2010 A Summer of Challenges

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No question that the summer of 2010 was a summer for the record books throughout the United States. Record heat spanned the entire nation and as a result creeping bentgrass and annual bluegrass died everywhere.

Although we did not experience 90 consecutive days over 90 like the Southeast or more days over 100 ever recorded like the Northeast, we still had our fair share of heat. Looking over the weather data from last year however can be a little misleading. The average temperatures for May, June, July and August were not much greater than the normal averages (Figure 1). Yet, the nighttime temperatures greatly exceeded the norm (Figure 1)!

Couple those high nighttime temperatures with moisture equals DISEASE. Surprisingly though we did not see as much disease as one might have anticipated. Upon examining the precipitation data from last summer we may have a clue as to why.

The rainfall we got last year was early in the growing season and we also had warm temperatures. However, many areas throughout the Midwest received too much rain in April and May sometimes-in excess of 5 inches when compared to the norm (Figure 2).

Although temperatures were conducive to root development and growth, the rootzones were not. They likely were anaerobic during the months of May, June and even into July. Consequently annual bluegrass root development was severely stunted and even creeping bentgrass root development was slightly stunted. When the hot temperatures moved in during July a lot of annual bluegrass began to die.

Luckily our temperatures did not reach the levels to kill creeping bentgrass like they did in other parts of the country. Annual bluegrass died throughout the Midwest due to the amount of early precipitation and warm temperatures later in the season. Moreover, the past two or three summers were very mild and did not kill the "weaker" annual bluegrass plants. Those weak plants lingered around for two or three years and were removed from the equation this year.

The only reason I say this is because courses with extensive, old annual bluegrass populations saw very little loss in 2010. Courses with 30 to 60 % annual bluegrass populations were hit pretty hard.

Diseases were also an issue last summer. Pythium blight was a major issue on creeping bentgrass fairways. Fairy ring was also a huge issue and not to mention all of the talk about bacterial wilt.

The weather last summer was perfect for Pythium blight because we had an abundance of warm, humid nights and days over 90. The problem with Pythium blight last year was how the disease expressed itself. The symptoms were not typical of Pythium blight, at least not how I am used to seeing the disease.

I think the reason for this is the newer cultivars used, better nitrogen, water management and cultivation techniques. The symptoms expressed themselves very similar to brown patch or even dollar spot during the early stages. We saw many cases of Pythium blight starting as small circular spots that enlarged into larger more irregular areas (Figure 3).

Occasionally we heard about or saw smoke rings, which lead golf course superintendents to diagnose the disease as brown patch. Smoke rings are a diagnostic feature of brown patch, but they can also form on low cut creeping bentgrass that is infected with Pythium as well.

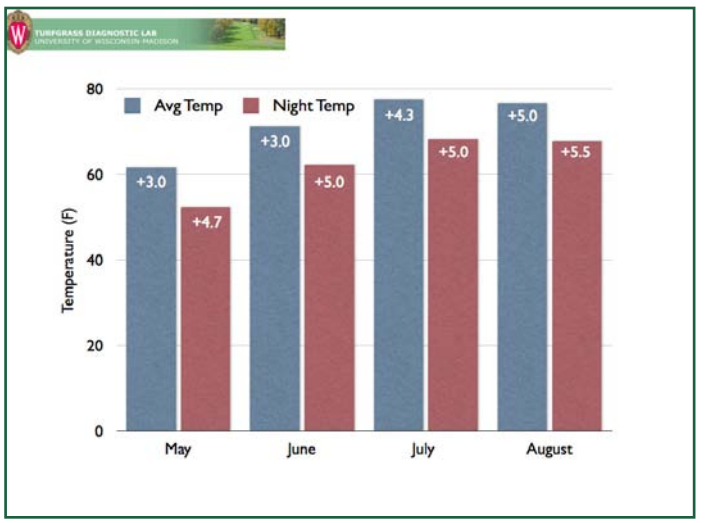

Figure 1. Average and nighttime temperatures for May, June, July and August for a National weather station in Madison, WI. Numbers in white indicate differences from the normal temperatures.

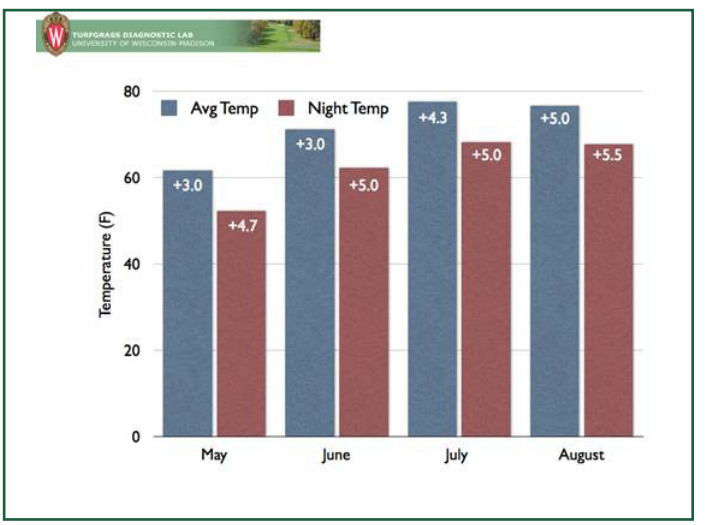

Figure 2. Precipitation amounts for May, June, July and August for Madison, WI. Numbers in white indicate the difference from the 30 year normals.

The key to controlling Pythium blight is to get the fungicides out before the symptoms develop if you want to use lower rates. Once the disease has developed, only the full label rates will provide the level of control expected on a golf course. Many products control Pythium blight quite well, however things like QoI's and the phosphonate products fail under intense disease pressures (Figure 4). Subdue MAXX is always a good choice for Pythium blight control and can be used preventatively or curatively. Another option that is fairly new is Stellar from Valent. This is a product that utilizes two active ingredients, fluopicolide and propamocarb (Banol). This product works very well against Pythium blight and I believe is competitively priced.

Last summer fairy ring was problematic throughout the Midwest because there was plenty of moisture for those fungi to thrive. When the heat descended in late summer some superintendents reported type I symptoms (necrosis/death). The key with fairy ring control is to get the fungicides out on a preventative basis. Fungicides should be applied when soil temperatures are between 60 and 70 F and two applications should be made about a month apart. The fungicides should be irrigated in 1/8 to ¼ inch of water. A wetting agent should not be tank mixed in. The wetting agent could facilitate movement past the area where the fungi reside. Most of the DMI fungicides work very well as do the QoI fungicides (Figure 5). The key is to pick the fungicide that fits in your budget and try it. Remember that there are over 60 different fungi that cause fairy ring and we do not know if a particular fungicide will work at your property until you try it.

Figure 3. Pythium blight stand symptoms observed on a creeping bentgrass teebox in the Chicagoland area. Note how the symptoms started in the upper right hand corner as small circular spots. Images courtesy of Dr. Derek Settle of the CDGA.

Finally there was a lot of talk about bacterial wilt this summer-most likely because so much turf died due to the extreme heat. However, this disease spread like wildfire through the US by word of mouth. I find it interesting that bacterial wilt was not diagnosed in Minnesota, Iowa and Wisconsin, but was diagnosed in almost every other state in the Midwest. I think one reason is I refused to call anything bacterial wilt this summer because we still do not know enough to make official bacterial wilt diagnoses. Here's why: A golf course in North Carolina submitted a sample in July to the Michigan State Turfgrass Diagnostic lab with necrosis and etiolation. After 4 months of work, researchers at MSU discovered a bacterium associated with the dying tissue that had not been reported on turfgrass before. The researchers contacted Dr. Lane Tredway at NCSU in an effort to set-up collaboration to figure out this anomaly. No collaboration was established and a first report of a bacterium (Acidovorax spp) causing a bacterial disease of creeping bentgrass was published. This caused quite a controversy amongst the turf pathology community, which was probably evident on the turf disease blog.

This particular report outlined a disease caused by a bacterium that had never been associated with creeping bentgrass in the US. As a result, the word spread rapidly and it seemed that everyone with dead turf had this bacterial disease. Yet there are some problems with the report. Only a few isolates were collected from a single sample submitted to MSU. In order to establish causality we have to conduct Koch's postulates, which is the only way to identify a new pathogen. Researchers at MSU were successful in causing symptoms on creeping bentgrass plants in controlled conditions, but the symptoms reported were only a mild necrosis of the leaf tips (Figure 6). While I do admit that it can be very difficult to reproduce symptoms exactly like those seen in the field, if this bacterium was responsible for such widespread destruction it should be more aggressive than it is in this report. The symptoms reported from the golf course in North Carolina were fairly large necrotic or yellow areas (Figure 6). Looking at those two pictures side by side makes it very difficult for me to believe that this new bacterium is soley responsible. I do admit that the bacterium probably does facilitate decay of the tissue, but I think it got a lot of press last year because it was extremely hot!

The jury is still out on this new bacterial disease and the USGA did fund a research project to help shed some light on the picture. Basically the main thing we do not understand is what bacteria are associated with healthy and injured turfgrasses. Once we have a better understanding of the natural bacterial community, we can begin to work out this bacterial problem from last summer.

Figure 6. Image of stand symptoms from the golf course where the bacterial disease was first reported. Note the widespread necrosis and chlorosis on this creeping bentgrass putting green. Do these symptoms even partially resemble those depicted in the previous figure?

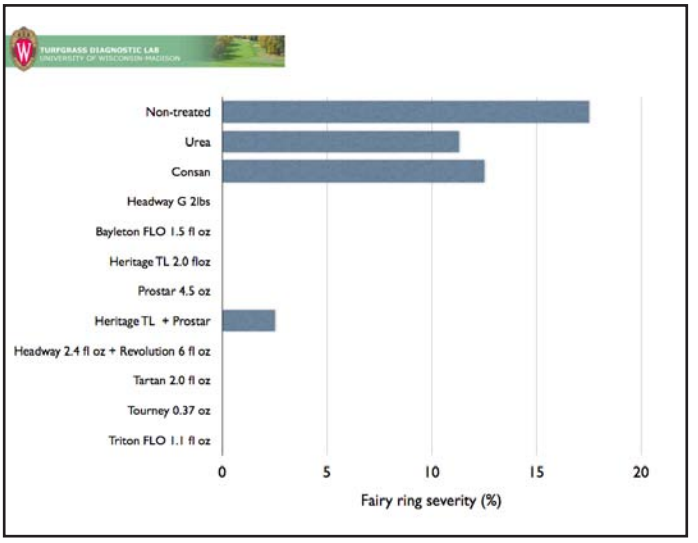

Figure 4. Fairy ring control data from a study conducted by Dr. Derek Settle at the CDGA. All applications were applied in May once soil temperatures reached 60°F and a subsequent application was made 28 days later.

Figure 5. Image of symptoms on creeping bentgrass induced by Acidovorax avenae in growth chamber experiments at MSU. Necrosis of the leaf tip was observed in a few of plants that were inoculated.