



Know Thy Disease

By Jeff Gregos, Department of Plant Pathology, University of Wisconsin-Madison

Over the past couple of months, Noernet has had several discussions about diseases that were thought to be present on golf courses in Wisconsin. Some of these diseases included leaf spots and pythium blight. Upon further investigation it was found that none of these claims was true and the proper pathogen was diagnosed. This article is to help clear up all of the confusion on this topic and to assist with proper diagnosis in the future.

Question: I think that I have leaf spot active on my greens in the spring. How do I know that it is really leaf spot?

Answer: Leaf spots on bentgrass are not that common. As for the leaf spots diagnosed on bentgrass in Wisconsin, I have found only two. These include *Bipolaris sorokiniana* and *Drechslera catenaria*. Another leaf spot of bentgrass is red leaf spot caused by *Drechslera erythrospila*, but this pathogen has

not been diagnosed in the TDL as of yet. Out of these three pathogens only one is active in the spring of the year, *D. catenaria* (Leaf Blight). When using only plant and stand symptoms, leaf blight can be easily confused with other disease such as take-all patch. The symptoms include a leaf tip dieback, which is similar to what is seen with take-all patch in older stands. Without the aid of a microscope the two diseases would be very difficult to distinguish. After an incubation period spores would form on the leaves of the infected plants from the leaf blight disease and diagnosis would be relatively simple. If spores do not form, your problem is not a leaf spot.

As a side note it should be mentioned that Helminthosporium diseases no longer exist. Sometime in the 1980's it was decided that these pathogens would be broken up into two groups. *Drechslera* pathogens were named after a pathologist at the UW at the beginning of the last century and *Bipolaris* pathogens received their name because the spores germinate from both ends.

Question: Now that I know that I do not have leaf spot and that in fact it is take-all patch, why do I have it on older greens and what can I do for it now (after symptom expression)?

Answer: Unlike what most people think, take-all patch does not just infect younger stands of bentgrass. Take-all patch (TAP) is probably active on every golf course in Wisconsin, but symptoms are not always observed. Another difficult thing about this pathogen is that the symptoms show up long after the pathogen had its way with your piece of grass.

As you may know TAP goes through a decline period where symptom expression gradually fades out over time in younger stands of bentgrass. But, with a turfgrass ecosystem as with any ecosystem, populations of organisms are always changing. A good example of this would be the competition between moose and timber wolves on Isle Royale. The populations fluctuate over time. When the moose are high the wolves will be low and vice versa due to their dependence on each other and climatic changes. Similarly, the same thing happens in the turf ecosystem. Take-all also has natural predators which can be affected by weather, fungicide applications, fertilization, soil moisture, etc. Many of these answers are left unexplained and much more research is needed in this area.

As for curing TAP in the spring, leave the sprayers in

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the shed. But if it will make you sleep better at night your options are limited. The only chemistries that have shown some success with treating it are the DMI's (Banner, Bayleton, Eagle, Rubigan, etc.) and the strobilurins (Heritage). But, I could save you some money by telling you to include these into your snow mold protection program and get you a lot better control. The symptoms that you are observing now are from damage that occurred in the fall. This pathogen seems to be more active in the fall because the soil temperature hovers in its optimum range for development longer than it does in the spring. The magic numbers for soil temperature are 55-70°F. If a spring application is made it should be when the average soil temperature is around 55°F. After 70°F you are wasting money. In the fall the first application should be made when the soil temperature drops below 70°F and repeated 28 days later.

Now that we are past these crucial temperatures this year, it is time to deal with what you have. First thing is to ensure good root growth. This can be done with aeration and maintaining an adequate level of phosphorus. The other major factor is pH of the top inch of soil. You will want a pH lower than 7.0 to help reduce the severity of this disease. The second thing to do is to provide ade-

quate moisture to these areas. I know that everyone tells you that it is wrong to irrigate lightly and frequently, but this is a time for just that. I have seen this to be a very effective method to reduce symptom development at a golf course in the Madison area throughout the summer, and even eliminated the need for fungicide applications. This works because much of the root system is dysfunctional and is unable to use a lot of the water provided in a deep and infrequent watering regime.

One other factor to consider is your fungicides and irrigation water. The pH of these are usually on the alkaline side and can have an extreme effect on soil pH (at least irrigation water). At the Noer we are initiating a study to examine if the pH of the soil is changed by repeated application of certain fungicides. As you know it is very difficult to change the soil pH, but the pH of the rhizosphere (around top one-inch) can be changed rather easily. This may be the reason that we are seeing more take-all on older stands.

Question: This spring I have seen patches that had mycelium that looked like pythium blight and streaking in some cases; was this really pythium?

Answer: No!!!!!! Sure we had some warm days this spring, but the nighttime temperatures were not there.

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Pythium requires several days with HOT and HUMID weather (90+ daytime, 68+ nighttime, 90+ humidity). We did not have this and we did not have pythium this spring! What we did have was actually two different diseases active this spring, microdochium patch (pink snow mold or fusarium patch to the old timers) and yellow patch (cool-season brown patch).

If these confused you, don't be ashamed. I have heard of several cases where pythium products have been applied before the person discovered that it was not pythium. Yes, microdochium streaks and yellow patch has mycelium that looks like pythium in the field. But, these are very easy to diagnose under the microscope and can save you thousands in pythium products if you send in a sample.

Microdochium patch is cause by *Microdochium nivale* (a.k.a. *Fusarium nivale*; once again the taxonomists must have some type of job security). In the field you will have orangish spots about an inch to two in diameter. These can coalesce to form large patches. This pathogen produces a large number of spores, which enables it to be easily transported by water and equipment, giving the streaking effect. Because of the high number of spores and their characteristic shape it is easy to diagnose under the microscope, but it does require a

magnification of 400x or more.

As for yellow patch, this one is cause by *Rhizoctonia cerealis*. Yes, it is a relative of our buddy from the summer, but this one likes it cold. In the field the symptoms will be somewhat similar to brown patch. The mycelia of all *Rhizoctonia* spp. are similar, but differ in the number of nuclei present in each cell. This is only determined after staining the hyphae and viewing at magnification of 1000x.

Question: What is the take home lesson from this article?

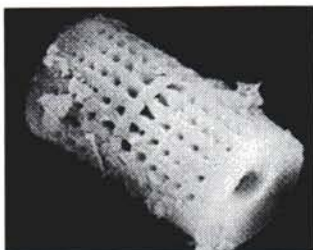
Answer: Support you local diagnostic lab (i.e. the Turf Diagnostic Lab) by getting a contract. The contract can be thought of in a couple of ways. First, it is an insurance policy to ensure that someone is actively employed in turf diagnostics that knows the crop and how to rectify your problems. Second, it is cheaper than a fungicide application. A \$500 dollar contract is cheaper than the price of fungicides to treat 18 greens. If we save you one application throughout the year, your investment has paid off. This also includes those wrong applications because you were treating the wrong disease. If you are interested in a contract or would like more info about the lab, feel free to give us a call at (608) 845-2535. ♡

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