



# A GAME CHANGER

The turf industry faces off against the possible emergence of bacterial wilt, a bizarre, complex, indiscriminate killer. By David McPherson

**T**he snow has yet to melt in the Midwestern and the Southeastern United States and superintendents are already losing sleep over what surprises Mother Nature has in store for them come opening day. What diseases are lurking below the surface – just waiting for the right conditions to make the turf bosses' job that much more difficult? For golf clubs with creeping bentgrass greens in certain parts of the country, one of the biggest fears is a pathogen called "bacterial wilt."

"It's a game changer and an indiscriminate killer," says Jeff Kent, superintendent, Quail Hollow Club in Charlotte, N.C., home of The PGA Tour's Wells Fargo Championship each May. "It begins as a minor nuisance but spreads rapidly and builds over time like rolling a snowball down a hill that eventually ends in an avalanche."

Bacterial wilt has caused some confusion in the turf pathology field. Not all academics, who were initially working cooperatively doing research, partly

funded by the United States Golf Association (USGA), are on the same page. Currently, the USGA is supporting research on the bacteria question with Joe Vargas at Michigan State University, Nathaniel Mitkowski at the University of Rhode Island, and Bruce Martin at Clemson. In the past, they also funded Lane Tredway – part of the not-yet-convinced camp – at North Carolina State University. Tredway is currently working for Syngenta.

"It is an interesting, complex story," says Stan Zontek, director

of the USGA Green Section's Mid-Atlantic region. "Most pathologists in our industry have discounted bacteria as being much of a turf problem. I don't think we quite know whether it is a primary pathogen, but I can tell you this does have the industry concerned with ample justification. That's why the USGA is supporting research on a fairly wide scale."

As Zontek alludes to, most are in agreement, but some dispute that what superintendents such as Kent at Quail Hollow have



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found on their greens is really a bacterium. Whatever you call it, superintendents who have witnessed bacterial wilt destroy their greens don't care. They just want pathologists and the USGA to work collaboratively to find a cure.

Jim Rooney, director of golf courses and grounds at Saucon Valley Country Club, Bethlehem, Pa., first saw bacterial wilt on his *Poa* greens back in 2005. After regrassing the 60 holes at this historic private club with A1A4 creeping bentgrass, he saw some of the bacteria return to his renovated greens in 2010. He sent plugs to Tredway (who

was at NC State at the time), to the University of Rhode Island, to Rutgers and to the University of Connecticut.

Rooney – a 25-year turf veteran – has never seen a disease this devastating. He's upset by the controversy among the pathologists over this issue.

“To have academics arguing is wasting everyone's time,” Rooney says. “What am I supposed to tell my membership? It's not fair for the superintendent.”

Tredway is still not convinced that what Kent and others are seeing on their bentgrass greens is bacterial wilt. To him, it's just

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—Lane Tredway, Syngenta

etiolation – a technical term to describe yellowing and elongation of the turf, which is a common symptom seen on creeping bentgrass putting greens.

“In most locations, the symptoms come and go with changes in the weather conditions and it is not a significant problem,” Tredway explains. “In the absence of proof as to what causes it, I continue to call it etiolation.”

On the other side of this disease debate is Nathaniel Mitkowski, who has been studying bacterial wilt for several years. Looking through last year's records he saw it most concentrated in Ohio, Illinois, Pennsylvania, south New Jersey, South Carolina, North Carolina and then back in through West Virginia. It's also been identified in Texas and Kentucky.

“If you have excellent growing conditions for bentgrass you most likely won't see it, but when you get a very hot, stressful year, the pathogen becomes very aggressive and that's when you start to see decline,” explains Mitkowski, associate professor of plant pathology at the University of Rhode Island.

This summer, Mitkowski, along with colleagues at the University of South Carolina, are set to do extensive field trials at golf courses throughout his region on what he dubs “a bizarre disease.”

Bacterial wilt first cropped up widespread on putting greens around 2006-07 at Quail Hol-

low and it came back over the following few years, causing severe etiolation of leaf blades on the course's bentgrass greens. Tredway was involved in the initial research into this disease at Quail Hollow.

According to academics, what basically happens with this disease is the plant becomes clogged with bacteria; then, when you mow it, or roll it, you spread it around unknowingly. If the plant becomes too stressed from being dry and hot, you try and cool that plant, and evapotranspiration and photosynthesis and everything else that is taking place in the plant doesn't allow the plant to function. Since it can't transport nutrients upward or downward, it clogs up, withers back, turns yellow and wilts.

Kent decided to send a plug out-of-state to try to figure out what it was. One researcher he sent it to was Joe Vargas at Michigan State; Vargas identified the bacterium as *Acidovorax*, according to Mitkowski and despite no conclusive evidence discovered by Tredway's team, and published a paper of his findings.

“What Joe [Vargas] was able to do was pull the bacteria out of the plants, put it on clean plants, and get disease in a greenhouse environment,” says Mitkowski. “To many, it was pretty clear it was a pathogen.”

The summer of 2010 was the hottest year on record in many

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parts of the country. Quail Hollow lost some grass because it was so aggressive and other courses started to feel the wrath of this silent killer. Mitkowski had reports of bacterial wilt from Maine to Georgia, so he considered it a significant problem in the turf market.

Sam Green at Eagle Point Golf Club in North Carolina is another superintendent who believes in this bacterium. “This will be the single limiting factor to growing bentgrass in parts of the southeast,” he says.

Green has dealt with bacterial wilt on and off for the past couple of years on his 12-year old bentgrass greens. Fortunately, he has not had total turf devastation as the bacterial wilt tends to be isolated to segregated areas. He speculates that the disease is caused by a variety of modern superintendent maintenance practices to get grass to grow to golfer’s high expectations.

“The way we have to treat our greens to achieve expected green speed and firmness and our fungicide rotations all play a role,” says Green. “I believe growth regulators and the way we are using fertilizers also have something to do with it. In a nutshell, we are growing the grass lower than we should, then we are foliar feeding it to get it to recover, and then, so we don’t lose any speed we are putting a growth regulator on top of that to slow it down.

“Then on top of that we are using these newer fungicides for some of these different diseases that have come on in the last number of years,” he continues. “We are throwing four things at

the turf, so I don’t think it is any one product that anyone is using that is causing it . . . I believe it is a combination of everything we are doing.”

Last year, Green was part of a trial that used Daconil Action (a Syngenta product) in two of his putting greens that historically had etiolation and in which Dr. Tredway had verified Acidovorax in the plugs.

“We eliminated the yellowing and the problems on those greens last year versus historically having some trouble,” Green says. “We need to have open discussions about this issue. I’ve heard arguments that it’s product-related, some say it’s a primary pathogen, others say it’s a secondary pathogen. At the end of the day, it doesn’t matter what it is, I want to know why it’s happening and how to fix it.”

There is still a lot of research remaining to pinpoint the root causes of bacterial wilt and find the best fix for this perennial problem. Working with the University of South Carolina with USGA funding, Mitkowski sees this summer as a crucial time in the field where he hopes to discover good data that will help find a cure to this serious turf problem that doesn’t appear to follow the rules.

Plant pathologists are trained in universities, not trained on golf courses, he says.

“Training at universities is typically, if you see something in the field, you have to replicate it in the lab, and if you can’t, that’s not the cause . . . that is really the foundation of disease diagnosis,” Mitkowski says. “Right now what we’ve got is a pathogen that

doesn’t seem to follow the rules.

“That’s a concern,” he adds. “But, I’m not going to throw the baby out with the bathwater and say, ‘just because we couldn’t get it in the greenhouse, it couldn’t possibly be bacterial wilt. We don’t get etiolation in the greenhouse, but we get the same decline and the same loss of grass that you see in the field.’”

What many do not understand, he says, is just because they take a plug out of their green and they send it off to a lab and see some bacteria streaming from the plant, that doesn’t necessarily mean they have bacterial wilt. So, whether it’s a pathogen or not, what are some of the solutions discovered to date to battle bacterial wilt? Daconil Action that Green tried at his course is one fungicide that doesn’t actually kill the bacteria, but it turns

there are antibiotics that are not labeled yet for turf, but experimentally they work very well,” he adds. “People are now looking at registration of some of these products for turf because those will control the disease.”

Green says changing his general maintenance practices – such as backing off on topdressing and keeping soils at the optimal wetness by using handheld moisture sensors – have also helped keep bacterial wilt from spreading.

Based on what superintendents and pathologists have seen, it will take a true cooperative effort to win the battle against this indiscriminate killer. The summer of 2012 is going to be a busy one for turf pathologists studying this disease.

“I’ll be driving from golf course to golf course where they



Bacteria or not, the culprit tends to be isolated to segregated areas.

on the plant’s defenses.

“We’ve seen very good control of the bacteria with this product when it is applied preventatively on a regular basis,” Mitkowski says. “It’s not going to give you 100 percent complete control, but it will definitely give you enough control that you can probably manage it if you get it early enough and you can go through the summer without too many problems.”

“In terms of other solutions,

have the disease, examine the results, try different products, and see what works,” Mitkowski concludes. “This is going to be the first time we go out and try to control this disease in the field and hopefully, by the end of the summer, we will have some good data.” GCI

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