



What's New With Dollar Spot?

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Dollar spot just showed up on some bentgrass research plots at the O.J. Noer Facility last week. This little disease is aptly named: more fungicides are used to control dollar spot than any other turfgrass disease in the country—taking a big bite out of many superintendents' budgets.

Dollar spot is fairly easy to recognize, especially on coarser-textured turf. It can be confused with *Pythium* or *Rhizoctonia* on fine turf. Dollar spot lesions have a bleached look to them, they generally extend across the leaf and are bordered with a tan or reddish brown margin. On closely-mown turf, the small lesions quickly enlarge, the leaves turn yellow, and a sunken spot is formed that is rarely larger than a silver dollar. It's curious that the fungus grows out to this size and then stops. It is thought to be due to an accumulation of materials that the fungus itself secretes—a phenomenon called 'staling'.

The dollar spot fungus doesn't produce spores, but survives in the turf and thatch until conditions are right for the mycelium to grow again. The fungus enters the turf through leaf stomates and through cut leaf tips. Once a lesion is formed on a leaf blade, it serves as a food source for the fungus to grow further into the leaf and out onto other leaf blades. In the early morning dew you can sometimes see the cobweb-like hyphal strands (mycelium) growing from leaf to leaf. Since the fungus enters cut leaf tips and requires a wet leaf to infect, you can visualize how mowing wet turf infected with dollar spot can spread the disease! It's a perfect inoculation technique. Unfortunately, mowing needs to be done early on greens and they are usually wet!

If the invasion of the leaf tissue stops at an early stage, the plant can recover quite well since the fungus stays pretty much on the foliage and does not grow into the crown or roots. Thus, a vigorously-growing turf can recover quite quickly from dollar spot.

However, if turf vigor is low and no other measures are taken to stop the fungal infection, it can kill the plant and the affected areas may be slow to heal.

Like most fungal turf diseases, growth of the dollar spot fungus can only occur when leaves are wet (from rain, dew, high humidity or guttation water) and temperatures are favorable. According to R. Hall, working in Ontario, Canada in the early 1980's, dollar spot activity begins after two consecutive days of wet weather when the average daytime temperature is greater than 70°F or after a period of three consecutive wet days when the average daytime temperature is 59°F or greater. What we need to know is how long the leaves need to be wet before the dollar spot fungus can infect the leaves. This fungus doesn't always need rain to be active—we have seen dollar spot activity with just the morning dews to support its growth. More forecasting models for dollar spot are on the horizon. They will help in timing fungicide applications and timing management practices that discourage dollar spot outbreaks.

Hall found that an application of a fungicide one or two days after two conducive periods gave as good of control as that obtained by a seven-spray preventative program. This may have been coincidence, but it is very encouraging. I found in our trials last year that fungicides applied just as symptoms were appearing were effective in controlling the disease, although I did not compare the results with a strictly preventative spray program.

Unfortunately, no bentgrass cultivar is completely resistant to dollar spot. But it was interesting to note in the 1992 NTEP progress report for fairway/tee bentgrass, that bentgrass cultivars can differ quite a bit in their resistance to dollar spot. In the disease ratings taken in Indiana, the site with conditions closest to those in Wisconsin, the ratings ranged from a low of 3.3 to 7.0 (1 = severe disease,

9 = no disease). Cultivars Tracenta, Bardot, and Egmont received a rating of 6-7. Cultivars Cobra, Penneagle, Allure, Providence and National rated above 5. Cultivars Regent, Pro/Cup, Carmen, Putter, Penncross and Emerald were the least resistant cultivars, with ratings between 2.7 and 4.

Turf that is stressed by low N or drought is usually more susceptible to dollar spot. A good explanation for this came from R. M. Endo, who showed that the fungus needs to get a start with some kind of food base before it could infect a plant. In other words, it isn't strong enough to infect vigorously growing green plants, but could infect new plants if any senescent or killed leaves were available for it to grow on first. Endo's theory is that nitrogen deficiency creates an environment where more leaves are senescing than in a stand that receives adequate nitrogen. I believe nitrogen also plays a role in how quickly the turf recovers from an episode of dollar spot. Drought-stressed turf is also vulnerable to dollar spot, perhaps for the same reasons. During conditions conducive to dollar spot, management practices that mitigate the disease are (1) water enough to avoid drought but infrequently enough so that leaves don't stay wet, (2) remove dew and guttation water from greens whenever possible, (3) provide good air circulation, (4) maintain vigorous growth by judicious use of N. The use of plant growth regulators may affect dollar spot incidence. I am taking a look at this with Frank Rossi at the Noer Facility.

Resistance to fungicides is a concern with the dollar spot fungus. Resistant strains have been found to several main types of fungicides used to control it, including benzamizazole, iprodione, and demethylation (DMI) fungicides such as triadimefon. At the 1993 American Phytopathological Society meetings it was reported that two dollar spot fungi resistant to one DMI fungicide (triadimefon) were
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resistant to other DMI fungicides (propiconazole, fenarimol and tebuconazole) even though those fungicides had not been used on the course. Fungicide resistance is a process of natural selection through the repeated use of the same fungicide, or different fungicide with similar modes of action on the pathogen. It is a concern for us all, as superintendents, plant pathologists and fungicide manufacturers. The best way to avoid resistance is to use fungicides sparingly. There is no consensus among researchers yet if combining fungicides with different modes of action, or

using reduced rate mixtures will delay fungicide resistance. No one yet knows.

It is encouraging to find that there are several examples of control of dollar spot with organic materials. Thirty years ago, Cook reported that composted sewage sludge suppressed dollar spot more than the equivalent amount of N from an inorganic source, establishing for the first time that organic materials may have biological effects that result in disease control. In 1992, Nelson and Craft applied a mixture of sand and different composts and organic fertilizers (70:30 ratio) monthly as a topdressing. They found

two or three materials that were quite promising in controlling dollar spot on creeping bentgrass/*Poa annua* putting greens. The most effective materials were an organic fertilizer made of "plant and animal meals" (77% disease reduction), a manure compost (35% disease reduction) and a sludge compost (13% disease reduction). We have similar studies established on fairway bentgrass out at O.J. Noer. With the importance of this disease to turf maintenance, and the amount of fungicide currently needed to control it, we need all the control strategies we can get for this persistent little disease. ♣



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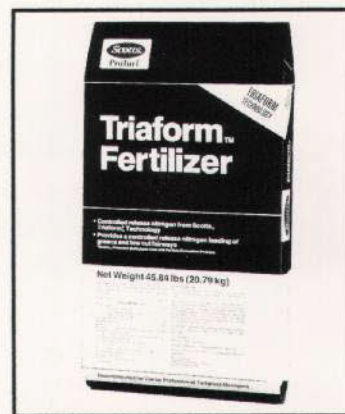
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