

TURFGRASS TRENDS

Volume 10, Issue 4 • April 2001

DISEASES

Disease Management:

It's not just fungicides!

By Monica L. Elliott, Ph.D.

I have one of the best family doctors in the country, and yet there are times when I want to take his perfectly knotted tie and, well, you get the picture. Why? Despite my puffy eyes, chills, runny nose and hacking cough, he will not give me an antibiotic to make the flu go away immediately. He says it is better just to go home, drink lots of fluids and get some bed rest, and then with a smug look, he reminds me that I refused to get a flu shot back in October.

Another time when we were discussing diet, he had the nerve to inform me that Tootsie Rolls, Twinkies and chocolate donuts are not part of the five basic food groups and could very well explain my increasing cholesterol level. And no, he wouldn't give me a drug to lower my cholesterol until I had met with the nutritionist about changing my diet. Alas, I can't argue with him. These are the same basic recommendations I give for turfgrass diseases.

Some diseases simply are not manageable with only fungicides. The root-rot patch diseases (take-all patch, summer patch, spring dead spot) are probably the best examples.

All too often a turf manager calls to inform me that their turf has been diagnosed with a specific disease. Their first and last question is always: what would be the best fungicide to apply? If only it was that easy!

Neither simple nor easy

While turfgrasses may be affected by diseases all year long, individual turfgrass diseases are prominent for only a few months each year, usually due to weather patterns and the resulting environmental effects. However, any stress (environmental or manmade) placed on turf will weaken the turf, and thus make it more susceptible to disease development.

There are four basic steps to disease management. First, the disease must be correctly identified. Second, the environmental conditions or management methods that are promoting infection and disease development must be determined. Third, identify the short-term management techniques that will alter or eliminate these conducive conditions or that will suppress the fungal pathogen while the disease is active. Fourth, (especially if this is a recurring disease problem), identify the long-term management techniques that can be implemented to prevent disease development or minimize the damage to the turfgrass from the disease.

An integrated management program that includes both chemical and cultural methods

IN THIS ISSUE

- **Disease management....1**
 - Neither simple nor easy
 - Miracle fungicides...not!
 - Growth regulation effects
 - Fungicides suppress fungal growth
 - Overusing fungicides
- **Interseeding: A new approach.....6**
 - How interseeding works
 - Test results
- **Future of green speed.....10**
 - Maintenance headache
 - Your best strategy
- **Preventing summer dormancy.....12**
- **Documenting employee issues.....14**
- **From the editor.....15**
 - Whatever you do, don't scratch

Executive Editor

Sue Gibson
440/891-2729; 440/891-2675 (fax)
sgibson@advanstar.com

Managing Editor

Curt Harler
440/238-4556; 440/238-4116 (fax)
curt@curt-harler.com

Senior Science Editor

Dr. Karl Danneberger

Group Editor

Vern Henry

Senior Production Manager

Rene' Fall
218/723-9352; 218/723-9223 (fax)
rfall@advanstar.com

Senior Graphic designer

Jeff Landis
440/891-2702; 440/891-2675 (fax)
jlandis@advanstar.com

Circulation Manager

Cheryl Beeman
218/723-9271

Group Publisher

John D. Payne
440/891-2786; 440/891-2675 (fax)
jpayne@advanstar.com

Corporate & Editorial Office

7500 Old Oak Blvd.
Cleveland, OH 44130-3369

New Subscriptions

888/527-7008

Abstracts: 800/466-8443
Reprint: 440/891-2744
Permission: 440/891-2742
Single copy or back issues:
Subscription/Customer Service
888/527-7008; (fax) 218/723-9437
Web site address:
www.landscapemanagement.net

**Chairman and Chief Executive Officer**

Robert L. Krakoff

Vice Chairman

James M. Alic

VP-Finance, CFO & Secretary

David W. Montgomery

Executive Vice Presidents

William J. Cooke
Alexander S. DeBarr
Morris R. Levitt
Daniel M. Phillips

Vice President & General Counsel

Eric I. Lisman

Treasurer and Controller

Adele D. Hartwick

is the key to preventing and controlling turfgrass diseases. Fungicides are one part of a management system, not the management system for disease control.

Miracle fungicides — not!

I always look with dismay at a turfgrass manager who tells me that he or she does not worry about disease "X" because a couple applications of fungicide "Z" easily takes care of the problem. My follow-up questions to them include: But why do you have the disease problem in the first place? And, what will you do when that pathogen develops resistance to that particular fungicide?

Dollar spot disease caused by *Sclerotinia homoeocarpa* is an excellent example of how fungicide use influences pathogen populations and eventually fungicide choices. The number of fungicide active ingredients this fungus has become resistant to in the United States is astounding. Field resistance to three different chemical fungicide groups has been documented in the dollar spot fungus. These include the benzimidazole, dicarboximide and DMI (sterol inhibitor) fungicide groups. Note the emphasis is on groups, meaning, for example, that the fungus is considered to have developed resistance to not just one DMI fungicide but to all fungicides in the DMI group.

Development of fungicide-resistant pathogens is not a recent phenomenon. One can find reports concerning the dollar spot fungus dating back to the late 1960's. Furthermore, it is not a natural phenomenon, but a man-made phenomenon directly related to fungicide applications.

An excellent study out of Canada reaffirms that the dollar spot fungus is not naturally resistant to the DMI fungicides, but that the extensive use of such fungicides has induced this resistance. Until recently (fall 1994), DMI fungicides were not registered in Canada for use on turfgrass. The research team collected 435 *Sclerotinia homoeocarpa* isolates from diseased turfgrass in Ontario during the summer of 1994, just prior to the legal use of DMI fungicides. Except for one population, which just hap-

pened to be near the U.S. border, the Canadian isolates were all very sensitive to DMI fungicides. Hopefully, the Canadian golf course superintendents will learn from the U.S. situation that the importance of cultural management should not be overlooked as part of a dollar spot control program.

Any practice that reduces disease pressure will also reduce the amount of fungicides required.

Another situation that concerns me are the phone calls from turfgrass managers indicating they have been applying fungicide "X" routinely, and yet they still have a disease problem. The disease observed usually turns out to be one that is not controlled by fungicide "X". This phenomenon occurred with the release of Heritage fungicide, which is a fungicide in the strobilurin chemical group. This fungicide is unusual because it does control a much wider range of fungi than most systemic fungicides. For example, it suppresses diseases caused by both *Pythium* and *Rhizoctonia*. However, Heritage has no effect on the dollar spot fungus. In some studies, it even appeared to increase dollar spot disease.

The point is that if you are going to use fungicides as part of a preventive program, it is imperative that you know exactly which diseases you are trying to control. After all protecting the turfgrass from one disease, only to see it die from another disease does not encourage good customer or membership relationships!

Growth regulation effects

Furthermore, instead of preventing diseases, fungicides can promote disease problems or turfgrass injury.

CORRECTION

Last month's article on the FQPA by Dr. David Gardner mistakenly noted that the product Cyproconazole was sold to Bayer. In fact, Syngenta still retains the use of it for coffee bean production.

For example, the use of DMI fungicides are not recommended on Bermudagrass turf for disease control because of the negative growth-regulating effect they may have on the turf, especially with repeated applications. In a study on hybrid Bermudagrass in southern Florida, we made a total of three fungicide applications applied on 28-day intervals, beginning in late April of 1992 and again in 1993. Eight different DMI fungicides, five registered products and three experimental products, were evaluated.

Cyproconazole (Sentinel), bromuconazole (experimental), myclobutanil (Eagle), propiconazole (Banner) and triadimefon (Bayleton) significantly decreased turfgrass quality compared with the control (water only) in the study.

In both years, the negative effect often did not appear until some other stress was placed on the turfgrass. In other words, the Bermudagrass initially appeared to be unaffected by the fungicide applications. Then, for example, we would have a tropical storm pass through the region, resulting not only in ample rainfall but also in very low light intensity for five to seven days.

The Bermudagrass plots that had not received any DMI fungicide treatments (the control) recovered from this stress, but the DMI-treated plots did not. This negative impact from the fungicides can be compounded if they are being used in combination with triazole plant growth regulators, as DMI fungicides are also triazole chemicals.

Tough diseases

Some diseases simply are not manageable with only fungicides. The root-rot patch diseases (ex: take-all patch, summer patch, spring dead spot) are probably the best examples. This group of diseases also illustrates an example of when disease suppression with a fungicide only occurs if the fungicides are applied preventively, prior to any disease symptoms, and not curatively, after disease symptoms are observed.

The recurring theme in discussions by pathologists on these diseases is while many fungicides may reduce the severity of the

disease, the level of control by any particular fungicide seems to vary from year to year. Plus, even though disease control may be better with a fungicide than without a fungicide, the level of control is often commercially unacceptable.

So, despite a fungicide application, you may still lose your job or the account! Remember, just because a fungicide label has a disease listed on its label does not mean that you will observe control.

Never assume that there is independent research data from your area that backs up the information on the pesticide label. That is not the case at all.

Check with your local university turfgrass research or extension pathologist to determine if they have evaluated these products and what their results were.

Let's examine spring dead spot disease on Bermudagrass more closely to determine why fungicides may not be effective.

This is a disease that is caused by not just one fungal species, but by three or four fungal species. The majority of the species belong to the fungal genus *Ophiosphaerella*. They also share some common biological characteristics. One is that these root-infecting fungi are most active at temperatures that severely inhibit Bermudagrass root growth, around 60°F. Plants that are infected by these fungi in the fall are going to be more sensitive to cold damage. Thus, when the temperatures increase in the spring to normal Bermudagrass growing temperatures, the plants infected in the fall that were killed in the winter by cold damage never green-up, leaving the ugly dead patches characteristic of the disease.

Obviously, applying a fungicide in the spring will have no effect. A dead plant will not be revived by a fungicide. Therefore, a fungicide will need to be applied in the fall. But, when will you apply it? Since the fungicides that may be useful are systemic, the Bermudagrass must still be actively

Never assume that there is independent research data from your area that backs up the information on the pesticide label. That is not the case at all.

What will you do when that pathogen develops resistance to that particular fungicide?

growing when the fungicide is applied in order for the fungicide to be absorbed into the plant.

However, if you apply the fungicide too early in the fall, there may not be enough material left in the plant roots to inhibit the fungus. Why? The Bermudagrass plant is still growing, so the material becomes diluted in the new growth. Since precise long-term weather is extremely difficult to forecast, fall fungicide applications are difficult to time correctly.

Therefore, pathologists highly recommend the use of cultural practices to manage this disease, rather than relying on fungicides. Similar statements apply to other diseases that occur in the winter months, such as snow molds or *Fusarium* patch.

Fungicides suppress fungal growth

You already knew that fungicides suppress fungal growth, right? But, all too often turfgrass managers take this statement one step further to add "and then the turfgrass will recover." The last statement is often only partially true. The turfgrass will recover only if it is growing!

A problem I often observe relates to *Rhizoctonia* blight (brown patch) on St. Augustinegrass, a disease that occurs in late fall through early spring. This would be the problem scenario. The disease occurs on a lawn in the fall, as the temperatures start to decrease. An appropriate fungicide is applied. However, within a week, the temperatures drop even further and stay at a level that does not permit growth of the St. Augustinegrass. The patch symptoms remain throughout the rest of the winter and into spring.

Did the fungicide work? Yes, I am sure it did. Is the grass dead? No. Why are the symptoms still present? The grass was not growing due to the cold weather, so the symptomatic leaves are left in place until new growth occurs.

This will be true for all leaf diseases — no recovery without turfgrass growth, even after a fungicide is applied.

Overusing fungicides

Another conversation that is common with golf course superintendents concerns the number of fungicide applications that have been made. They applied "A" fungicide on Monday, and then, since there was no response by Wednesday, they applied "B" fungicide. Today is Friday and they have just applied "C" fungicide. Their question is what should they do next? I really, really, really want to say "pray that the grass doesn't die" or "what in the !@#% were you thinking." Instead, I ask what disease are they trying to control. Then, if they have applied one of the appropriate fungicides, we discuss what is the appropriate interval between fungicide applications.

I am sure that do know this information already, but simply are not thinking clearly when faced with a disease crisis. While we have become a society that demands instant action, turfgrass managers need to remember that Mother Nature is still an essential component of the turfgrass system.

Summary

I do not want to leave you with the impression that fungicides have no place in turfgrass disease management. That is not my intent. I do want to impress upon you that fungicides are only one part of a management program.

Applications of fungicides should be made after a thoughtful analysis of the disease problem. They should not be applied simply for the sake of doing something that looks good to the client or membership. When they don't resolve the problem, those same people are going to ask what did you do wrong or why did you waste their money.

Because turfgrass is in the public spotlight, it is imperative that the industry use pesticides efficiently, effectively, and safely.

— Dr. Monica Elliott is Associate Professor of Plant Pathology at the University of Florida's Fort Lauderdale Research and Education Center. She received her M.S. and Ph.D. at Montana State University. Her primary research interests are soil-borne plant pathogens and soil/root bacteriology.

REFERENCES

- Burpee, L. L. 1997. Control of dollar spot of creeping bentgrass caused by an isolate of *Sclerotinia homoeocarpa* resistant to benzimidazole and demethylation-inhibitor fungicides. *Plant Disease* 81:1259-1263.
- Clarke, B. B., and A. B. Gould, eds. *Turfgrass Patch Diseases*. APS Press, St. Paul, MN.
- Cole, H., B. Taylor, and J. Duich. 1967. Evidence of differing tolerances to fungicides among isolate of *Sclerotinia homoeocarpa*. *Phytopathology* 58:683-686.
- Elliott, M. L. 1999. Effect of demethylation inhibiting fungicides on 'Tifgreen' Bermudagrass quality. *HortTechnology* 9:195-197.
- Golembiewski, R. C., and T. K. Danneberger. 1998. Dollar spot severity as influenced by trinexapac-ethyl, creeping bentgrass cultivar, and nitrogen fertility. *Agronomy Journal* 90:466-470.
- Hsiang, T., L. Yang, and W. Barton. 1997. Baseline sensitivity and cross-resistance to demethylation-inhibiting fungicides in Ontario isolates of *Sclerotinia homoeocarpa*. *European Journal of Plant Pathology* 103:409-416.
- Smiley, R. W., P. H. Dernoeden, and B. B. Clarke, eds. *Compendium of Turfgrass Diseases*, 2nd ed. APS Press, St. Paul, MN.
- Vargas, J. M., Jr., R. Golembiewski, and A. R. Detweiler. 1992. Dollar spot resistance to DMI fungicides. *Golf Course Management*. 60(3):50-54.
- Vincelli, P., and D. Williams. 1998. Managing spring dead spot of Bermudagrass. *Golf Course Management*. 66(5):49-53.
- Wetzel, H. C., III, D. Z. Skinner, and N. A. Tisserat. 1999. Geographic distribution and genetic diversity of three *Ophiosphaerella* species that cause spring dead spot of Bermudagrass. *Plant Disease* 83:1160-1166.