

Is Dollar Spot Evolving into an Uncontrollable Beast?

Year in and year out, dollar spot is the most commonly occurring disease of golf turf in the upper Midwest. Dollar-spot fungi (Sclerotinia? Rutstroemia?) frequently attack the bent-grasses (Agrostis spp.) and Poa species (especially Poa annua and Poa trivialis) that grow on our greens, tees, and fairways—and these are the most intensively managed and valuable turfs on our golf courses. In some years, such as last summer (Y2K), dollar spot persists through most of the growing season and becomes a severe, chronic problem. Therefore, repeated fungicide applications and large monetary inputs can be required to control this disease.

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Why was dollar spot especially severe in 2000? Have the dollar-spot fungi changed or evolved into some uncontrollable, fungicide-resistant beasts? Certainly, disease-control failures can arise when a fungus mutates to become fungicide-resistant, but there are a number of other factors that should be considered when trying to decide why a disease-control strategy failed. For example, dollar-spot control problems can arise when superintendents are pressured to reduce the frequency and/or concentration of fungicide sprays, both for monetary and environmental reasons. Even if an effective fungicide is used at the correct rate and interval, failures can still occur if application equipment is inadequate, poorly calibrated, or if too low of an application volume is used. These types of problems most commonly arise when treating fairway turf, where most of the complaints about excessive disease and poor disease control occur.

Any number of reasons could explain why dollar spot was severe at your golf course last summer, but I believe the overriding factor was the weather pattern(s) that occurred over the northeastern part of the country. The summer of 2000 was fairly cool, with no hot spells in June, July or August. The first 90-degree-plus day did not occur in Chicago until mid-August, and there were only four 90-plus days all year. Daytime high temperatures stayed in the 80- to 85-degree range, with fairly cool nights.

We know that dollar spot is favored by moderate daytime temperatures (65-85 degrees F) and cool, clear nights that promote heavy dew formation. Because of this, in northern Illinois we generally see two peaks

of dollar-spot activity, one in late May or early June, and another in late summer—around Labor Day (see **Figure 1**). Hot and/or dry weather in July and August generally reduces dollar spot “pressure”—but not last year! Temperatures remained in a moderate, dollar-spot-conducive range for most of the summer and well into autumn. Dollar-spot fungi were active for a long period of time without a break in the cycle.

What other factors contribute to dollar-spot outbreaks or perceived lack of control? Turf management practices that reduce the plant’s ability to resist infections, or reduce the plant’s ability to recover from infections, greatly increase dollar-spot severity. Of major importance is the maintenance of adequate fertility levels—especially nitrogen. Plants that are N-deficient are more prone to dollar spot and recover more slowly from infections once the disease is stopped. On fair-

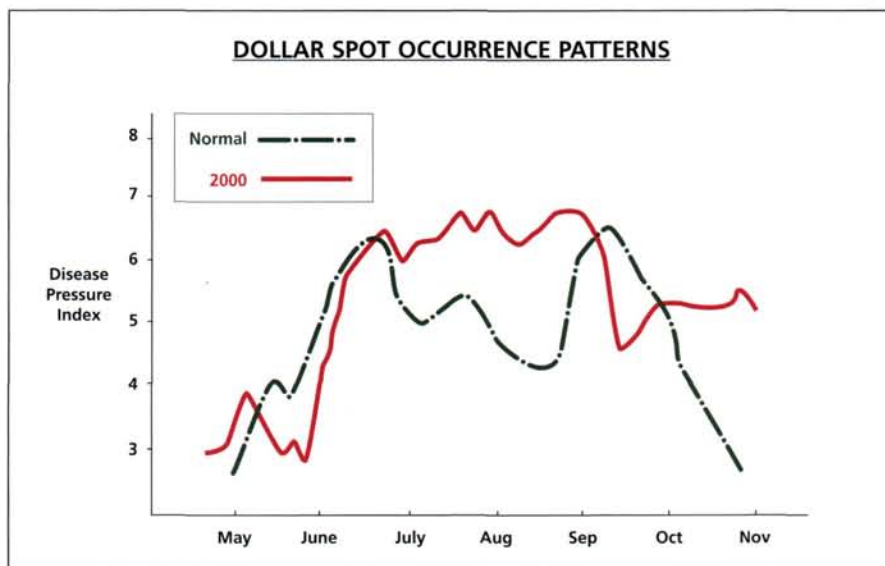


Figure 1.
Graphical depiction of dollar-spot activity in northern Illinois in 2000 versus a “normal” year.

ways, N rates are often kept low to keep leaf clippings to a minimum, since most courses collect and dispose of clippings.

Also, plant growth regulators (PGRs) are often applied to fairway turf to further reduce

leaf-growth rates, clippings and the frequency of mowing per week. PGR applications just prior to or during a dollar-spot outbreak can prolong symptoms, since leaf-growth rates are reduced. With slowed leaf growth,

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Figure 2.
Chronic, out-of-control dollar spot can literally eat the infected turf right down to the “dirt.”

dollar-spot symptoms will remain apparent even if the disease is stopped by a fungicide or by a change in the weather.

Another concern is the chemical make-up of certain PGRs. Several widely used PGRs slow leaf growth by an anti-gibberellin mode of action, which is closely related to the sterol-inhibiting mode of action of systemic fungicides in the DMI group (DMI = demethylase inhibitors). Frequent use of DMI PGRs (e.g., Cutless, Enhancer, Trimmit) has been correlated with development of dollar-spot resistance to DMI fungicides (Rubigan, Bayleton, Banner, etc), especially where both PGR and fungicide have been used simultaneously on a turf.

Another cultural factor that can have an effect on dollar-spot severity is the use of resistant bentgrass cultivars. Unfortunately, most turf managers have not had much of an opportunity to use some of the newer resistant cultivars, unless they are managing a new stand of turf. In the Chicago area, most fairways consist of mixed *Poa annua*, *Poa trivialis*

and old south German or “Seaside” bentgrasses—all of which are highly susceptible to dollar spot. Certain clones of *Poa trivialis* appear to be especially susceptible and often show dollar-spot symptoms well before surrounding patches of bentgrass. Research is underway at Rutgers and other northern universities to identify and develop dollar-spot-resistant bentgrasses (both creeping and colonial types). Hopefully, in the not-too-distant future, we will have dollar-spot-resistant bents available for green-height and tee/fairway-height turfs.

As mentioned before, fungicide application parameters play a critical role in controlling a chronic foliar disease like dollar spot. The first and foremost consideration when evaluating a poor-performing fungicide has to be whether application rates and spray intervals were appropriate. Most fungicide labels state very clearly: “When under high disease pressure, use the higher (curative) rate and the shortest interval to insure control.”

Unfortunately, on fairways we usually find that the lowest label

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rate (or lower) and the longest interval are being used. Note that contact fungicides with chlorothalonil as the active ingredient (e.g., Daconil) usually do not provide adequate control for more than seven to ten days, while dicarboximides (Chipco GT, Curalan) may last 14 to 21 days, and demethylation inhibitor (DMI) fungicides (Banner, Bayleton, Eagle) may last 21 to 28 days (assuming no resistance problems).

Also, on fairways it is much more likely that the volume of spray solution per acre is lower than the manufacturer recommends. Most of these problems occur on fairways because of the time, labor and cost involved in making multiple applications to control a common disease like dollar spot. Poor coverage of leaf tissue results from low application volumes, and can lead to lower levels of disease control than anticipated.

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Figure 3.

Dollar spot fungicide trial at Cantigny in 2000; plot on right (foreground) was treated with iprodione plus chlorothalonil while plot on left was treated with thiophanatemethyl, confirming fungicide resistance for the benzimidazole class of fungicides.

Finally, development of dollar-spot resistance to fungicides remains an ongoing concern, and shouldn't be discounted by superintendents who are having dollar-spot control problems. If you are experiencing chronic dollar-spot control problems and you have correctly applied the appropriate fungicide(s), then it becomes prudent to investigate whether or not fungicide resistance is developing on your course. In Illinois, we have found a few courses with obvious DMI fungicide-resistant dollar spot. However, the frequency of occurrence of this problem appears to be fairly low (e.g., < 5%). Dollar spot is such a variable fungus from site to site, and it may be that true DMI-resistance problems will occur only very sporadically.

We continue to monitor golf courses in Illinois that we suspect have fungi that are less sensitive to

DMIs and other fungicides. Most golf courses in the Chicago area have benzimidazole (e.g., Cleary 3336)-resistant dollar spot, and a few courses have developed benzimidazole-resistant anthracnose as well. The majority of Illinois golf courses report no problems controlling dollar spot with DMI or dicarboximide fungicides. The few courses that have shrinking residual control of dollar spot with DMI products are being investigated. In general, we find that relatively simple, in vitro laboratory tests can confirm a developing DMI problem. After the intense disease pressure of 2000, many courses also reported lack of control with chlorothalonil. However, we have yet to find in the laboratory a dollar-spot fungal strain that is resistant to chlorothalonil, which is a multisite inhibitor (and therefore should have very little risk of developing a resistance problem).



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