Water – The Monster Under the Bed

Note: The Turfgrass Diagnostic Lab will be closed from August 4 – August 12 due to involvement at the 100th PGA Championship at Bellerive Country Club.

Weather

Searing July Starting to Yield
A. July temperatures have moderated over the last week. - Source: Missouri Climate Center
B. Nice, cool temperatures expected to persist into early August. - Source: NOAA

July has been tracking above average in the region, meaning it has been typically hot and uncomfortable. At least, however, we aren’t nearing records like the previous hottest May and 4th warmest June. The high 90s, real feel 105+, temperatures though kept pounding on cool season turfgrasses including tall fescue, Kentucky bluegrass, and creeping bentgrass. The good news is a cool front is set to come through and stay in the region for at least a few days. As shown above, being blue is very good when it comes to summer weather prediction by NOAA, and through the first few days of August the forecasted temperatures are extremely favorable.

Precipitation in the past week has been persistent on the East Coast and Mid-Atlantic causing some intense flooding, but the same can’t be said about our neck of the woods. Rain throughout July has been very scarce throughout much of Missouri, a pattern we’ve seen in much of the summer thus far. Particularly in the northwest and upper central region of the state, the drought is pervasive resulting in agricultural losses and persistent hydrologic issues (i.e. wells & ponds are drying up). While 1-3” rain deficits have occurred in the central and western portions of the state over the past month, the southeast region has a 1-3” surplus. Fortunately, very good precipitation chances through the end of July are forecasted. One to four inches are expected across the region with most centered in the southwestern portion of Missouri. This area needs the relief too, but perhaps could spare a few drops just a little farther north.
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Last week, I wrote a short piece on the weather pattern over the past year in Missouri and its detrimental effects particularly on creeping bentgrass putting greens in the region. The article was distributed to local GCSAA superintendent chapters, but also can be found here. Word of warning, the title of the article is very blunt.

Drought Intensifies But Hopefully Some Relief on the Way
A. Drought situation as of July 26, 2018 in the region. - UNL - www.droughtmonitor.unl.edu
B. Rainfall estimates to end July in the region are 1-4” - Source: NOAA

Quick Hits

Drought
A. Non-irrigated cool season turfgrass has felt the brunt of this current drought.
B. Areas that are continually mowed or subject to tree competition are most severely affected.

- **Drought on Lawns** – Most non-irrigated tall fescue or Kentucky bluegrass lawns and roughs are feeling the brunt of this recent drought. In July on our research farm, the
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estimated short crop evapotranspiration has equaled 5.2 inches, whereas only 2.33 inches of precipitation has fallen. This 2.87 inch difference at 70% replacement (approximately 2 inches) equates to -54,552 gallons of water over an acre, and -10,910 gallons over a typical 0.2 acre lawn. Even lawns with irrigation systems are probably not keeping up with this rate of loss, and more than likely are simply keeping tall fescue from going into drought dormancy properly and spurring disease in areas with poor drainage.

Areas most severely affected are those that have intense traffic, are continually mowed under drought stress, or have underlying salt issues due to previous deicing salts used on sidewalks and driveways. A degree of patience should be advised to homeowners during this tough time. Recovery efforts now or throwing a bunch of chemicals (or heaven forbid fertilizer) on dead or dormant grass will not bring Lazarus back to life. September is just around the corner, and with some hopefully well timed rains a good assessment of the state of the lawn can be made then, along with plans to reseed and build density again.

Pythium Blight on the Loose

A. Severe Pythium outbreak on NTEP bent grass fairway trial.
B. Pythium blight and brown patch on the same tall fescue leaf blade.

• **Pythium Blight** – The heavy heat and humidity of mid-July brought on some intense outbreaks of Pythium blight on untreated creeping bentgrass managed at fairway/tee height, fine fescues, perennial ryegrass and somewhat on tall fescue and Kentucky bluegrass. Unlike Pythium root rot, this foliar disease is rarely seen on established bentgrass putting greens. On tall fescue lawns, this disease is often related to intense shade conditions that promote leaf wetness or in low areas that accumulate water from precipitation or over-irrigation. Irrigation of lawns should be conducted early in the morning to attempt to reduce leaf wetness periods. Curative control of this disease with mefenoxam (Subdue), cyazofamid (Segway), or propamocarb (Banol, Stellar) should be initiated quickly.
Over the last two weeks, more black layer and water-associated root decline has been observed in the diagnostic lab than any other time since my start here in 2010. Most samples of black layer have been on putting greens, but in a few cases it also has been present on sand-based sports fields. The severity of these instances has been staggering, with thickness of the layers ranging from finger width to 4-5”. The black layers have been found near the surface, or residing a few inches down in the soil profile.

Put simply, black layer is a certain (and very smelly) death to turfgrass in our current summer conditions. Symptoms begin as general, patchy chlorosis that evolve quickly into plant decline. Early symptoms are often thought to be dry wilt and then mistakenly overwatered, which drives black layer formation even further. Black layer is caused and
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thrives on the lack of air in a soil profile caused by too much water. Anaerobic bacteria and their byproducts in the black layer release toxic sulfur compounds, resulting in root decline and a further restriction of water uptake. Also, the salt levels in black layer are double or even triple those found in surrounding unaffected soil, limiting water uptake even more by roots. Through these mechanisms, a black layer can be self-sustaining by keeping water from entering roots and exiting the soil profile. Therefore, these areas must be vented with solid tines to get the air back in and restore balance.

Dig down in poorly performing areas with a soil profiler or sampler. Look and smell for black layer symptoms; the smell is disgustingly pungent... trust me you'll notice it. Several reasons for water persisting in the profile are described below, and should be assessed in cases of black layer.

- Wetting Agent Misapplication – It doesn’t take much to kill bentgrass this year, but this is the most common mistake observed in the last two weeks. Wetting agents come in various forms and varieties – penetrants, retainers, movers and shakers – that honestly are nearly impossible to keep up with. The one thing that unequivocally makes these important tools turn into a dagger thrown at one’s self is not watering them in with sufficient amounts of water. Their purpose is to restore a solid wetting front. If not deep enough, that front stays in the top inch and holds the water there, where it goes black and dark quickly. Water them in immediately and with verve. Three to five minutes is not enough. Water in with 0.2-0.25” of post application irrigation. If concerned with puddling or run off, watch them get to that point, shut the irrigation off until the water infiltrates, then water them again. Last but not least, read the label and follow it.

- Clogged Drainage Pipes – If water isn’t moving out of the bottom, it’s not moving anywhere. In several cases, the root of the problem lies 16 inches below the surface. If black layer is occurring on a green, probe deep and see if there isn’t also a black layer at the gravel interface. Also, find your outlets and either with an umbrella during a downpour or by running a flush irrigation cycle make sure the water is running out. This is especially important for greens with an outlet that exits into a body of water prone to flooding. Silt, algae and other items can build up in the outlets and plug up the works. Consider renting a scope to make sure your drainage is free and clear.

- Limited Plant Root Activity – As noted various times, heat reduces or stops the activity of bentgrass roots, which have the job of taking water from the soil and getting it into the plant, which transpires it through hopefully active stomates. When this process doesn’t go properly, water obviously builds up. Venting or using fans helps this process by reducing soil temperatures and allowing oxygen exchange. Also prevent root pathogens such as summer patch and Pythium root rot which can further reduce root activity.

- Sod Layer – Sod with soil that doesn’t match the existing soil layer can create a potentially lethal perched water table very high in the soil profile. If this situation occurs, punch through it often.
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• Organic Matter – Is a sponge. Normally where OM holds the water is exactly where root depth stops, as seen in the above picture. Declined roots also contribute to OM accumulation, further driving this cycle.

• Putting Green Liners – Trap water along the margin of the green. Consider a smile drain to get the water out in these areas, particularly on the lower runoff areas of the green.