be sure to check out *Golfdom* TV while you're there, and see our video interview with one of the superintendents profiled this month, Coal Creek's Chris Bradford.

In this series, we're asking superintendents what they're seeing when they look at "the root of the matter." As in, the roots of their turf. Do they like what they see? Or would they like to see stronger roots?

Summer is right around the corner. Here's hoping your roots are ready.

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Bigger Roots Combat Turf's Challenges

As we discussed last month, golfers often judge a superintendent's turfgrass management skills by what they see on the surface of the course — but superintendents know they've got to train, nurture and treat the health of underground root systems to keep blades playable.

Dr. Christina Wells, associate professor in the Department of Environmental Horticulture at Clemson University and plant physiologist, helps me explain what superintendents should consider when determining root management needs that improve plant health.

"In a situation where a lot of the nutrition is being provided for the plant, like on a golf course, it makes more sense to use sugars for energy to drive high rates of uptake," said Dr. Wells. "There's really no reason to grow more roots because it's not necessary. The plant doesn't need to explore to find nutrients when they are right there."

Sugars, which are derived from photosynthesis, play a big role in root development. Below ground, they provide the carbon and energy for continued root growth, as well as powering the mechanisms of nutrient uptake.

Root systems are larger when the photosynthate supplies from the turfgrass leaves increase. The carbon is freed up to other areas



BY KATHIE KALMOWITZ, PH.D.

of the plant, such as the roots. Properly balancing that carbon use is important to helping the plant fight disease, withstand stress, and recover faster if a stress event occurs.

Root health implications for the turf manager

There isn't one answer to what a healthy root system looks like. It really depends on the turf manager's point of view. Why should deeper roots mean a healthier plant? In fact, especially on a golf course, many practices by superintendents promote smaller root systems. Turf is watered and fertilized frequently, and mowed almost daily. With water and nutrients in abundance, and added stress to the plant, roots do not often grow deep.

"If your turf management goal is consistent, dark green turf with no dead or diseased patches — you can achieve that with a minimal root system," said Dr. Wells.

However, as we have seen in the past few summers the perfect growing conditions are becoming harder to find.

"Superintendents faced with re-

strictions on irrigation or the amount of nitrogen they can put on their turf should focus on promoting a bigger root system for a healthier plant," she said. "It's all about the constraints and turf management goals. A healthy root system is whichever one gets superintendents to their management goals."

Understanding how turfgrass functions below the surface can help superintendents more effectively work through multiple agronomic options and select solutions that are essential to keeping turf healthy, and players and course management happy.

Research from BASF Professional Turf & Ornamentals indicates that Intrinsic brand fungicides (active ingredient: pyraclostrobin) can be a helpful tool for superintendents seeking to manage a broad spectrum of diseases and support plant health, including deep roots and stress tolerance.

Learn more about Intrinsic brand fungicides at www.Intrinsic-PlantHealth.com and other BASF Professional Turf & Ornamentals innovations at www.betterturf.basf.us. ■

Kathie Kalmowitz, Ph.D., is a Technical Specialist for BASF Professional Turf & Ornamentals.

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PLANT HEALTH SUCCESS STORIES

Two supers discover better plant health right when they need it. **BY KEN MOUM**

For tickets to see the Rolling Stones. The men's room at halftime of a college football game. Any time there is a buffet involved.

These are all valid reasons to wait in line, and most people have probably spent some time in one of the above lines. There's nothing glorious about waiting in line, but at times it is warranted.

Just ask Chris Bradford, superintendent at Coal Creek Golf Course in Louisville, Colo. He knows a worthwhile line when he sees one — like the line at the BASF booth at the 2011 GIS.

“Like pretty much everyone else in the business I have budget constraints, and I was more than willing to stand in line to get \$1,500 worth of product. I got a sample of Insignia SC at the 2011 Golf

Industry Show, along with a couple of dozen others,” Bradford says. “Any time you can get enough free fungicide to help the course's bottom line a little bit, it's worth a try.”

Seeing results

As recommended by BASF, Bradford applied Insignia SC to his greens about a week before he aerified them in 2011.

“The winter of 2010-2011 was relatively warm, which allowed us to have 4,000 rounds over the winter, adding a bit to the stress on the greens. So we used the Insignia SC in conjunction with spring aerification, because we were hoping to prevent anthracnose from coming in to the injured turf.”

After applying the fungicide, it wasn't long before Bradford noticed the plant health effects. His greens, he said, “all greened up really quickly. And the aerification holes closed very



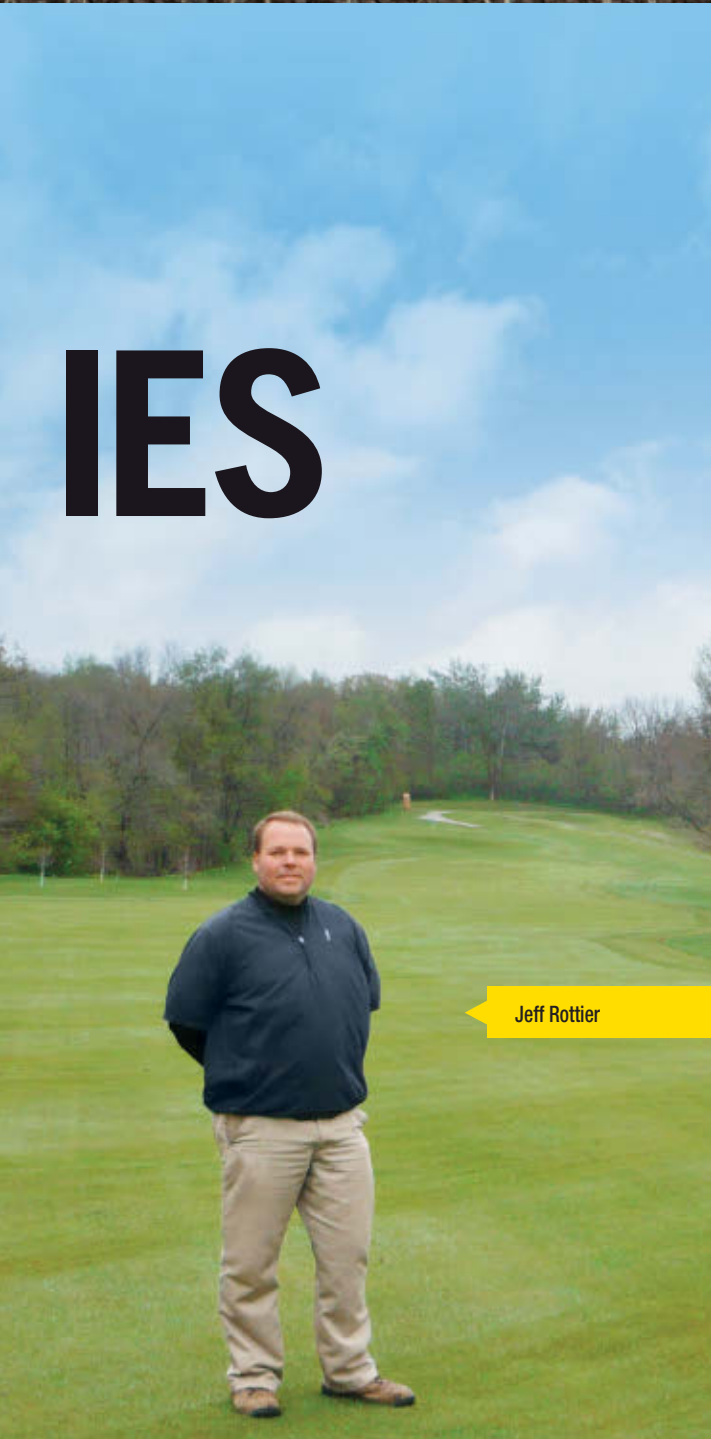
Chris Bradford

THE SUPERS

Jeff Rottier and Chris Bradford don't know each other, but they have a few things in common. Both have had success with plant health products, and both know how to care for golf courses designed by Dick Phelps.

Early on, Bradford learned working inside wasn't for him.

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Jeff Rottier

He first worked as a dishwasher in a pizza place, working his way up to cook.

But working in a kitchen wasn't for him. "I swore I'd never work inside again," he said.

Bradford's father knew board members from the local nine-holer, Heather Gardens Golf Club, and worked his connections on behalf of his son.

quickly. I saw a reaction to it in a few days.

"I know it was the Insignia SC because we applied it with a sprayer that has wind guards on it," he continued. "And at the very end of the boom there was apparently a drip off the end of the shield. It left green trails in the greens that almost looked like we overlapped too much."

The effect, Bradford said, lasted several weeks.

"If you can get the added benefit of plant health and it's economical, the decision to use it is simple. If it allows you to stretch the application intervals, it can save money."

When Bradford arrived at Coal Creek 12 years ago, the course was applying fungicide on a 14-day schedule just to stay ahead of disease — especially anthracnose. Since then,

Bradford said, "by improving plant health I've been able to stretch those intervals to at least 21 days."

A healthier fairway

When it's hot and muggy, as it was in 2010, the 15th fairway at Janesville Country Club in Janesville, Wis. is the first to experience anthracnose and pythium blight, says Jeff Rottier, the course's superintendent.

So Rottier sought to learn more about the promises of plant health.

"Our 15th fairway is in a hollow, so there's less air movement, higher temperatures and higher humidity than elsewhere on the course," he explained.

That meant the fairway was subjected to relentless heat

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While at Heather Gardens, Bradford rose from laborer to assistant superintendent. "I was intrigued by how golf courses looked, and that piqued my interest in turf," he said.

Bradford eventually moved on to an assistant position at Canterbury Golf Course (now Black Bear) in Parker, Colo. The management company he worked for then offered him the chance to become superintendent at Coal Creek. Twelve years later, he's still there.

FAMILY ATMOSPHERE

Rottier's path to golf course maintenance was different than Bradford's.

"I was looking to get free golf. So I started mowing greens on weekends, at Bos Landon in Pella, Iowa," he said. "I loved working on the course."

Rottier started working more and more at the Phelps-designed course. By his third season he was full time, saying goodbye to his father's hardware store.

The Bos Landon superintendent was a Michigan State

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and humidity. With them came disease pressure, especially from anthracnose. Rottier gave the fairway proper attention. Nonetheless, it was damaged every year.

In June 2010, the fairway began to worsen. In early July, Rottier applied Insignia SC. Almost immediately, he says, the turf condition improved. There were virtually no losses on the 15th fairway despite consistently hot and humid weather, Rottier said. Also, fairways that typically fared better than the 15th suffered significant turf loss.

“Overall, we had about 30 to 40 percent loss,” Rottier said. “But the 15th fairway only had 1 to 2 percent loss. The only thing I did differently on that fairway was apply Insignia SC.”

Plant health benefits

BASF isn't the only company in the plant health game. Bayer offers two fungicides, Interface and Reserve, with the EPA-approved plant health label. Syngenta, meanwhile, offers Daconil Action, which stimulates a plant's



Stop by www.golfdom.com to see a video interview with Chris Bradford on plant health, Colorado's dry spring and rounds played.



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University graduate, which prompted Rottier to enter the two-year turf program there.

Upon graduation, Rottier moved on to bigger things. When he saw an ad for an assistant superintendent job at Whistling Straits, he went for it — and got the job.

Rottier's next stop was the much-heralded Erin Hills Golf Course, now tapped to host the 2017 U.S. Open. Rottier grew in the course and stayed for four years. From there, he moved to Janesville Country Club.

Asked about the change, he admitted that working at Erin Hills was a big deal. “Maybe too big,” he said. “I have a family with three young sons, and when we came to visit Janesville we loved it. It offers a great family atmosphere.”

COAL CREEK'S BIG PLAN

Bradford said like many courses, Coal Creek has suffered from deferred main-

tenance. That's why he's implementing a new master plan for the course.

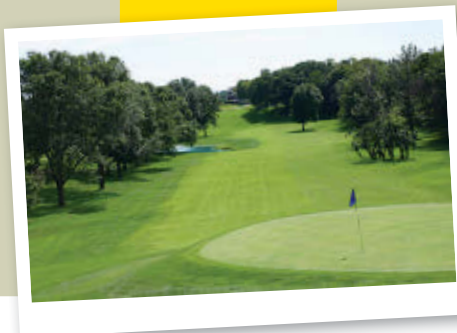
The plan was assembled by Kevin Norby, principal with Herfort Norby Golf Course Architects. Norby said the master plan calls in part for rebuilding bunkers and controlling volunteer trees that have encroached on the playing corridors. Although the projects are necessary, neither will be easy.

Bunker renovations are always expensive, and many golfers feel emotionally attached to trees.

Adding to the need for sensitivity, Norby said, is Coal Creek's wooded environment. “In that part of Colorado, golf courses with tree-lined fairways are the exception,” he said. Nevertheless, the initial work will address some of those trees and set the stage for significant irrigation improvements.

Coal Creek meanders through the course. And in the course's 22-year history, volunteer cottonwoods have grown adjacent to it, affecting

No. 15 at Janesville CC went from being a problem hole to a success story.





It might be hard for golfers to see trees go at Coal Creek, but it's needed to help playability.

defense system in a process called Systemic Acquired Resistance. (*Editor's note: See "Clark Talks Turf" on page 40 for more on Daconil Action.*)

"BASF has studied plant health benefits from the active ingredient pyraclostrobin for more than 10 years in crop and for the last three years in turf and ornamentals," said Brian Lish, business manager for BASF Professional Turf & Ornamentals.

Insignia SC Intrinsic and Honor Intrinsic work by inhibiting mitochondrial respiration, resulting in the fungi's death, he explained.

Inhibiting mitochondrial respiration in plants has its own benefits. It can increase stress tolerance and make plant physiological processes more efficient. The inhibition also enables plants to

retain more carbon dioxide, fueling their growth. And it increases activity of nitrate reductase, the enzyme that makes nitrogen available to plants.

Consequently, more nitrogen is available for plant growth, and enzymes that remove harmful activated oxygen species are more active.

According to Bradford, word is slowly spreading on the efforts chemical companies are putting into creating products with plant health benefits.

"I've talked to a few people about it. They know we've used it," he said. "Everybody wants to do it their way, so it takes a while for people to come around." ■

Contributing editor Ken Mowm lives in Topeka, Kan.

the playing corridors. With input from Bradford and Chris Lichty, Louisville's city forester, the Coal Creek team has identified 149 trees that need to be removed because they are either diseased or unsound.

The selective removal of those trees aims to restore the design intent and playing corridors of the course's original architect, Dick Phelps. Removing the trees also creates a safer course with better agronomic conditions.

After the trees are removed, Bradford said, the team will plant new trees that are more viable for golf courses and in more strategic areas.

According to Norby, nothing needs to be done to Phelps' original routing or bunker layout. And, unlike a lot of older courses, the tee sizes are appropriate. He also said USGA regional agronomist Fred Soller gave the greens a positive review, so no major work is planned for them.



Bradford looks forward to the updates at Coal Creek. "The course is definitely aging," he said.

But Bradford doesn't have a GPS map of the irrigation heads, and the system is old enough that many brass heads still are in service. The first phase will replace old heads and include a detailed map of the system. The plan also includes a new booster pump.

The second phase entails improving areas of poor fairway drainage by re-grading and new subsurface drainage.

Beyond that, Norby's master plan involves completely rebuilding the bunkers with lower flashed faces, new drainage and new sand. Phelps' original design featured complex bunkers with capes and bays. Norby said they'll retain that look while reducing the amount of sand that needs to be maintained.

Finally, the irrigation system will be overhauled, requiring the installation of 2,200 new sprinkler heads, according to Norby.