

Pythium Diseases of Turf: Never Underestimate Their Destructive Potential!

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Before describing how little we know about *Pythium* blights, let me say that there are effective ways to manage your turf so that these diseases do not take your turf and your job. The amount of technical information describing *Pythium* blights and *Pythium* root rots is great, but the number of unanswered questions about these diseases is even greater. The term “blight” is not used casually by plant pathologists. A blight is a term reserved for diseases that rapidly destroy (kill) plant tissue. But not all of the *Pythium* diseases on turf are blights. We now recognize that *Pythium* fungi can attack virtually all parts of the turf plant. Generally, those that attack the foliage (in cool and hot weather) are blights that result in rapid death of turf.

A second group of *Pythium* diseases is that which attacks the crowns, roots, rhizomes and/or stolons. These diseases are generally termed “rotters,” because after they infect the turf, other soil fungi and bacteria reduce the diseased plants to a rotten mess.

A third group of *Pythium* diseases is much less obvious and often goes undiagnosed in turf. These diseases can be described as chronic, because they result in reduction of the grass plant but often do not result in death. An

example of this type of disease could be that termed “*Pythium* root dysfunction.” These diseases are important, because they can predispose turf to stresses such as drought and heat.

I have painted a pretty bleak picture of *Pythium* fungi, and most superintendents do not regard these fungi as welcome in their turf. However, the *Pythium* fungi are very important for a stable turf ecology. They are capable of breaking down organic matter (thatch) as well as causing disease. It might surprise you to realize that *Pythium* fungi live in all soils and can grow and survive without living turf. In addition, *Pythium* blights are a problem only in turf that we manage. In natural grass swards, the *Pythium* fungi are in balance with the turf ecosystem, and thus do not cause severe disease unless the total ecological system has been upset. For example, flooding could upset or disturb a natural stand of grass and allow *Pythium*, a water mold, to flourish, thus resulting in severe disease. In our managed turf, especially golf turfs, it is important to understand why turfgrass management practices predispose turf to *Pythium* blights.

Are all *Pythium* blights caused by one species of *Pythium*?

The answer is no. First, more than 30 different species of *Pythium* are known to live on turfgrasses. Some do very little damage, while others are capable of causing blights. Presently, there is little information which would

indicate that a significant difference exists among the different types of *Pythium* fungi in terms of how management practices affect the disease severity. However, as more is learned about these fungi, important differences may be discovered. For example, it could be learned that turfgrass plants could differ in terms of their disease resistance among the types of *Pythium* fungi. At one time, it was thought that there was no difference among the *Pythium* fungi in terms of their sensitivity to fungicides. This implies that all of the *Pythium* fungi should be equally sensitive, but this was unproven; and, in fact, it is known that certain species of *Pythium* can change and become more resistant to some fungicidal chemicals.

Do the *Pythium* fungi that cause the most damage to turf in one location of the country (world) differ from those in other locations?

Here, the answer appears to be yes! For example, in the north-east United States, *Pythium graminicola* is the most destructive and prevalent species; but in the Midwest, *Pythium aphanadermatum* is the most problematic. Why this difference exists cannot be explained because many, if not all, species of *Pythium* can be found in most soils!

How do you determine that *Pythium* fungi are causing a disease in your turf?

Diagnosing *Pythium* blights is not trivial. Simply finding *Pythium* in your turf proves nothing

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ing. What is important is that both the weather conditions and the nutrition of the turf are conducive for *Pythium* blight to develop. If "disease conditions" exist long enough to allow the fungus time to attack, you see disease symptoms; and if you can find significant evidence that a *Pythium* is colonizing turf plants sampled from the affected turf, then you have diagnosed *Pythium* blight. The conditions for *Pythium* blight of the foliage are generally: 1) wet/humid weather, 2) daytime air temperatures above 85°F and night temperatures above 80°F, and 3) turf that is rich in sugars (lush green). Conditions for root rotting *Pythium* diseases are: 1) wet soil, 2) nutrient rich plants, and 3) soil temperatures of 45°–60°F or 80°–90°F. Unfortunately, once a *Pythium* blight starts

to develop, it can destroy turf rapidly. It is better to plan ahead by using information that can help you predict potential *Pythium* blight development.

How can *Pythium* blights and *Pythium* root rots be predicted?

Pythium Blights: Weather conditions are the most important criteria for predicting warm temperature foliar blights (see above). These conditions need to exist for several days. On each golf course, there usually are several areas that will develop *Pythium* blight before others. I call these "hot spots." If you can identify these, you will know where to look for early signs that *Pythium* blight is developing. Observing your "hot spots" and knowing when disease-conducive weather conditions exist should allow you enough time to apply *Pythium* fungicides.

For golf turfs, it is often necessary to integrate a fungicide plan into your disease management program. To upgrade your *Pythium* management program, consider using a weather monitoring system that interprets both the present and near past weather conditions and estimates the potential for *Pythium* blight (Envirocaster is one such system). Remember, having the correct weather conditions does not mean you will always get *Pythium* blight. Another tool to use is a *Pythium* detection kit. This type of kit detects the presence of *Pythium* and attempts to quantify it. However, caution should be taken when using these kits because the presence of *Pythium* in turf tissue alone is not enough to predict that a blight will develop.

Pythium Root and Crown Rots: These diseases are much

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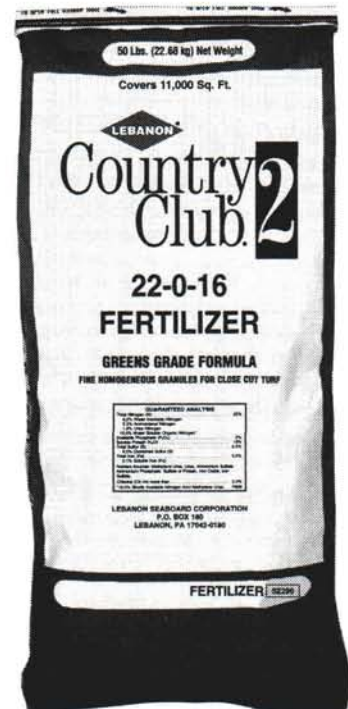
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more difficult to predict, but they also develop a bit slower than foliar blights. Recent research reported by Professor E. Nelson from Cornell University indicates that several species of *Pythium* can cause these rots, and the rots are most severe at temperatures of 45°–60°F or 80°–95°F. Essential for the development of *Pythium* root and crown rot is having a very wet turf. Again, these diseases will develop in the same general areas of turf, and you can identify “hot spots” that can be monitored. There are no predictive models that will evaluate soil conditions and predict the potential for root rot.

What is the best approach for controlling *Pythium* blights?

Each golf course could require a slightly different approach to managing *Pythium*

blights, but there are some good directives that, in general, should keep these diseases from getting out of control.

1. Reduce the length of time your turf stays wet! There are two approaches here: a) create conditions that allow the foliage of your turf to dry rapidly (for example, insure good air circulation), and b) maintain water infiltration and soil drainage (core aeration and subsurface drainage will get this done).

2. Maintain a balanced level of fertility! Do not overapply fertilizer. If your thatch layer is increasing or if your nitrogen is higher than 6%, you are overgrowing your turf, and it will be more susceptible to *Pythium* disease.

3. Do not stress your turf! Drought, heat, wear and soil compaction are a few of the many stresses that can predispose your

turf to increased severity and incidence of *Pythium* blight; and they will slow down the rate at which your turf can recover from this disease.

4. Reduce the pH of your turf, especially in the thatch and crown area! Maintaining turf at a pH of 6 or lower will have a positive effect on *Pythium* blight development. Turf pH values above 8 will be more conducive to the *Pythium* blight fungi.

5. Add organic material to your turf as top dressing! This is not a proven method to specifically control *Pythium* fungi, but adding organic matter will improve thatch degradation and adds microbes to your turf that could compete with the *Pythium* fungi.

6. Use fungicides to stop or slow the rate of disease
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Peter Leuzinger, CGCS, spoke this past May 16 in Washington, D. C., for a summit meeting of environmentalists on "Golf Environments of the Twenty-First Century: Integrating Wildlife Conservation and Golf Courses." The meeting was hosted by the National Fish and Wildlife Foundations and the United States Golf Association and was held in the National

Geographic building in the heart of the capitol. Peter was very excited about this trip, as he felt it was a new audience to speak to about the attributes of golf course developments and their positive role in providing natural habitat in a community. Other speakers included experts from the EPA, National Fish and Wildlife Foundation, Audubon International, Save the Bay, and representatives from the GCSAA and USGA.

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Congratulations to Chuck Anfield and Ann Marie Hopson on their marriage, May 10, 1997, in Chicago Heights, Illinois. Chuck is the superintendent at Steeplechase G. C.

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A very happy 93rd birthday to Mrs. Ray (Jo) Gerber on June 12, 1997!!!
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I received a note from Roger Stewart recently, and he states that the construction of the course is slowly coming along. Last year's record rainfall of 62 inches(!!!) delayed their schedule. He hopes to be seeding during May; and although he really doesn't like the idea of spring seeding, it will have to be done then. The opening date was pushed back from this fall to May 1998. Roger, good luck and keep plugging away.
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increase! *Pythium* blights and root rots are powerful diseases. Once they are well entrenched in a turf, they will be very difficult to stop, unless there is a dramatic change in the weather or a fungicide is used to control them. The fungicides registered for *Pythium* control vary in terms of their active chemical ingredient. It is not possible within the scope of this brief article to describe their differences. However, it is generally agreed that the same type of chemical should not be used repeatedly and that fungicide use should always be used as part of a disease management program, not as the only part.

Next, consider that a raging *Pythium* blight can kill hundreds of square feet of turf in days. Therefore, the speed with which a fungicide acts must be quick. I have observed that systemic fungicides registered for *Pythium* con-

trol require several days to nearly a week to reach their full effectiveness. Contact fungicides reach their potential within a day, but the effect is lost after several days if the grass is growing. Therefore, I would offer the following suggestions:

SITUATION ONE: If you are managing *Pythium* blight in turf that develops the disease every year, then use a systemic fungicide (for example, Banol) prior to the development of blight symptoms. Then keep your eye on these areas, because even the best fungicides can be overcome if disease conditions are too great. If this happens, apply a contact fungicide.

SITUATION TWO: If your turf develops *Pythium* disease and you were not already using a fungicide, then apply a contact fungicide at the manufacturer's recommended therapeutic rate. If you want to switch to a systemic

fungicide, apply it after you have applied the contact fungicide. The idea here is that the contact fungicide will protect the turf while the systemic fungicide is working its way into the turf.

Pythium diseases are complicated, and if you feel you have a problem managing them, work with a plant pathologist. These diseases can be managed! ■

Editor's note: Why would you invite a mushroom to a party? Because he's a "fun guy"!