



ULTIMATE SURVIVOR

This winter's frigid temperatures may impact Pythium, but don't count it out of the fight just yet.

by Rob Thomas

As the term "polar vortex" was bandied about and record-low temperatures stretched across the country, thoughts turned to what this winter's weather might mean for disease pressure come spring. For superintendents concerned about Pythium, recent history may provide a clue.

Jim Kerns, Ph.D., turfgrass pathologist at North Carolina State University, thinks it is unlikely that an unusually cold winter will impact Pythium much.

"Yes, the survival of the inoculum from the previous year may go down, but these organisms are great survivors," Kerns says. "They produce thick-walled oospores that can survive for many years in soil regardless of weather conditions. Moreover, the recent polar vortex makes us think this winter has been unusually cold, but when looking at average weather data, our winter

in North Carolina is not much different from 2010 and we observed numerous cases of Pythium root rot during the summer of 2011."

Dr. Jill Calabro, Valent Professional Products' regional field development manager, says the most common Pythium blight is associated with hot (86-95 F) and humid/rainy weather with nighttime temperatures above 70 F; however, cool-season Pythium is also possible. Cool-season Pythium blight can occur at temperatures between 55 and 64 F, again in wet weather.

According to Kerns, Pythium species are classified in a different kingdom than fungi, but they are still referred to as oomycetes or water molds.

"The key term there is 'water molds,' so wet weather generally leads to ideal conditions for Pythium infections," he says. "It is very important to note that there are



KEY POINTS

- Pythium produces thick-walled oospores that can survive for many years in soil regardless of weather conditions.
- Wet weather generally leads to ideal conditions for Pythium infections.
- The common theme with Pythium diseases is moisture, but the timing of the moisture is different for each disease.
- Spring and summer climate plays more of a factor than winter temperatures.
- Creeping bentgrass, annual bluegrass and ultradwarf Bermudagrasses are the turfgrasses typically seen with Pythium issues.



A number of fungicides can be used in early curative situations for Pythium.



many different Pythium diseases. There is Pythium blight, which is a foliar disease that typically develops during hot, humid weather and is typically associated with native soil fairways or putting greens. However, with ultradwarf Bermudagrass putting greens we see Pythium blight during periods of wet, cloudy weather. This typically occurs during the spring and fall, but it could also occur during the summer if wet, cloudy conditions persist for a period of days or weeks.

"Pythium root rot is a disease of putting greens, primarily, and is associated with hot, wet conditions, as well," Kerns adds. "This disease is also associated with summer stress... it is our biggest issue on creeping bentgrass putting greens in the transition zone. It can occur in Northern climates, as well. This disease is poorly understood with regard to specific weather conditions, but Dr. Lee Miller and I received funding from the GCSAA and local chapters in Missouri and Wisconsin to examine this disease in more detail.

"The final disease is Pythium root dysfunction," Kerns adds. "This particular Pythium disease has only been associated with creeping bentgrass putting greens of high sand content that are relatively young. With Pythium root dysfunction, the pathogens infect when soil temperatures are between 55 and 75 F, but symptoms do not manifest until the plants experience heat or drought stress. This disease is associated with moisture, too, but high moisture contents when soil temperatures are conducive for infection."

Overall, the common theme with Pythium diseases is moisture, but the timing of the moisture is different for each disease, according to Kerns. His suggestion to superintendents: Send samples to a diagnostic lab if they suspect a Pythium issue because all Pythiums are not created equal.

FIND THE CURE

Fortunately, if Pythium rears its ugly head on your course, it's not too late.

"There are several really great fungicides that can be used in early curative situations, such as when the first signs of infection appear, including Stellar," says Dr. Jill Calabro, Valent Professional Products' regional field development manager. "If the disease has progressed, a fungicide such as a Terrazole may be necessary."

Jim Kerns, Ph.D., turfgrass pathologist at North Carolina State University, suggests high rates of Subdue, Segway, Stellar or Banol for curative management of Pythium blight. Pythium root rot and Pythium root dysfunction are more difficult to manage when they develop, though.

"The damage to the root system has already occurred if symptoms develop, however, there are some steps that can improve turf quality," Kerns says. "We have heard from superintendents that curative applications of Terrazole and Segway are effective when applied at high rates and short intervals (5 to 7 days as weather conditions persist).

"For example, an application of Terrazole followed by Segway for 3-4 days has slowed the development of Pythium root rot in our experience," he adds. "Unfortunately, managing Pythium root rot chemically is more of an art form than science. Culturally, this disease is normally associated with low-lying areas of putting greens, so monitoring soil moisture levels is critical. In some circumstances, due to subsurface flow of rain and irrigation water, it may not be necessary to water certain areas of putting greens. I would advise superintendents to map their problem greens, at least, to determine if water is accumulating in certain areas of the putting green, because this is most likely the areas Pythium root rot will be most severe.

Curative applications for Pythium root dysfunction are rarely successful, according to Kerns. He has seen some response from high rates of Insignia and some have reported suppression with mixtures of Signature and Banol.

Kerns says the best way to combat Pythium root dysfunction when it occurs is to raise mowing heights, increase spoonfeeding of N (from a 1/16 to 1/10 or 1/10 to 1/8), alternate mowing and rolling ... basically anything that alleviates physiological stress on the plant. This is also beneficial for Pythium root rot.



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Considering the variations, no region, nor turfgrass, is safe from Pythium.

"Pythium blight can occur in all parts of the country, but clearly is more common in southern and transition zone areas that normally experience the hot/wet weather conducive for Pythium," Calabro says. "All grasses are susceptible to Pythium blight, though cool-season grasses are more susceptible."

Kerns says climate this spring and summer will play a major factor. Perennially, Pythium root rot is problematic throughout the transition zone, while Pythium blight continues to plague some ultradwarf putting greens.

"When I was at UW-Madison, we rarely [saw] Pythium root diseases, yet Pythium blight could be problematic if our summers were warm and wet," he says. "Basically, I cannot say what area should be most concerned with Pythium diseases. Superintendents in each area should be aware of the weather - which they all are - and if conditions are conducive for a particular Pythium disease, then deploy the appropriate management strategy."

Creeping bentgrass, annual bluegrass and ultradwarf Bermudagrasses are the turfgrasses typically seen with pythium issues, Kerns says. However, most turfgrasses are susceptible to Pythium infections.

"Perennial ryegrass is the grass species that many turfgrass pathologists use to test fungicides for efficacy against Pythium blight, so if turf managers are growing perennial ryegrass, then beware of Pythium blight," he says. "It is not one I saw much of in Wisconsin or North Carolina because the grass was not commonly grown in either area.

"Seedlings are particularly susceptible to a disease called 'damping off,' so if new seedlings are planned, it is imperative to protect against damping off," Kerns adds. "Many fungi can cause the disease, so we typically suggest tank mixing a Pythium product (Segway, Subdue, Banol, Stellar) with Chlorothalonil, Heritage, Insignia, Compass or Disarm."

As for what part of the course that's generally affected, Calabro says low-lying areas or areas with poor drainage known for standing water, and areas with poor air circulation are most susceptible to Pythium blight (and many other diseases, for that matter). A good preventative measure?

"Increase drainage and air movement as much as possible," she says. "Consider utilizing fans in closed-in areas. Irrigate early in the morning. A monitoring program is also important: Watch for Pythium development in areas with a history of disease development and keep track of

weather forecasts. Treat preventively with fungicides, such as Stellar Fungicide, when hot/wet conditions are predicted."

In addition to watching the weather, Kerns suggests communicating with a local turfgrass pathologist now to develop a plan of attack for the summer.

While the variations of Pythium make it difficult to suggest a one-size-fits-all plan, Kerns says developing a sound fertility and watering regime that promotes healthy rooting will help in combating all diseases.

"I also think it is important to ask for help from your peers or local turfgrass faculty," he says. "Specifically for Pythium blight, limit nitrogen applications during hot, humid periods and schedule preventative applications a week to a few days prior to the development of hot, humid weather. In my experience, superintendents are good with Pythium blight management.

"The Pythium root diseases can be tricky, however," Kerns adds. "For Pythium root dysfunction, most of the preventative management should be focused when soil temperatures are between 55 and 75F. This would include preventative fungicide applications, nitrogen fertility and limiting watering if possible.

"For Pythium root rot, we typically suggest starting preventative fungicide applications in May in North Carolina," he continued. "We normally see substantial rainfall in May, followed by hot weather. So if, or when, that happens in other regions of the United States, it is time to manage for Pythium. In some circumstances that may be a short window or in others it could be a very long window. I know some courses in the Pacific Northwest have struggled with a Pythium disease, and scheduling fungicide applications or other cultural practices can be challenging."

Both Kerns and Calabro suggest sending a sample to a diagnosis lab - most state universities offer disease diagnostic services - if Pythium is suspected. This is especially important in the case of a possible cool-season Pythium blight or Pythium root rot infection, as these can be easily confused with other diseases, Calabro says. **GCI**

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