

## Key points

- Bottom line: Turf stress is the main influence on anthracnose.
- Winter's polar vortex, extensive ice buildup and resulting winterkill may place Midwest courses at the most risk for an anthracnose outbreak.
- Warm, dry spring conditions could also herald an anthracnose outbreak.
- Consider a preventative fungicide program soon after the spring thaw.
- Nitrogen deficient turf predisposes turf to anthracnose and compromises its ability to recuperate from disease damage.

It's no secret the key with anthracnose is stress. If turf is stressed, it opens the door for the disease to come in and go for the kill. It's exactly for this reason that Frank Wong says his "pathological spidey sense" is telling him this year is going to be a bad one for anthracnose.

"If you look at this last winter, there's a lot of environmental stress on those plants," says Wong, technical service specialist for Bayer Environmental Science. "Anthracnose is particularly hard on annual bluegrass, and a lot of it has taken a heavy beating this winter. If your annual bluegrass is 'farkakte,' it may be at high risk for anthracnose to come in and finish it off."

The region Wong believes is most at risk is the Midwest, based on the "polar vortex" and ice damage and winter kill. And he goes one step further to say the form of anthracnose that will likely be seen this spring is basal rot, which tends to come in on plants with damaged crowns and stems and is considered more virulent than foliar anthracnose.

"Crown infections tend to occur in cold, wet conditions, leading to basal rot," Wong says. "Once you get basal rot, the changes of recovery are low."

Anthracnose is a stress dis-

ease and develops under "extreme" environmental conditions. On the flip side, dry, hot weather can induce stress as well and make plants susceptible to anthracnose. Wong cites the example of California this year. While it has received some rain, it is still experiencing severe drought conditions which will probably open the door for anthracnose.

As superintendents go into winter dormancy, they undoubtedly cross their fingers and hope to have a mild winter. With that out the window this year, there's not much that can be done when a course is buried under 6 inches of snow and ice. It's a waiting game until, temperatures rise, everything thaws out and plant growth resumes.

After a stressful winter, Wong recommends embarking on an early preventative fungicide program.

"You should go on this program as early as possible, especially in winter-damaged ar-

reas," he says. "Also, make sure you apply adequate fertilizer in the spring to promote active plant growth and recovery."

Research from the Rutgers School of Environmental and Biological Sciences and the New Jersey Agricultural Experiment Station seems to support Wong's assertion about nitrogen, at least on annual bluegrass putting greens. Its current findings indicate that nitrogen fertilization is "the most influential cultural practice affecting anthracnose severity in annual bluegrass putting green turf. Nitrogen deficient turf predisposes turf to anthracnose and compromises its ability to recuperate from disease damage. Other practices that we have studied such as mowing height, topdressing, foot traffic, irrigation, lightweight rolling and the application of plant growth regulators can also affect this disease."

Wong's other recommendation is to show plenty of patience and "TLC" with your turf because the last thing you want to do is put it under more stress.

"If you want summer U.S. Open conditions right out of the gate in the late-winter or early spring, and put that stress on your turf, you may be setting yourself up for anthracnose," he says. "Have patience, show your turf TLC, and let it recover and get reestablished and then put stress on it later when it's ready for it."

Matt Giese, regional technical manager for the Midwest for Syngenta, has kept a close eye on the United States Drought Monitor and feels that temperatures have been the most significant characteristic of this winter. There have been areas on the East Coast that have received significant amounts of precipitation, whether it be rain or snow, but the story has been entirely different in other parts of the country.

"Yes, it has been a harsh winter, but in some areas it has been a dry winter. A lot of areas may not have recovered from previous summer moisture conditions," he says. "So as we move into the spring months, that can be a key factor as to what level of severity anthracnose and ultimately some other diseases that also require moisture manifest themselves."

Predicting anthracnose pressure based on winter conditions as a crystal ball question.

"It's difficult to answer, but there is research that says cold temperatures will affect disease pathogens such as dollar spot, anthracnose, et cetera," Giese says. "It might reduce maybe the number of pathogens that might be isolated out of a particular area, but does it reduce the severity going into spring? It's hard to answer. Once you have disease in an area, it resides in that plant debris, maybe even the thatch area. And so, at least with anthrac-

## DON'T RULE OUT

Bayer's Frank Wong also cautions to not forget about other diseases like Pythium root rot, Microdochium patch are worse in the Spring on winter-injured turf.

In addition, pay attention to air and soil temperatures rather than a calendar-based program as they are more reliable indicators of when to enact disease management strategies.

"If you base your management programs strictly on a calendar instead of environmental conditions, you can miss a critical disease control window and be behind the 8-ball for a long time," he says.



Anthracnose severity is more dependent on spring conditions and whether there is continued moisture and what sort of stressful events might occur.

nose, it requires some sort of stress in the plant to manifest or activate its symptoms. There is a germination or incubation period for overwintering structures, so once it detects the stress in the plant we see the symptoms on leaves, roots or in the crown.”

According to Giese, anthracnose severity is more dependent on spring conditions and whether there is continued moisture and what sort of stressful events might occur.

“Clearly, there are some cultural practices that can beat up the turf a little, and that’s a normal part of the turf life cycle, but it’s more dependent on spring conditions – if con-

tinues to stay wet, how long the leaf stays wet during the day, if we have cold conditions, etc.”

Giese says that if the spring is cool and wet and you have poor drainage areas, it will be those areas you want to check first as they are hot spots where you might see anthracnose initially. But he admits that sometimes anthracnose is not temperature-related.

“I have seen where even in February we saw anthracnose active on putting greens, so it certainly isn’t waiting for 70-degree temperatures,” he says. “The key factor is moisture, especially in poorly drained areas or areas that have compaction because they

weren’t aerified. Or maybe it didn’t receive the last round of fertilization so there are nutritional deficiencies as well. It’s all of those things working together and creating this mutual stress on the plant, and that’s where we see anthracnose survive and continue to cause problems.”

Basal rot anthracnose is more likely to occur when the soil is saturated with moisture. If you have drier conditions on the surface then you have less leaf wetness, so foliar anthracnose is less likely in that scenario but not exclusive. But Giese admits you could also have both foliar and basal rot

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anthracnose at the same time.

"You could have wet conditions above and below the surface that could make the plant more susceptible to infection, especially if it's under stress," Giese says.

If you have a well-drained soil profile but have continuous dew or leaf moisture and this situation occurs for a long time, it's possible you could only get foliar anthracnose.

"Sometimes it will stay foliar and sometimes it will turn into basal," says Giese. "It depends on what environmental conditions and parameters might be occurring."

For treatment, Giese prefers AI combo fungicides like Head-

way, Concert or Strata. Snow mold applications contain three different AI that can also be used against anthracnose in spring. In the Central Plains and Great Lakes, snow mold apps made in the fall can sometimes carry over into spring.

"It's one application and done, but it sort of helps set the stage to be a bit more ready to start those spring applications and allows you to be one step ahead of the disease curve," Giese says. "It ends up being a more preventative approach if you can get ahead of the turf. And then it also gives you broad spectrum activity against a plethora of other diseases in that early spring timeframe."

## For more

Looking for more info on anthracnose? Enter [bit.ly/1gKk120](http://bit.ly/1gKk120) into your browser to hear Dr. Karl Danneberger talk about how to spot anthracnose in the wild and control it with cultural practices in this Ohio State University Turfgrass series.



Many pathologists, Giese says, recommend applications at least a month prior to when you expect to see symptoms. For example, if you typically see symptoms in late June, then you would apply in mid- to late-May.

"Be prepared. If you have areas historically were hit with anthracnose, have a spray program ready. Be prepared to make the first application even

if it seems it may be earlier than the previous year. The reason is it's much easier to be on a preventative program and get better control with that approach than waiting till you see symptoms and then use rescue treatments to manage the disease." GCI

*Jason Stahl is a Cleveland-based writer and a frequent GCI contributor.*

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**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](mailto:groots@charter.net).

## HARD WORK AND GRIT

What paves the road to success hasn't or will ever change.

A lot has been said lately that Obamacare would allow some people to quit working (or work fewer hours) and still receive health care. This was viewed by many as a good thing because it allowed those same people to "do what they really wanted to do." In many cases, that was essentially nothing.

18 year old who sued her parents for money to finish her private high school and for college.

What is going on here? I still contend, as I have my whole life, that hard work is our country's key to success. It isn't always a guarantee, but it is more important than anything else. That is true in our

the rough mower Omar was repairing. They looked up long enough to trade some banter and insults, and then I left. I felt a sense of pride. I had hired them all, pretty much based on the belief that they would work hard and probably enjoy it. Hind-sight says I was right.

Back in the early 70s I made a conscious effort to hire farm kids. Some of it was prejudice – I was a former farm kid. My thinking was that they worked hard and cheerfully. From the time you were big enough to feed chickens or calves, kids were part of what made a successful farming operation. The virtues of working hard were ingrained at an early age, and the opportunities to see the results of your efforts were endless. It turns out the same principles are true for golf course management.

I've noticed in my career, which covers almost five decades, that really successful people work really hard. Effort counts. The Greatest Generation got this right. I saw it in my parents and grandparents and aunts and uncles.

Bookstores have hundreds of titles on the business, economics, psychology, education and the steps to success. And I agree there are other factors involved – from education and intelligence

to discipline and conscientiousness and everything between. If I were to write a book on this topic, it would be a very slender volume. Hard work is first. A close second in success predictors is grit. I have witnessed this up close many times, too.

Grit is a passionate commitment to a single notion. It's a constant that wavers little, if at all. It is perseverance to the max. I think about a new superintendent charged with fairway improvement but no equipment to get the job done. He put ¾-inch tines on his four Ryan Greensaires and slowly moved up and down a fairway at a time. It was time consuming, boring and aggravating, but incredibly effective. His grit got the job done for several years, and the fairways improved dramatically. They were healthier and tolerated closer mowing now that the surface was smoother. There are endless examples of such grit in our golf turf profession.

So, there you have it. Tom Edison famously said success is "1 percent inspiration and 99 percent perspiration." There is no need to set your standards lower to make it appear that you have accomplished more. Just apply hard work and grit; they'll get that job done. **GCI**

“Grit is that passionate commitment to a single notion. It's a constant that wavers little, if at all. It is perseverance to the max.”

Really? Are you kidding me? I thought the whole program was to help people. Instead, abuse like this is pathetic and counter-productive and is a negative approach to life and success. It essentially condemns hard work in lieu of a freebie from Uncle Sam. Whoever advocates such an approach should be ashamed.

And then there were stories about dumbing down the SAT exam. Fewer students were taking it, scores were going down, and rather than encourage more study and college prep, they made the exam easier. Like Kathleen Parker said, "when the going gets tough, just make the going easier." Even more appalling was the

profession as much as it is in any other. In my travels to golf course around our state, hard work is indeed valued and practiced. I see it everywhere.

During the last GIS, I made a quick stop at our shop (I know it isn't my shop anymore, but I am lucky my successor gave me a key). Chad and Pat were in Florida, but the guys all had their noses to the grindstone, working hard. Dave had a chainsaw in a million pieces, and Omar was tangled up in the rough mower making a repair. Chris had the Foley grinder humming along, proud of his lineup of sharp walking greensmowers. Angel was in a cloud of steam and mist, cleaning the decks of

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# WETTING AGENTS



*Once considered "snake oil," wetting agents have emerged as a key tool in healthy turf.*

**T**here was a time when wetting agents, or surfactants, were considered snake oil. Something you might buy from a street corner huckster who would claim that they were the miracle cure for diseased turf. Rodney Tocco admits as much. The researcher at Michigan State University's Plant and Soil Sciences Department, says this reputation was still alive and well in 2003 unless your course was located in an arid region and you had seen firsthand the benefits from salinity flushes.

"Why did people need them when they had plenty of water to use?" he says. "But now, restrictions are coming out of the Great Lakes region and Ontario, requiring the need to monitor water usage. Also, a river got run dry in Connecticut – all of which was not caused by the golf industry. But they're now looking at these water reserves going down because of too much pressure from growing populations. So it has been an eye opener that we can put surfactants in there and reduce water input."

Colleen M. Tocci, marketing manager at Engage Agro USA, adds that wetting agents aren't just for water conservation, and more and more courses are seeing the multiple other benefits they offer.

"With the formulations we have today, there are so many other

benefits beyond water savings," she says. "You get into chemical efficiency, irrigation efficiency and playability because you're creating healthier turf and roots and those help fight off disease and insect pressure. You're just creating a healthier environment in the soil profile."

Still, Tocci admits that one of the most common reasons to use injectable surfactants is to increase the efficiency of your irrigation system.

"A lot of money has been spent over years upgrading and improving overall irrigation systems on golf courses," says Tocci. "However, you can modify your irrigation system as much as you want, but if the water you're applying through that system and whatever other chemical you're applying through that system doesn't get down to the rootzone, it doesn't much matter that you've spent all this money on upgrades."

On a greens or tees program, Tocci says, you're typically looking to alleviate water repellency issues in USGA sand profiles managing hot spots or localized dry spots that can pop up on the course.

Water repellency, you say? Yes. This is probably the perfect place to explain how wetting agents work. According to Tocci, soil

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particles can become hydrophobic or water repellent after years of typical cultural practices (ie. Breakdown of fertilizer and buildup of some topdressing products) and natural processes such as decaying plant roots, certain fungal species, surface waxes from plant leaves, and decomposing soil organic material that create a water repellent, organic coating on the particles.

"Surfactants help create sites on those particles making them water receptive or hydrophilic," she says. "Surfactant molecules help the soil particles accept the water and allow hydration."

Turning soil into a "water lover" versus a "water hater" is something MSU and Winfield's Rodney Tocco has seen firsthand. He conducted a study with wetting agents over a three-year period, where the first year was mild, the second year was wet and the third year was the hottest, driest season in Michigan in 100 years. And that's when surfactants really wowed.

"They really stood out for what I was doing in the environment to help sustain turfgrass, particularly on putting greens," he says. "We received no rain for two months, and wetting agents kept things alive."

Tocco believes wetting agents have really ramped up



in popularity especially over the last couple years with the lack of moisture and rainfall.

"One of the things surfactants do is help modify the environment so we get the benefit from those peaks we see and keeping them more moderated."

It's important to note, however, that all surfactants are not the same. There are multiple classifications, and new ones are constantly being introduced to the market. Ones you would use on your greens would not be ones you would use on your fairways because you're dealing with different soil types and different cultural practices. That's where you get into different formulations and classifications of chemistries.

"If you're looking for something that will help water to



Some wetting agents are meant to be used preventively to prepare the soil for what's coming, but others, both liquid and pellet formulations, can be used for spot treatments. Gasparillo Golf Club in Boca Grande, Fla., has been injecting the surfactant Integrate on its course for about a year and a half.

penetrate, there are products just for that," says Engage Agro USA's Tocchi. "Then there are products that will help water to penetrate but will also have a residual in the soil profile and help facilitate continued hydration."

Tocchi says there are also products that go beyond that and are long-term and don't break down as quickly in the soil, holding on longer and helping hydration and rehydration in wet/dry cycles. "Some people want a long term product so they don't have to apply as frequently, but others are just put through your fertigation system, which makes it a no-

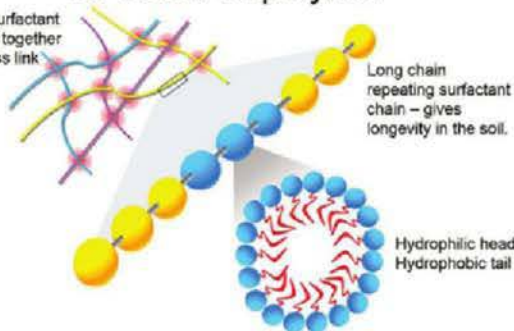
brainer if you're treating your fairways because you don't have to monitor the application closely."

Wetting agents have been around since the 1950s, but Tocchi says today's formulations are definitely better. With block copolymers, triblock copolymers and multi-block copolymers, modern wetting agents have three different components that can battle the different soil particles and what is causing water repellency.

Some wetting agents are meant to be used preventatively to prepare the soil for what's coming, but others, both liquid and pellet formulations, can

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Looking for more information about how to employ surfactants at your course? Drainage is paramount for golf courses that see a lot of precipitation, and soil surfactants can help keep that water moving. Check out this podcast with Kevin Collins, territory manager for Aquatrols. Enter [bit.ly/1gHFsp2](http://bit.ly/1gHFsp2) into your browser to access and listen.

be used for spot treatments, including a pellet by Engage. This pellet is comprised of 10 percent seaweed, which provides some beneficial kickbacks to the turf. They can also be used as tank additives.

"If your soil is receptive to water, it will also be receptive to whatever chemicals you apply," Tocci says. "Most surfactants can be applied with fertilizer with no problem. However, there are a lot of requirements, especially in California, where they won't allow you to mix it with another chemical. Many foliar adjuvants are labeled for tank mixing but soil surfactants really focus on the soil. However, if your soil is receptive to water, and two days later you go out with either a fungicide or herbicide application, you're adding benefits to those chemicals because you have gotten your soil particles ready to accept them, more so than

when they were repellent. It definitely helps aid your other cultural practices."

Wetting agents can do a lot of things, but one thing Tocci says they can't do, at least alone, is alleviate soil compaction.

"I've been in the industry for 20-plus years and I can say that soil compaction will not be alleviated solely by a soil surfactant. Compaction gets into more of a physical issue, so you'll need to verticut, core aerate and perform other practices in conjunction with surfactants. Once those other things are done, then surfactants can help aid the movement of the water and chemicals through the soil."

Another benefit is they present no negative impact to the environment – something the European market has taken advantage of, says Tocco.

"With the ones I've worked with, I saw no negative to mi-

crobes, no increase in them," Tocco says. "This was a huge thing I saw as a positive, especially in the European market where they're locking down their pesticide storage facilities or taking them totally offline. So they're using surfactants, which are safe and not designated as pesticides. They give you an opportunity to optimize the turf from a health standpoint, giving it the ability to combat diseases and insect pressure."

Tocco believes another reason for wetting agents' surge in popularity is that people are starting to see an economic return on them. Now that a greater premium has been placed on water resources, the tables are turning a little. There's no longer just an environmental reason to use them, but monetary as well.

"People are now seeing there can be an economic value to using them," Tocco says. "People weren't looking at wetting agents a while ago because there was no economic impact. In fact, there probably would have been an upcharge. You would have been spending more to use a wetting agent than you would have needed. Now, economics is playing a big role. It's good to be a good environmental steward because you're using less water, but the economics needed to catch up."

In a nutshell, wetting agents help level the playing field between courses that have too little water and courses that have plenty of water.

"But they also help move

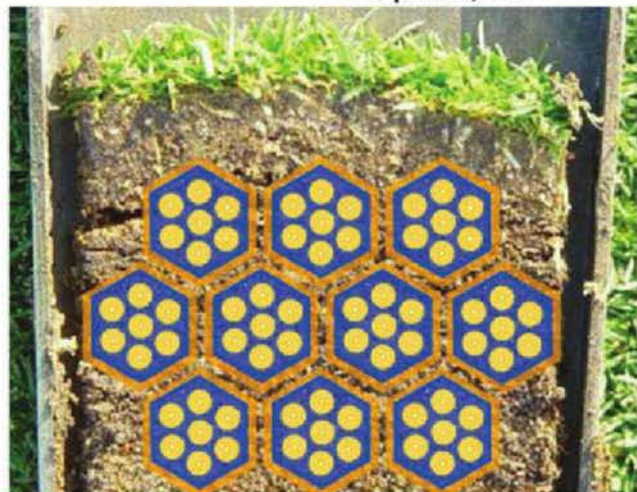
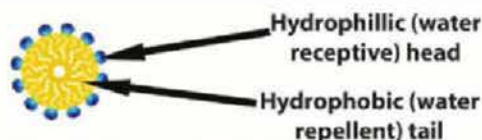
water through profiles that have been plugged up," Winfield's Tocco says. "With research and a gain in popularity due to economics, we've seen them getting used in more places we ever thought of. I know of some courses using them from tee to green, and smaller ones that are trying them out or don't have the budget for them still because they're still expensive for the 'Cadillac' products. Even areas in Michigan that have been known to have plenty of water and have never considered a water shortage are using them."

Colleen Clifford, marketing manager at Aquatrols, also makes the important point that wetting agents are not meant to be a "cure-all," but one tool in the toolbox for superintendents to combat turf issues.

"There is a lot of documentation on their ability to reduce your volume of water and irrigation frequency. As long as you can irrigate, they're helping."

But Clifford is careful to dispel the notion that, if it's not dry and you don't have water conservation issues and have gotten copious amounts of water and reservoirs are overflowing, you don't need surfactants.

"Formulations today allow for increased drainage and movement of water, so surfactants will also benefit you if you have too much water or rain. It's still a good thing to be on a surfactant program because you can help move moisture through, make greens drier and firmer, and improve playability. It's not just a question of water savings." **GCI**



Graphic depiction of the new 100% Multi Block Copolymer Surfactant, Pisces™ EA. Ratios of surfactants were selected that give rise to long rod micelles structures that combine to form hexagon shaped rods. The hexagon structure covers larger surface area in the soil profile.