Probabilities in Turf Diseases: *How Do We Deal With It?*

By Dr. Gayle L. Worf
Professor and Extension Plant Pathologist
Department of Plant Pathology
University of Wisconsin - Madison

I've been convinced for a long time that we would have much better and more dependable control methods available today if we could count on all of our severely damaging diseases to occur every year!

This thought returned to me recently while I was reviewing the results of our field research efforts of the past season. We had conducted extensive trials on Poa summer patch at Pine Hills and Nakoma again this year—and again—no disease. We tried to assess what impact that early season (April and May) summer patch control treatments might have upon subsequent anthracnose and mid-summer Poa decline problems at Blackhawk. We also looked at red thread control options on red fescue, still trying to determine what we might suggest now that Actidione is no longer available. We tried to determine whether we might make certain treatments of Aliette useful against yellow tuft disease to supplement the effective but "resistance-vulnerable" Subdue treatments, and to assess the role that ProStar can play in controlling fairy ring disease.

To be sure, with some of these trials we obtained some useful information about residual effects on other diseases, and may have picked up some ideas about how these long lasting products might influence development of other disease problems, favorably or unfavorably. But we didn't learn *anything* about how to control the problems we earmarked. So we go yet *another* year without more important answers.

It's frustrating. But it's the real world. That's because disease development is linked up with the most whimsical characteristics of mother nature, e.g. humidity, rainfall, nighttime temperature, daytime temperature, spring weather conditions, summer weather events, genetic makeup of the pathogens and hosts, etc., etc. It's an absolute kaleidoscope of events.

We can expect disease problems every year, but we can't be sure which ones they are going to be. From the standpoint of a superintendent trying to figure out what to do, it's got to be especially annoying, since most control measures require preventive, rather than corrective treatments! And increasingly, treatments are more expensive, and much more subject to environmental impact and scrutiny.

So what's a person to do? We can roll the dice. Or we can work on ways to work with the two important "P's"—probability and predictability. The ideas below come to my mind as I reflect upon this very important question for every superintendent who is responsible for the health of his or her golf course.

1. What are the problems I have encountered on my course over the last five years? Never mind what other courses have experienced. Each one is different. I do want to know what is occurring elsewhere, so that I can keep an eye out for it on my course. But their grasses, soil type, specific environmental conditions, cultural and fertilizing practices, maybe their fungicide treatments, etc., are different, so I have a different disease probability situation.

2. How much *damage* did the diseases I encountered cause when they occurred? Were they annoying only to me, or did players sense something going on? And was it threatening my greens and tees?

3. Is the threat more to *me* than to my course? Will I get in trouble with my greens committee if I don't take some kind of action, even if it's only to let them know that I'm doing my job? Or can I take them into my confidence, and discuss what's going on—the expected effects, the treatment alternatives that are available, etc., sometimes coming to the conclusion that doing nothing is the best alternative available.

4. Can I "read the weather" and predict with reasonable certainty what's likely to occur? And if there are good corrective treatments available, can I keep an eagle eye out during critical periods for very early stages of problems, and start remedial treatments at the right time? Maybe I can use the new diagnostic kits to help me in certain situations.

Effort has been made in a number of situations to try to develop predictive models for such diseases as Pythium, Rhizoctonia and Anthracnose. My perception is that they have been good starts, but they were rushed into release before they were perfected. Conditions from one region or state to another are simply too variable for them to apply effectively or dependably.

For example, we reported to you last issue about the considerable differences we are encountering as we look at temperature thresholds on various isolates of Rhizoctonia. I really believe considerable progress can be made with disease prediction, but the amount of work done to date on individual turf diseases and their patterns just scratches the surface. Two crops I'm familiar with where disease predictability patterns are being used with good success in directing fungicide application patterns are potatoes and apples. For potatoes it is for two diseases, late blight and early blight; with apples it is for only *one* disease, apple scab. And the background research that led to the information spanned a fifty year period of time! And we have more than one or two diseases to contend with. Obviously, it doesn't require that much research time, but neither can the research be done in a limited area, with only two or three years of invested time, to come up with dependable data and models.

But two important discoveries make disease prediction models and their application likely tools for future superintendents, in my opinion. The first is the computer, which can measure the critical environmental events and simultaneously make the necessary mathematical computations that say "go" or "no go". The second is the advent of fungicides that have sufficient "kick back", or therapeutic capability that can do some good once an infection period has been detected.

5. How effective are my treatment options? How about summer patch treatments, for instance? Much has been made over the past couple of years about treating before the soil temperatures reach 60°F in order to give the fungicides a chance to work

on the fungus before it causes serious root and crown damage. And some of the sterol inhibitors appear to be effective when applied this way. The same is probably true with take-all patch, which has increased in appearance in recent years in Wisconsin. (However, it is still affecting only a relatively few courses. So it's probably someone else's problem, not mine!) And fortunately, take-all patch, where it has occurred, has not been nearly as damaging to Wisconsin turf as it has been in the cooler coastal states.

These are root-attacking fungi. Unfortunately, we still have quite a ways to go in developing useful control measures for pathogens that attack underground, or those that become systemic within the plant. The products we might use for them are also expensive, have a long residue, and have sometimes shown a tendency towards increasing other diseases. So unless I'm having such problems on my greens or tees, I'm probably going to shy away from treating them. They don't occur predictably, and on the basis of experience, their probability is not high enough to justify the preventive treatments that are required.

I *can* treat effectively for dollar spot, Pythium, Rhizoctonia, Helminthosporium. These I can handle preventively on greens and tees where I must keep disease out of the picture, and I can treat therapeutically at first symptoms on fairways. I can significantly reduce Poa anthracnose problems with preventive applications on fairways where the probabilities are pretty high that I'll encounter the problem. The same is true for snow mold disease in the fall of the year.

These are my reflections on dealing with disease probability. What are yours?