Weather

In most years, August 15th is looked upon as the “whew!” date to get past for managing bentgrass putting greens in Missouri. Not in 2014. A sustained blast of late August/early September high temperatures plus precipitation led to a number of problems on creeping bentgrass putting greens over the last three weeks. The first weather wallop occurred over the Labor Day holiday when 2 to well over 5” of precipitation occurred in a 24-hour period over much of the I-70 corridor. This left hook broke a single day rainfall record in Columbia, and amounted to the Kansas City region being 1-2” and the St. Louis area being an outstanding 4”+ above normal during the previous 14 day span. This first punch of saturation landed on putting greens that had accumulated a (mild) summer’s worth of organic matter, which held onto it like a sponge. The right uppercut occurred two days later, when temperatures soared into the mid-90’s with high humidity on a root system and soil profile that was still soaked. To add insult, a final 0.5 – 1” of rainfall fell on September 5th in some areas, just to make sure the root system stayed wet.

Despite the summer being fairly mild from June – early August, late August and early September turned flat out ugly in Missouri for superintendents managing golf putting greens. The Plant Diagnostic Clinic has received an unprecedented number of putting green samples over the past three weeks, and abiotic causes of decline top the list for turfgrass decline. On the bright side, the current forecast shows a marked decline in temperatures and a drier than normal rainfall pattern over the
next 6-14 days. For renovation, some supplemental irrigation may be required to keep seed wet, but for turfgrass roots with extremely soggy feet the dry down will be welcome.

**Quick Hits:**

- **Fall armyworm** (*Spodoptera frugiperda*) outbreaks have been numerous and extremely damaging over the past two weeks. I started hearing reports in late August from the Kansas City area, and in early September received reports of several outbreaks in the St. Louis suburbs. On September 5th, we noticed our first fall armyworm outbreak (that any of us could remember) on our tall fescue research plot at the MU turf farm. Damage from this pest mirrors drought damage, which we should have none of, and can occur quickly as a large population moves across a yard. A common homeowner quote is “I left on early Friday for the weekend and returned to a brown, dead lawn!”. Unless a killing frost occurs, fall armyworm damage may continue for another couple of weeks.

Since damage from this pest is occasional and control is relatively straightforward, preventive insecticide applications are not recommended. However, this does put a critical emphasis on scouting and detecting damage early to apply a curative insecticide targeted for these foliar feeders. If a lawn or other higher cut turfgrass (particularly new sod), is turning brown in large patches, and no larvae are evident on the leaf tips, the turf should be parted to examine for green fecal pellets and larvae. A soap drench may also be used to flush the worms to the surface. At the MU turf farm, we detected our outbreak after the 5.5” of rain had flooded the area, leaving the larvae (many dead and bloated) clinging to leaf tops. Since most damage is occurring to bunch-type tall fescue or tall fescue/Kentucky bluegrass
mixtures, severe armyworm damage can be permanent and renovation/overseeding should be conducted now for these cool-season turfgrasses.

- **Transition Time:** Just as a reminder, it’s time to flip the switch towards fertilizing, seeding, renovating, and cultivating cool-season turfgrasses, and monitoring and preventing warm-season turfgrass diseases. Finally, I agree with the commercial narrated by the gentlemen with a certain northern European accent.

- **Pythium root rot** on creeping bentgrass putting greens has been prevalent in samples coming into the Clinic over the past two weeks. This disease is normally a sustained occurrence over the summer, but has not been routinely observed in samples since the earlier outbreaks in late May. Current Pythium root rot activity should be of no surprise with the extended periods of saturation and heat stress events over the past few weeks. Since many *Pythium* spp. may be involved in this complex, a fungicide application targeting this disease is still suggested since some species may still infect roots even in cooler temperatures.
**Summer & Take-All Patch Infection on Putting Greens**

A. Infected root and crown tissue.
B. Infection mat of the summer patch pathogen on a creeping bentgrass root.

- **Summer/Take-all Patch** has also been observed on many of the putting green samples submitted over the previous three weeks. Although definitely prevalent and causing damage, in many cases these were secondary pathogens (either the chicken or egg) on roots that were compromised by the environmental conditions. In heavy infections, a watered-in application of a QoI fungicide such as Heritage and Insignia may limit further infection and encourage recovery.

**Algae/Black Layer**

A. This is a cup cutter sample folded over to so the black layers near the soil surface.
B. Algae intermixed with bentgrass crowns and stolons.
C. Black layer coating bentgrass stolons and root tips.
- Also in the chicken or egg argument, algae and/or black layer have also been encountered frequently in bentgrass sample submissions over the last few weeks, often in the same sample. The cause of these conditions is obvious - a water-logged, saturated root zone with clogged pores and low oxygen, and reduced density due to the associated root decline.

**The Danger of Saturated OM in Bentgrass Rootzones**

The aforementioned problems relating to Pythium root rot, patch diseases, surface algae, and black layer on bentgrass putting greens were all a product of the overall predisposing factor of a wet root zone combined with high temperatures. As detailed above, these two environmental factors occurred in spades from Sept. 1 – 5, but occurred in more minor local events in middle – late August. These conditions caused physiological root decline in response to the high soil temperature and low gas exchange caused by the saturated system.

Another factor in this decline may be the timing of our heat stress event in 2014. By previous summer standards, June and July had much less temperature stress than in normal summer months. Managers may have reduced inputs on golf greens, perhaps skipping a venting application or two, or skipping a watered-in fungicide application. Meanwhile, the bentgrass is growing well, and therefore the organic matter in the soil is still building. The soil microbial community may not have been working at full capacity due to the reduced temperatures, or a skipped venting didn’t allow enough oxygen to these microbes or the roots. All of a sudden the shock of a high rainfall event causes this excess organic matter to saturate and hold water. Roots in this saturated layer lost access to oxygen and a subsequent 48-72 hours of sustained + 90 degree temperatures initiated the rapid decline. Pathogens and competitors were happy to oblige the roots in their demise.

Dr. Peter Dernoeden detailed this wet wilt situation in a great publication the March/April 2006 USGA Green Section Record ([click here to read this great article again](#)). With the compromised root system and high night temperatures, bentgrass had little chance in relieving themselves through the cooling process of transpiration, and in a sense boiled over the 3-week span. In some instances, the greens became puffy after a rainfall event and scalping may have further reduced the plant’s transpirational ability.

Several practices aimed at stress reduction are recommended during a wet wilt or high temperature, saturated soil condition. A change in mowing practices, especially raising mowing heights, alternating mowing and rolling, and switching to smooth rollers, is often necessary during these late season stress events. Venting or spiking greens before and after a considerable rain event may help dry out the
upper 2” of the soil profile and reduce the amount of black layer, algae and root loss that occurs due to inadequate gas exchange. Lastly, most of the current samples came from greens that are perennial problems due to lack of air movement. As is normally the case, none of the current samples came from a green with a fan, demonstrating how critical air movement is in cooling the turfgrass canopy, removing water from the system, and reducing soil temperatures.

Now that we are back in the gravy for cool-season root growth, and it appears we are going to stay there, fertilization and recovery should ensue. If afflicted, a dry down aided by an aerification event, followed by a watered-in fungicide to stop the secondary pathogens and a good push of fertilizer should aid recovery. As many have looked forward to through this past tough month, it’s time to hear the sweet whine of the working tine.

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