Anticipating Acidovorax

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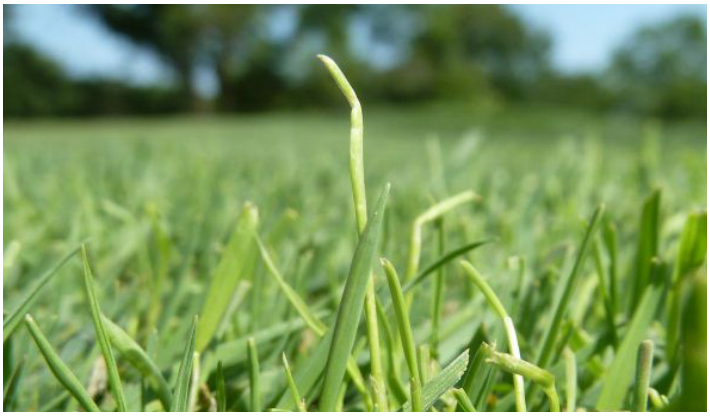
Summer has arrived, and so far, our weather has been a welcome departure from the past 3 years. The cool wet April and mild month of May were just what the doctor ordered in terms of growing grass. That's not to say the weather could not turn hot and dry during the months ahead. Before we get too far into the season of disease, I thought it would be worthwhile to give some thought to the threat of Acidovorax for 2013.

I will not review the history – especially because it was discussed in a GCM article in July 2012 and repeated in a GCI paper this past March. However, I am interested in reviewing some of the facts involved in this dilemma—with hopes that a solution will become obvious in terms of "doing more with less".

The discussion should focus on two questions. The first question involves the presence of bacteria on our golf courses - and the second question depends on the answer to the first.

Question 1. How did Acidovorax become established on my putting green?



A symptom of Acidovorax was reported to create etiolated tillers on creeping bentgrass. Photo credit: Derek Settle.

Discussion 1. There are a limited number of ways that inoculum becomes established. It is either introduced (exotic) or it is local (endemic). A couple of the exotic explanations (bacteria introduced with thunderstorms or on golfers' shoes) are not vey plausible, given what we know about the transmission of bacterial pathogens. A third possibility is the introduction of Acidovorax on infested grass seed. Many bacterial pathogens causing crop diseases are introduced with contaminated seed - so this is a really interesting possibility. However, none of the empirical evidence points to contaminated seed as the source in this case. The overwhelming likelihood is that Acidovorax is a natural part of the microbial population that inhabits root zones of our putting greens (and tee boxes, and fairways, etc.). In fact, a paper published in the early 2000's demonstrated that Acidovorax was present in all golf course soil samples tested. It

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makes total sense. Since there are tens of thousands of species of microbes in every gram of soil, the likelihood that Acidovorax is among them is high - and the evidence is strong.

So, let's stipulate that the pathogen is endemic. It is there today, as it was in 2010, and as it was in 1990 (for example) and always. Given that conclusion, the second question involves what has happened between, say 1990, and now that caused the damage associated with Acidovorax?

Question 2. If Acidovorax was always part of my putting green, then why did I only see over the past 3 years?

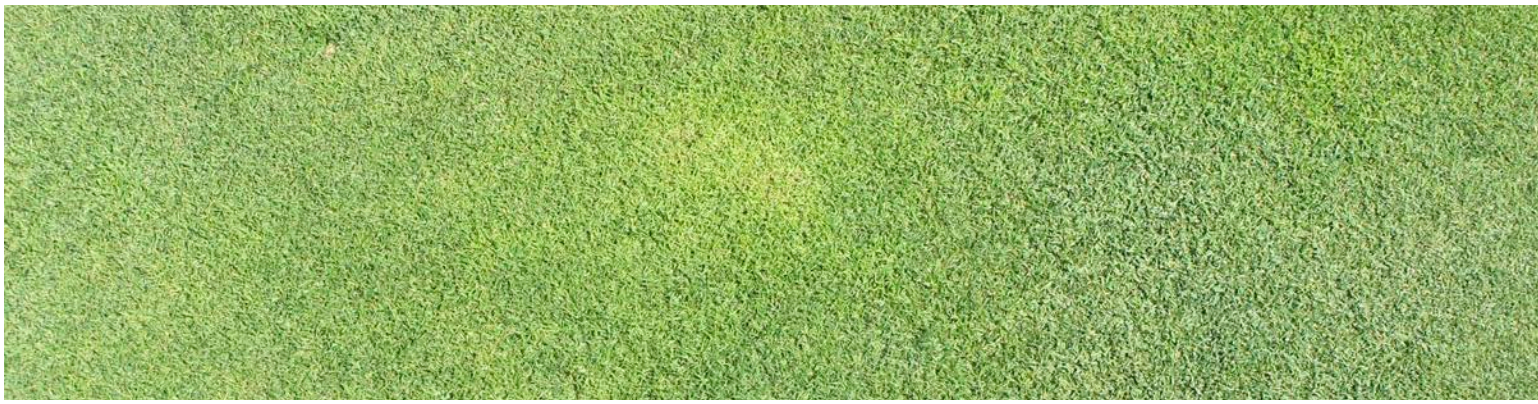
Discussion 2. There are three likely explanations. 1) damage did occur, but was masked by other problems, 2) the past three summers were unusually hot and/or dry, and 3) our management practices changed. The likelihood that we simply did not recognize the damage is possible—but given the severity of damage allegedly associated with Acidovorax, I think that explanation is weak compared to the other two. Also, there are no confirmed outbreaks in the US prior to 2009. Heat and/or drought prevailed in the eastern half of the US during the summers of 2010, 2011, and 2012. We know that this is a "stress" pathogen. The heat/drought stress helped create conditions for this opportunistic bacterial pathogen to parasitize plants to such an extent that it caused serious damage to turf.

There is no argument here, but some of us can recall other summers when heat and drought may have been worse (consider 1988 and 1995). Therefore, the argument that weather alone predisposed turf to infection is not as strong as we need to draw valid conclusions. Perhaps our management practices contributed to that stress? How is creeping bentgrass managed today compared to 1990? In the search for firm and fast playing surfaces, putting greens are mowed much closer now than they were 25 years ago. We also use growth regulators to reduce clippings and help increase green speeds. We probably fertilize less, and, during the construction boom of the 1990s and beyond, we adopted new creeping bentgrass cultivars that possess the dense, upright growth habit that requires aggressive grooming to reduce thatch accumulation - keeping playing surfaces firm. Other stress inducers include fungal root pathogens, nematodes, and factors that result in compaction.

Perhaps the recent outbreaks of Acidovorax are associated with a "perfect storm" of stressful management practices coinciding with stressful environmental conditions?

What does that mean in terms of the Acidovorax threat for 2013? Of course we cannot change the weather, but we might be able to adjust management practices to relieve turf stress, and perhaps avoid a flare up if the weather does turn awful.

The discussion too often turns to what can be applied to prevent or mitigate damage associated with Acidovorax. Despite my contention that we should be doing less (raise HOC, perhaps reduce PGR, and generally avoid management related stress) the issue of remedial treatments must be addressed. There are few constants for our consideration. Conventional fungicides are not effective against bacterial pathogens. Antibiotics may reduce pathogen populations, but they are not legal and many trials show no effect. There is no evidence that biorationals (e.g., Zerotol and Rhapsody) have any effect and biostimulants may actually aggravate the condition. Some evidence from attempts to control bacterial diseases of crops indicate that copper hydroxide will slow the spread of bacterial disease but can also be very phytotoxic to plants.



As the bacteria continues to infect, patches of etiolated/chlorotic bentgrass become apparent as pictured above.

For courses where the disease was confirmed (by an appropriate lab) in years past, and where remedial treatments are part of the plan for 2013, I think products with "plant health benefits" are worth trying. Whatever you might apply, do not expect a miracle because research results have been inconsistent. Also, better results probably will be achieved if you make every effort to relieve turf stress from an agronomic perspective. Finally, I strongly urge you to create a "check plot" - an area (the larger the better) of untreated turf that can serve as a basis for comparison. The only way to truly learn the benefit you gain from any product is to compare it with untreated turf.

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