

Know your Pythiums

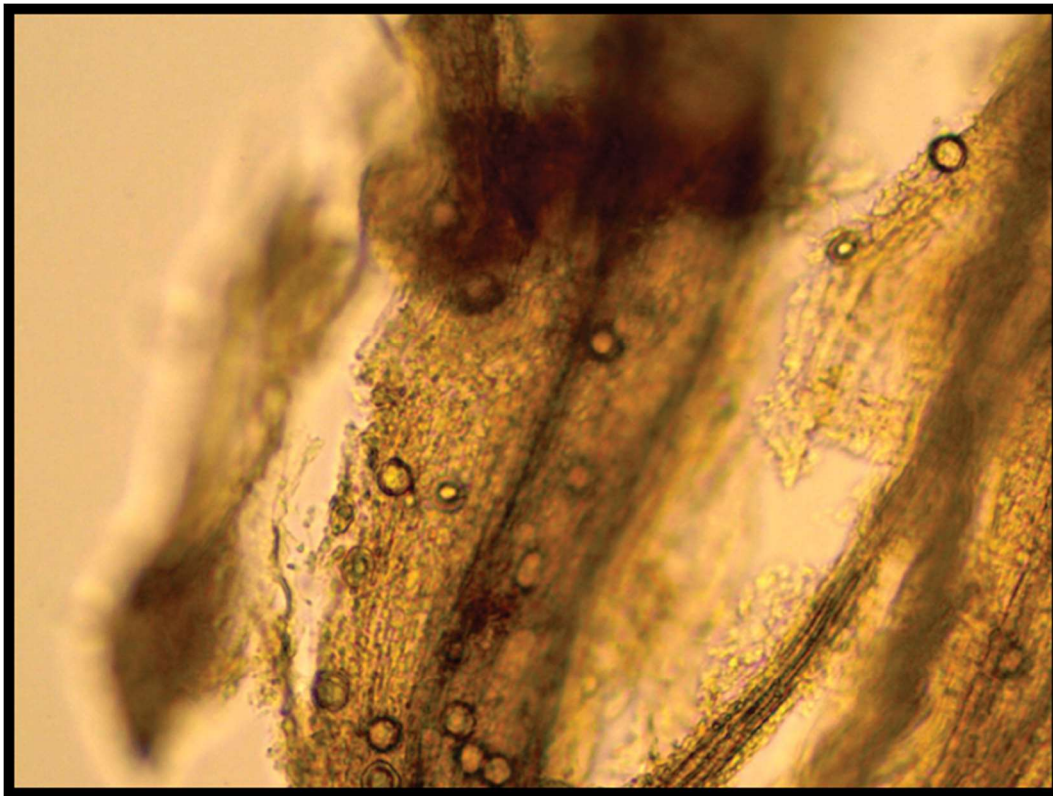
You may think you know all there is to know about the various pythiums, but it's what you don't know that could kill not just your turf, but your career.

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Multiple turfgrass varieties can be affected by Pythium, including *Poa annua*..

photo: courtesy of bayer



The word “Pythium” will instantly get a superintendent’s attention because an outbreak, if undetected, can devastate a golf course in short order.

There are several diseases that are part of the Pythium family. Most superintendents are all too aware of Pythium blight, which was first observed in the 1930s. But other Pythium diseases are also a cause for concern.



Understanding the different types of Pythium can help a superintendent properly treat the disease.

photo: courtesy of bayer

Pythium Root Rot

Pythium root rot is more likely to occur in wet soil conditions and areas of poor drainage. But while these are certainly contributing factors, those conditions are not essential for the disease to become problematic, particularly in the Transition Zone.

With bentgrass greens in the Transition Zone, Pythium root rot has become the major limiting factor to maintaining healthy turf in the summer regardless of whether the greens drain poorly, says Syngenta senior technical manager Dr.

Lane Tredway. “Maintaining with regular aerification and topdressing is an important management tactic,” he adds, “but that alone isn’t guaranteed to solve the problem.”

Pythium root rot is most prevalent on annual bluegrass, creeping bentgrass or ultradwarf Bermuda greens, although it can affect other turfgrass species. The symptoms start out small, typically areas less than 6 inches in diameter that are purple to orange brown in color, says Dr. Jim Kerns, assistant professor and extension specialist of turfgrass pathology at NC State University. “The symptoms enlarge into large irregular areas and rarely are in distinct patches,” says Kerns, one of the nation’s foremost Pythium authorities. “Roots are necrotic (rotten) and root depth is severely limited.”

Pythium root rot is difficult to detect because other issues can mimic its symptoms, Tredway says. “They can show up as irregular areas, particularly, and as areas of stress from traffic or other mechanical injuries or poorly drained areas,” he says. “The sense is they’re just areas that are irregular or nondescript. So, the only dependable way to diagnose is by submitting a sample to a diagnostic laboratory.”

Turf managers are advised to time their Pythium root rot fungicide program with soil temperatures. “Applications for this disease should occur when average soil temperatures are between 65 and 70 degrees F at a 2-inch depth,” Kerns says. “In our research, Segway alternated with Subdue MAXX, and a mixture of Signature/Appear/Alude + Banol or Stellar is effective. We have observed excellent suppression with Segway when applied at the low label rate of 0.45 fl oz. when in a rotation. In many climates, four to six applications of Segway may be necessary to maintain acceptable suppression.”

Some 30 different species of Pythium may cause Pythium root rot, says Dr. Paul Giordano of the Bayer Green Solutions Team, and that each responds differently to fungicide treatments. “That’s kind of where you need to understand your site and what has worked in the past, particularly if this is a chronic issue,” he says. “Start developing your program around products that have shown success in the past.”

Pythium Disease				
	"Pythium Blight (High Temperature)"	"Pythium Blight (Low Temperature)"	Pythium Root Rot	Pythium Root Dysfunction
Primary Species Involved	<i>P. aphanidermatum</i> , <i>P. myriotylum</i>	<i>P. graminicola</i> , <i>P. ultimum</i>	<i>P. graminicola</i> , <i>P. ultimum</i> <i>P. torulosum</i> , <i>P. vanterpoolii</i> + <i>many others</i>	<i>P. volutum</i>
Typical Conditions for Disease Development	Daytime temps. of 85 - 100°F; nighttime temps above 68°F; hot and wet; problematic on newlyseeded turf in hot, wet conditions (damping off)	Daytime temperatures below 55 - 60°F; cool and wet	Low plant growth potential in hot or cold conditions and wet soils; worst on stressed turfgrass	Newly-established greens and/or stressed turfgrass; soil temps of 50 - 75°F (spring and fall) but damage can appear under summer stress conditions
Cultural Conditions Favoring Disease	Excessive nitrogen fertility, poor soil drainage and air movement		Poor soil drainage and air movement, plant stress	Low fertility, soil compaction and plant stress
Host Species	Primarily cool-season turf	Primarily warm-season turf	Cool- and warm-season turf	Creeping bentgrass only
Primary Location	Foliage and crowns	Foliage and crowns	Roots	Roots

Chart: courtesy of BAYER. for more, see backedbybayer.com/talking-turf

Pythium Root Dysfunction

Found exclusively on new bentgrass greens five years old or less, Pythium root dysfunction has been most problematic in the Southeast and Transition Zone. However, it has been observed as far north as New England.

Pythium root dysfunction produces some distinct symptoms — patchy, circular areas from 6 inches up to several feet in diameter that begin to decline in the spring and summer when it encounters heat and drought stress, says Tredway. “Below ground, you’re not necessarily going to see a dramatic reduction in root depth,” he says. “Instead, what you’ll see is a lack of branching of the roots and oftentimes you’ll see that the sand doesn’t cling to the roots like it normally does. It just falls off and your left with two strings of unbranched bentgrass roots. That’s indicative of the fact that the fungus has killed off the root hairs and is causing that dysfunction of the roots.”

Pythium root dysfunction doesn’t completely kill the roots, instead it rots them back. As a result, it reduces the roots’ ability to absorb water and nutrients out of the soil.

The disease is most active when the soil temperatures are around 55 to 60 degrees, and symptoms don’t appear until mid-summer on higher, drier areas of the green surface, Giordano says. “That’s one kind of key indicator,” he says. “If you start to see these funky symptoms on dry, or knoll areas on a green, one suspect or culprit could be Pythium root dysfunction. Unfortunately, by the time the symptoms develop out in the field, it’s kind of already too late. Certainly, there are some remedial treatments that can go down, but in terms of identifying it, it needs to take place much earlier in the year.”

Superintendents maintaining bentgrass greens should be on high alert, Giordano says. “If it’s a newer strain of bentgrass and you get a particularly stressful springtime — especially if it’s wet in the springtime — and the pathogen can start to reproduce and infect roots, then this is the time where they may be able to take samples, send them to a lab, get (the pathogen) identified and make applications prior to the symptoms expressing themselves.”

Like dealing with Pythium root rot, application timing for Pythium root dysfunction is dependent on soil temperature, with effective preventative applications targeting soil temperatures of 55 to 75 degrees, Kerns says.

“Applications should start when soil temperatures reach 55 in the spring of the year,” he says. “Three applications a month apart have been sufficient in our work. Fungicides that have been most effective are Insignia, Heritage, Fame, Segway and a mixture of Signature plus Banol. Our current suggestions for

Pythium root dysfunction management are Insignia or Lexicon for the first and second application with the third application being Segway or Signature plus Banol.”

Kerns adds it’s possible for Pythium root rot and Pythium root dysfunction to exist simultaneously within the same green. In some cases, a superintendent might find themselves making applications for both diseases at the same time.

When treating for either disease, Kerns says fungicides need to be watered in with at least 1/8 inch of irrigation following application for maximum effectiveness. “Many superintendents ask, ‘Can we water that night? The answer to this question is ‘No.’ It is best to water in immediately after application to ensure the greatest efficacy of the product.”

Being on a consistent wetting agent program and tank mixing the fungicide with a wetting agent will also aid in movement of the fungicide into the root zone. Kerns cites a study from Dr. Travis Gannon’s group at NC State, which demonstrated that up to 50 percent of azoxystrobin was removed with mowing the day after application from tall fescue swards when the product was irrigated in.

“We suggest superintendents do not mow the day after fungicide to ensure the fungicide remains in the system,” Kerns says. “It may also be beneficial to irrigate lightly again the next morning as the fungicides can re-solubilize in the dew. All of these will aid in the management of these diseases.”

For Pythium root dysfunction, limiting moisture during the infection period limits symptom development during the summer months.

Pythium Patch

While relatively few turf experts are familiar with Pythium patch, Dr. John Kaminski, director of Penn State’s Golf Course Turfgrass Management Program, has studied the disease extensively, which is found most commonly in Northeast

Poa annua putting greens. Kaminski first detected the disease in the New York metro area during his time at the University of Connecticut.

The disease mimics summer patch — slow to develop and produces a yellow leaf. It is difficult to diagnose, and some turf experts consider it a variety of summer patch. Like Pythium Root Rot, poor drainage tends to increase the severity of the problem.

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