Diagnostic Lab Update

The turfgrass diagnostic lab is back in time to aid in getting through this back half of summer. However, we will be operating on a restricted basis with a new online payment and submission system. Please adhere to the new operational guidelines below.

- Only samples submitted through and paid for in the online system will be accepted.
- No sample drop-offs. No exceptions.
- Only two fees: in-state and out-of-state. No home lawn samples at this time.
- Digital photos will be **required** with samples. Having photos of stand symptoms along with a sample in-hand is a vital one-two punch for diagnosis. No need for up close, zoomed in imagery, but we do need the appearance of the area from a stand still. You can upload photos with the online submission form or email them to me at turfpath@missouri.edu.
- Ensure delivery is scheduled for Thursday at the latest. Mail arriving on Friday will not be picked up until the following Monday, at which point the sample will likely be in too poor a condition for diagnosis.
- Please email us the tracking number to facilitate delivery.

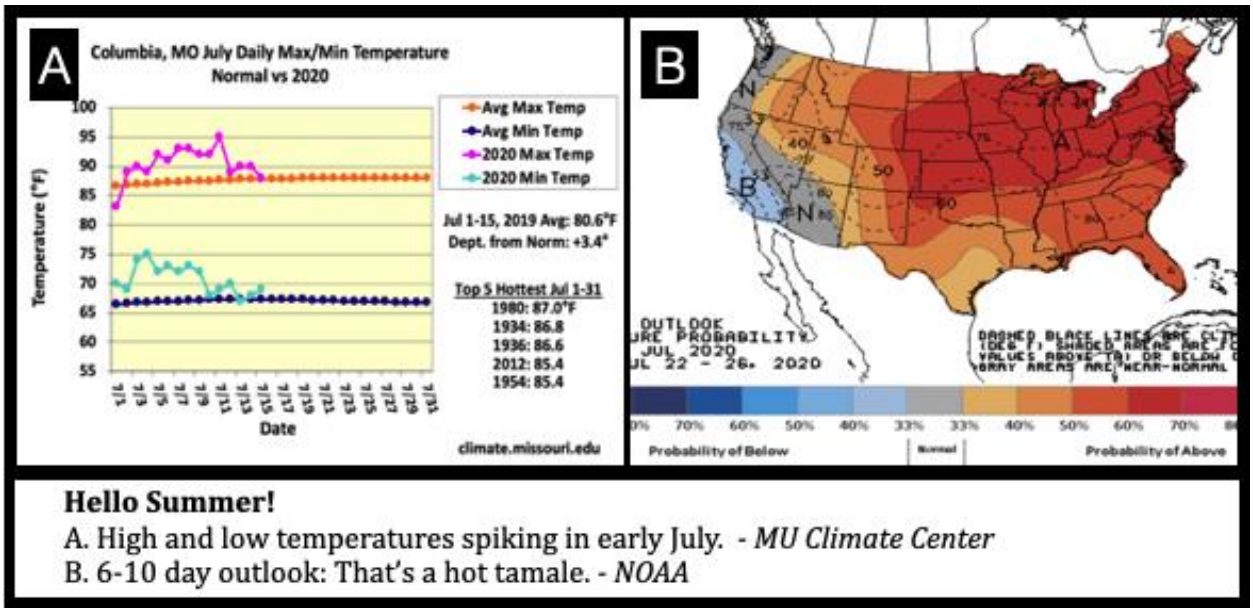
The submission site can be found by clicking the link **"Turf Diagnostics"** here, or on the side bar.

Need a Nematode Check?

We've got that covered too. Dr. Kaitlyn Bissonnette has the MU nematode laboratory (aka SCN diagnostics) fully staffed and back in operation for assessing nematode populations on golf putting greens or sports fields. If you would like me to also assist in interpretation of the population levels and management options, include a note to them.

Click here for information on submitting a sample for nematode analysis.

Weather



Hello Summer!

A. High and low temperatures spiking in early July. - *MU Climate Center*

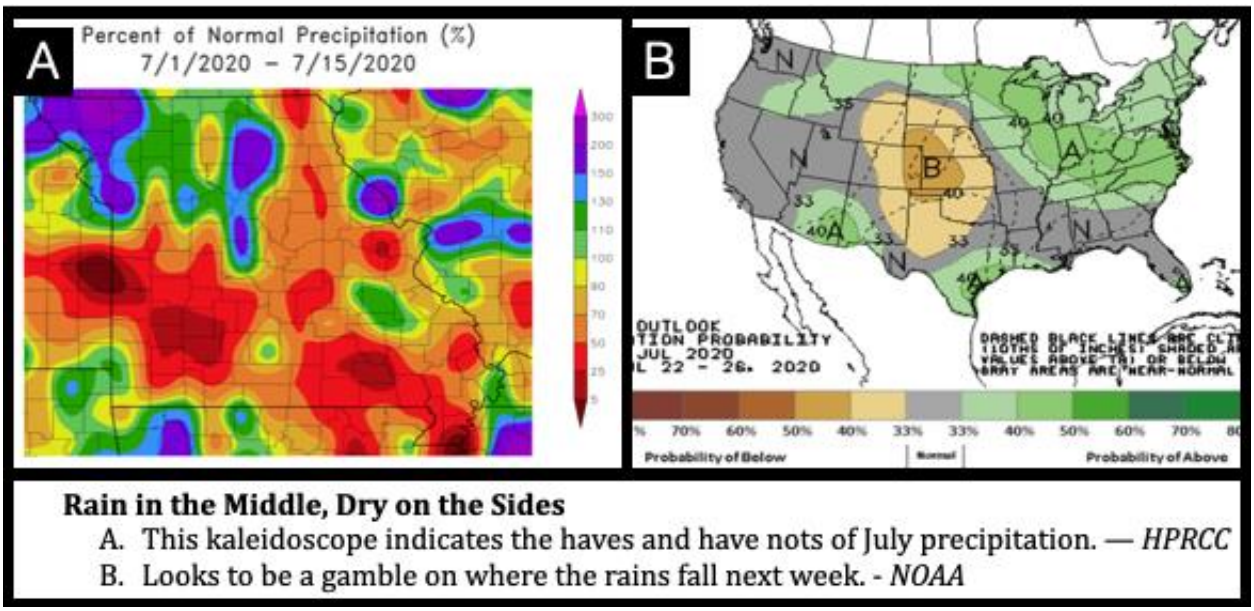
B. 6-10 day outlook: That's a hot tamale. - *NOAA*

The light switch of summer was quickly and forcefully turned on in the last two weeks, with both high day and low nighttime temperatures spiking considerably. Along with these spikes, evapotranspiration (ET) values estimating plant water needs also rose considerably, with short crop ET estimating 0.2 up to 0.25" a day of plant water loss. Much of southern and western MO landed into the first, lowest level of drought intensity as of July 14 - droughtmonitor.unl.edu.

Rain did return for some this week after most of MO had been missed over the previous. Intense storms on Wednesday, July 15 dropped upwards of 2-3" on some parts of NW Missouri, but most other areas, particularly in southern MO are still in a 1-2" deficit for the month.

Forecasts indicate a sustained heat wave, with a significant spike this weekend into the upper 90s (feel like 100+) and the 90+ degree high/70+ degree low painful train extending through much of July. Rainfall chances will also be sporadic. Typical dog days of summer are unfortunately on tap to drag down cool-season turfgrasses.

Chicken and The Egg



Rain in the Middle, Dry on the Sides

A. This kaleidoscope indicates the haves and have nots of July precipitation. — *HPRCC*
B. Looks to be a gamble on where the rains fall next week. - *NOAA*

Quick Hits

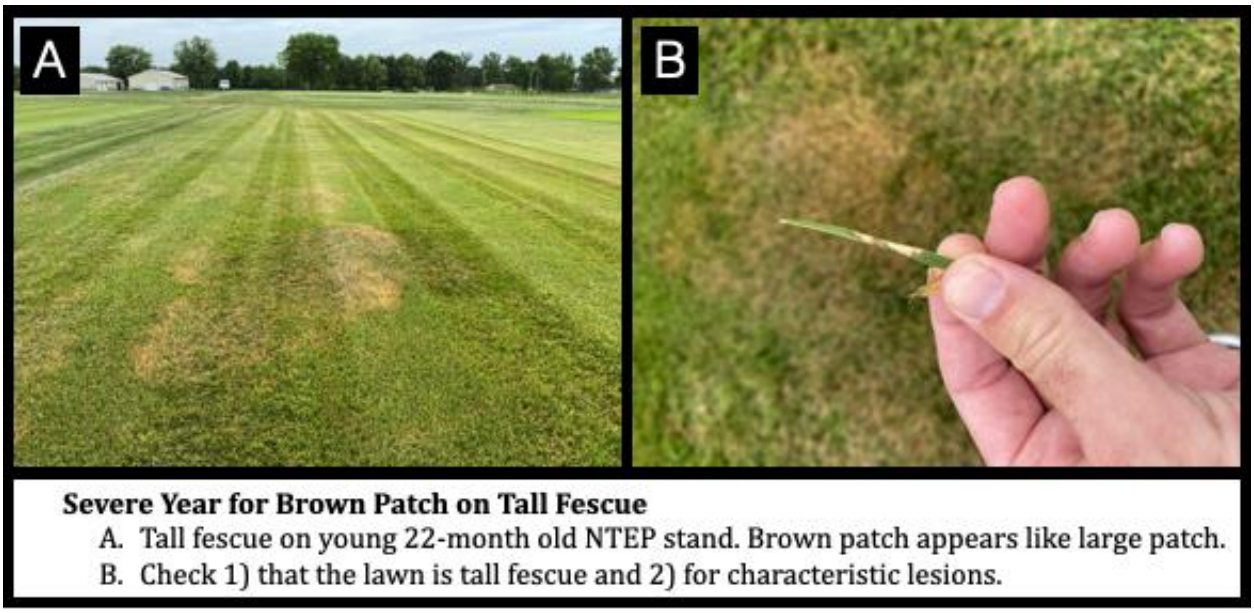
When the Other Spots Attack

A. Copper spot prevalent on research putting green.
B. Tiny conidiophores of leaf spot pathogen on bentgrass leaf blade.

- **The Spots –** Copper spot caused by *Gloeocercospora sorghi* and red leaf spot caused by *Drechslera erthrospila* have been ravaging across our research putting greens in the last two weeks. These two diseases are rare on course since they are picked up by most preventive applications. A notable exception is that some SDHI fungicides such as Velista and Kabuto applied alone won't control copper spot and/or red leaf spot (see research reports). Adding a contact fungicide to a systemic every once in a while, will help mediate these two foliar diseases greatly.

Chicken and The Egg

On another note, dollar spot finally arrived in the last two weeks. We are observing it on creeping bentgrass and Kentucky bluegrass across our turf farm, but the severity at our site is still very mild, probably the lowest spring/early summer infection levels I've observed in my 10 years here. This goes right along with what we are observing in the Smith-Kerns model output, which has cycled up and down this season whereas in previous years the probability gets well above the threshold and stays there. There are reports of Kentucky bluegrass lawns in urban areas having this disease, however, indicating the importance of knowing the host and symptoms prior to making a diagnosis (see this timely tweet by Lee Butler at NC State University).



Severe Year for Brown Patch on Tall Fescue

A. Tall fescue on young 22-month old NTEP stand. Brown patch appears like large patch.
B. Check 1) that the lawn is tall fescue and 2) for characteristic lesions.

- **Lawns –** The dry conditions along with high disease pressure have been brutal on cool-season lawns over the last month. Brown patch, caused by *Rhizoctonia solani,* has been exploding since mid-June on our research plots, and my lawn. On our young NTEP plot, which we've watered quite a bit to avoid drought stress, brown patch is so severe that in many instances it appears like large patch on zoysia. We are also noting brown patch on 'HGT' Kentucky bluegrass along with dollar spot, which can be confusing to discern without closely examining symptoms. To compound matters, Pythium blight may be teaming up with brown patch in some cases, and in others too much water and poor drainage is resulting in boiled, bleached out areas without any disease assistance at all. Not to mention brown patch can also be confused with drought stress.
  A few notes on summer home lawn care are below.
  - In our trials, the strobilurins (QoIs), particularly azoxystrobin provides the best control of brown patch on tall fescue. As a class, the DMIs, (propiconazole, myclobutanil, and others), and some of the new SDHIs (penthiopyrad, isofetamid) are not effective in high disease pressure situations like we are experiencing now. The strobilurins also yield a bit of a preventive Pythium blight

punch too, so it's probably not a coincidence these fungicides yield the highest tall fescue quality in our trials.

- Brown patch may appear like drought, and even in dry conditions can infect tall fescue due to heavy dew events. Check for the symptoms and pay attention to rainfall patterns. A big clue is if the lawn has an in-ground irrigation system. Make sure this is being programmed correctly in the early morning with deep, infrequent cycling.
- Check older leaves for yellowing. A small shot of fertilizer, (~0.25 lb N/1000 sq ft) can be applied in the summer months if needed, but take care not to over juice it in these high temperatures. Organics may not be a bad choice, since temperature driven microbes will release the nitrogen more quickly.
- Mind the transition zone cycle. Cool-season turfgrasses aren't taking these summer conditions well despite the best (and unfortunately sometimes the misguided) intentions. Get to September, fertilize, overseed and rebuild density and quality.

The Chicken and the Egg

Wet Soils = Black Layer et al.

A. Putting green with small patch-like symptoms on turf surface.
B. Prominent black layer observed as an underlying factor.

Summer patch has been observed infesting both Kentucky bluegrass and creeping bentgrass roots over the last few days. The two reports, however, may have underlying, predisposing factors for the outbreak that are related to the same issue.

On the golf course putting green, black layer was prominent at about the one-inch mark and extended another inch or so before stopping and resuming to normal disease-free sand. The profile had aerification channels filled with fresh sand and for 20+ year old greens the layering wasn't that significant and the organic matter seemed well distributed.

Chicken and The Egg

Although summer patch was found prevalent in the roots, the bigger chicken in this case is the black layer. The anaerobic bacteria release hydrogen sulfide gases, and their mere presence indicates a lack of oxygen. The first and most important course of action is (of course) an immediate solid tine venting, which by the way everyone should be doing often to burp greens in this heat! For black layer, a move away from ammonium sulfate and towards nitrate-based sources is also suggested. But the question is why the black layer there in this profile?

The summer patch on the Kentucky bluegrass was most prominent on areas where the tarp water was dumped. Again, excessive moisture leading to summer patch outbreaks and in this case unfortunately accompanied by a high pH water source. However, this site, like the golf course, was on a solid preventive fungicide program geared specifically for summer patch control. No underlying black layer type issues detected here, but again why is the summer patch present when researched and effective fungicides were applied? Why is this chicken still running around the farm and not on the dinner plate?

In both these cases, the lack of enough post-application irrigation may be involved as an underlying factor. In the golf course case, the greens, like many, are on a program with wetting agents to facilitate more uniform soil moisture and to combat localized dry spot. The wetting agent may not have had enough post application irrigation to push it through and cause a uniform wetting front through the profile. The stagnant wetting agent would presumably hold the water in place and not allow for penetration deeper in the profile and out of the system. Dr. Micah Woods of the Asian Turfgrass Center recently posted a tweet pointing out the lack of research in how "penetrant" vs "retaining" wetting agents affect soil moisture. Without this data, my assertion is that the more post-application irrigation the better, with 1/8" being a minimum. My observation is that considerably more damage is caused by wetting agents not being pushed far enough, rather than being pushed too far. I also am not a fan of half-rate wetting agent applications, but that is another story.

In the Kentucky bluegrass case, enough post-application irrigation may not have been applied to push the fungicide far enough into the soil profile to get to the target zone of pathogen infection. Research at North Carolina State (https://turfpathology.ces.ncsu.edu/2019/02/where-did-your-fungicide-go/) consistently demonstrates that post-application irrigation on creeping bentgrass putting greens is vital to moving fungicides targeting soil-borne pathogens into the root zone. Even in a sand-based root zone, a quarter inch of irrigation is necessary to move many of these systemic fungicides down to an area where they can be effective. Also don't forget most of these fungicides are apoplastic and move systemically upwards in the plant. So as far down as you put them, is as far down as they are going to go.

Last but not least, an eighth to a quarter inch of irrigation is **a lot** of water. It's easy to get fooled and believe that it is a miniscule amount, particularly on a rain gauge when trying to figure out where the bottom of the meniscus is. The math, however, tells a different story – an acre inch of water = 27,154 gallons of water and translated to our standard area of

measurement is 623 gallons of water/1000 sq ft. See the chart below to see how this breaks out and the extraordinary amount of water this is. This fact struck me the first time I watered in applications for a research study by hand with Dr. Randy Kane at the Chicago District Golf Association. Over an eighth of an inch on a 50 sq ft plot took some time and resulted in a wet surface.

My advice is if you don't know exactly how much irrigation you are putting out in inches by the amount of time that you set, grab a few rain gauges or irrigation audit collection cups and get to work. Many of the times I've heard are in the 4-5 minute range for PAI. Even with part-circle heads this is concerning, considering that one less pass of the water stream may make the difference in whether or not the product is watered in sufficiently. Perhaps laying an egg on that product's purpose.