



What's Going On in Turfgrass Pathology?

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This is the start of my second year here at UW-Madison and I thought it was appropriate to give an update of what is going on in the turfgrass pathology program this summer. We have a multitude of projects this summer that range from very applied research to very basic research. Of course we will still have a fairly large fungicide testing program this year and if you attend the summer field day you can see those results. We will also have additional research focusing on management of dollar spot, snow mold and anthracnose.

Most of the summer research will focus on dollar spot epidemiology and management. Currently, my graduate student Chantel Wilson is working on determining the optimal temperature for growth, survival and infection of the dollar spot pathogen. She is doing this by growing the fungus on native soil and a USGA greens specification sand with and without grass debris (Figure 1). This particular experiment will give us an idea on how the dollar spot fungus grows and survives in soil or if it even can grow and survive on/in soil. Our preliminary data shows that the dollar spot fungus grows very well when grass debris is present and when temperatures are between 58°F (14°C) and 86°F (30°C) (Figure 2). The fungus does not grow well on bare soil at any temperature or when temperatures are above or below the aforementioned temperature range.

What does this mean? Well, not a lot until we conduct a pathogenicity assay. Once both studies are complete we will have a better idea of when infection occurs and when survival or saprophytic growth occurs.

Chantel will also be expanding on our early-season dollar spot work. She will look at different early-season treatments targeting dollar spot and following those applications up with 3/4 rates of propiconazole tank-mixed with chlorothalonil or full rates of the same tank mixture applied every 28 days. We will then compare disease severity and costs in our early-season programs to a conventional dollar spot program. This experiment will start in mid-May at the Milwaukee Country Club and at the OJ Noer Turfgrass Research and Education Facility.

To corroborate the project mentioned above, we are also working with Damon Smith at Oklahoma State University to develop a universal forecasting model for



Figure 1. Hyphal growth of the dollar spot fungus on a native silt loam at 68°F. Notice the limited growth emanating from the agar plug in the middle.

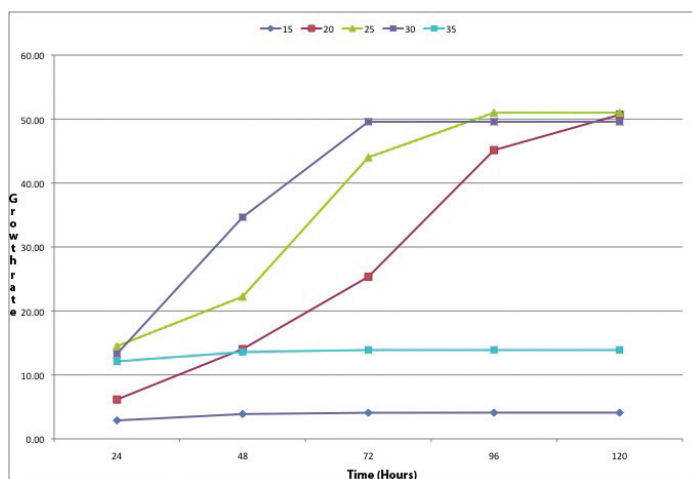


Figure 2. Growth rate of dollar spot isolates from Oklahoma. Growth was averaged across both soil types (native soil and USGA greens grade sand). Note the limited growth when incubated at 15°C (59°F) and 35°C (95°F).



Figure 3. Dollar spot epidemiology experiment conducted at Oklahoma State University this spring. We are conducting this same experiment starting this May in Wisconsin. Notice how the spots of the disease are painted and then the number of spots is correlated back to the environmental parameters to determine the conditions that are favorable for dollar spot development

dollar spot. Forecasting models have been developed for dollar spot, but they either over predict epidemics or significantly under predict epidemics. These models have been unsuccessful because they were only developed using one environmental parameter, such as rainfall and the researchers never used field data. In order to develop a more accurate forecasting model, we have set-up weather stations at two fairway sites at University Ridge Golf Course and one putting green site at the OJ Noer. When dollar spot becomes active, spots will be counted daily and using some pretty complex statistics we will determine what environmental parameters influence dollar spot development (Figure 3).

Preliminary data from Oklahoma suggest that dollar spot development is dependant on relative humidity and air temperature. According to these initial results, dollar spot starts to develop when the average 5-day relative humidity is above 90 % and when 5-day average air temperatures are above 58°F. Then dollar spot activity slows down once 5-day average temperatures rise above 86°F, regardless of the relative humidity. A preliminary forecasting model has been developed and will be tested this year in Oklahoma and Wisconsin. Essentially, Damon will pull weather data from a weather service here in Wisconsin and tell Paul and myself when to make an application. This particular treatment will be fitted into our dollar spot fungicide experiments this summer.

Paul Koch has also started working on his PhD in my program. His research will focus on epidemiology of *Microdochium patch* and the degradation of fungicides under snow cover. The latter is a very interesting experiment. We are using ELISA kits to measure the degradation of iprodione and chlorothalonil with and without snow cover. The ELISA kits have never been

used in a turf system before, so we are the first program to develop a protocol for turf. Paul is also trying to determine the optimal infection temperatures for *Microdochium nivale* (*Microdochium patch*). This will allow us to make better preventative control recommendations for this disease.

To continue the theme of reduced fungicide inputs, part of Paul's project will include a fungicide timing study to try and target dollar spot and snow mold. Basically, we are going to look at a couple of different timings during the fall and spring to see if we can adequately control snow mold and dollar spot. This research is being conducted at fairway height at the OJ Noer and at Sentryworld Golf Course in Stevens Point, WI. The first applications were made last fall and we were pretty successful at controlling snow mold. Stay tuned to learn if we were successful controlling dollar spot.

Finally, we are conducting a fertility trial to determine how nitrogen rate affects anthracnose severity. We are doing this work in collaboration with Tom Harrison at Maple Bluff Country Club. I know many of you are saying that Bruce Clarke has done a lot of this work and you are right. However, Dr. Clarke and other researchers have yet to expand the rates of nitrogen. Typically the studies have essentially been high or low treatments with nothing in the middle. We are planning on looking at four rates either applied granularly in the spring and fall or a total foliar program. We will measure anthracnose severity, ball roll and rooting depth throughout the year.

To summarize, we have an active program this year with a lot of interesting projects. My goal in research is to understand the fundamental biology of turfgrass pathogens and diseases and use that knowledge to refine our current management practices for those diseases. Please feel free to contact us at any time if you have questions about our research or if you have suggestions for research topics. 🌱

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