

Pythium Diseases of Turfgrass

Stephen Vann
Assistant Professor,
Extension Urban Plant
Pathologist

Aaron Patton
Assistant Professor,
Extension Turfgrass
Specialist

Introduction

Several species of *Pythium* can be associated with turfgrass diseases. Depending on the species involved and the turfgrass type, three distinct infectious *Pythium* diseases (blight, root dysfunction and root rot) have been described (Table 1). In cool-season turf such as tall fescue and ryegrasses, *Pythium* spp. can be responsible for root rot or blight. For warm-season turfgrasses such as bermudagrass, zoysiagrass, centipede-grass and St. Augustinegrass, root rot is the most common *Pythium* disease. *Pythium* root dysfunction is a disease of creeping bentgrass putting greens.

Pythium diseases are typically more problematic on intensively managed, high-value turfgrasses that are watered, mowed and fertilized

frequently such as golf greens and athletic fields. *Pythium* root rot and *Pythium* blight are commonly associated with excessive soil moisture and succulent plant growth. Root rot, which can be caused by several *Pythium* species, can typically be observed in areas with poor surface or subsurface drainage (saturated soils), heavy rainfall or irrigations and excessive thatch buildup in the turf. Extended leaf wetness periods in conjunction with lush turf growth in response to nitrogen applications increase turf susceptibility to disease.

Pythium blight is perhaps the most destructive turfgrass disease on high-maintenance turf such as putting greens. Although all turfgrasses are susceptible to *Pythium* diseases, cool-season grass species are most commonly damaged by these diseases.

Table 1. Overview of *Pythium* Diseases

Disease	Causal Agent	Host Grasses	Disease Symptoms	Fungal Signs
Pythium blight	<i>P. aphanidermatum</i>	creeping bentgrass, bluegrasses, fescues, ryegrasses	irregular patches or streaks of blighted turf occurring in summer	cottony mycelium may be present on foliage
Pythium root dysfunction	<i>P. volutum</i> , <i>P. aristosporum</i> and <i>P. arrehenomanes</i>	creeping bentgrass	irregular patches of declining areas visible during hot and dry periods, infected plants may turn orange and collapse as if drought stressed, stunted root development	none visible
Pythium root rot	<i>P. spp.</i>	all	nondistinctive, irregular patches visible any time during the growing season	none visible

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Table 2. Optimum Time Period for Pythium Disease Development in Arkansas

A is displayed for **Most Likely** months for disease development.

B is displayed for **Likely** months for disease development.

C is displayed for **Possible** months for disease development.

Disease	January	February	March	April	May	June	July	August	September	October	November	December
Pythium blight				C	B	A	A	A	A	C		
Pythium root dysfunction	A	A	A	A	A	A	A	A	A	A	A	A
Pythium root rot	A	A	A	A	A	A	A	A	A	A	A	A

Cool-season grasses – creeping bentgrass, perennial ryegrass, tall fescue and bentgrass – are all susceptible to Pythium blight. This infectious disease can spread rapidly, especially under hot, humid conditions, killing large areas of turf over a two- or three-day period. Pythium blight is active under conditions of high relative humidity, persistent rainfall or irrigations and night temperatures greater than 68°F and occurs primarily in the summer months, unlike Pythium root diseases (Table 2).

Several species of *Pythium* may be present at any given time in a particular turfgrass ecosystem. Subsequent infection may not occur until favorable environmental conditions develop. *Pythium* species can easily overwinter in the soil and in plant debris. The pathogens can spread by runoff water and on equipment tires or mower blades moving across an infected section of turf.

Symptoms

Roots, crowns and/or leaves may become symptomatic as a result of infection from this pathogen. Pythium blight symptoms usually occur during June to August. Entire leaves may die rapidly, leaving irregular patches or streaks of blighted turf. White, cottony threads (mycelium) may sometimes be seen on diseased leaves (Figure 1).



Figure 1. *Pythium* mycelium on tall fescue (Courtesy of Mike Richardson)

Initially, leaves may have a “greasy,” water-soaked appearance then turn brown or gray. Affected turf will often become matted. Root rot symptoms are typically nondistinctive, irregular patches and can be present as long as the soil stays saturated, for many days or weeks. Symptoms of Pythium root rot may be visible at any time during the growing season. Stolons, rhizomes and roots become dark brown or even black as a result of infection. The root dysfunction symptoms of *P. volutum* are usually seen during hot and dry periods on creeping bentgrass. Root development and penetration are severely reduced as a result of infection. These reductions may not be evident until mid to late summer when soil temperatures climb above 85°F. Infected creeping bentgrass often turns orange and collapses as if drought stressed. Diseased turf may occur as irregular patches of declining areas (Figure 2). Affected turf may resemble drought stress or other abiotic problems. Roots may be tan or brown and often lack root hairs that are important for nutrient and water absorption. This particular Pythium disease has become a significant factor for golf course putting greens throughout the Southeast, where creeping bentgrass is commonly grown in high sand content root zones.

Symptoms alone may not be diagnostic for the particular species of *Pythium*. Microscopic



Figure 2. Irregular symptoms of Pythium blight (Courtesy of Lane Tredway)

examination and laboratory culturing may be required to differentiate the particular species of *Pythium* responsible for the symptoms observed.

Management Tools

Cultural management for all of the *Pythium*-induced diseases should **always** include steps to emphasize or promote good surface and subsurface soil drainage. Turf establishment in low-lying areas that may collect water should be avoided if possible, particularly with *Pythium* blight. Hollow or solid tine aerification can be effective in helping relieve soil compaction, another predisposing factor for the diseases. Aerification will increase soil aeration and water infiltration, resulting in increased root development. Excessive nitrogen rates may encourage lush and succulent grass growth and should be avoided during periods of susceptibility. Perennial ryegrass is the most susceptible turfgrass species.

In the case of *Pythium* blight, golf course maintenance personnel should consider collecting and discarding clippings from infected areas followed by a thorough washing of equipment to prevent spread of the pathogen. Avoid mowing blighted areas during the morning, as the disease is more easily spread when dew or excessive moisture is present. High-capacity air-circulating fans (Figure 3) may be used as part of an overall program for *Pythium* disease management on golf courses. These fans enhance air circulation, promote surface drying and promote evaporative cooling of putting greens where air movement is reduced by surrounding trees or vegetation. Remove shrubs and tree limbs in surrounding areas to increase air movement and increase light penetration. With the exception of *Pythium* root dysfunction, *Pythium* diseases are typically more problematic with high levels of soil nitrogen.



Figure. 3. Circulation fans are often used on golf courses to reduce disease.

Fungicide usage is more common on intensively maintained golf course turfgrasses than residential lawns. Fungicides applied as part of a preventative program are usually more effective than when applied in a curative program. In the case of *Pythium* root rot, applications of commercial fungicides containing ethazole, mefenoxam, fosetyl-AL or propamocarb have been shown to be effective where this disease has been a chronic problem in the turf. Commercial fungicides containing pyraclostrobin or cyazofamid are among those effective for *Pythium* root dysfunction. Fungicides containing the active ingredients cyazofamid, mefenoxam, fosetyl-AL or propamocarb have been used for the management of *Pythium* blight. Consult Extension publication MP154, *Arkansas Plant Disease Control Products Guide*, at www.uaex.uada.edu for available fungicides for commercial or homeowner turf.

An effective disease management program should not rely exclusively on chemical applications. Turf managers should pay particular attention to such issues as soil drainage, fertility, weather patterns and chemical application history to design an appropriate yet effective disease management program.

For homeowners, fungicide applications by lawn care companies are usually considered as a last resort in disease management. Homeowners should monitor lawn irrigation schedules and avoid late evening or night irrigations that may leave the turf wet for long periods. Late spring or summer applications of nitrogen to perennial ryegrass, fescue or bluegrass lawns may also increase disease incidence by encouraging lush turf growth during favorable environmental conditions. Cool-season grasses should receive the majority of their nitrogen in the fall.

An effective management program begins with an accurate disease diagnosis. A laboratory exam in conjunction with background information about the turf may be required for an accurate diagnosis, since symptoms alone are not very diagnostic for *Pythium* diseases.

Additional Information

For further information about *Pythium* and other turfgrass diseases, contact your local county Extension office.

Additional fact sheets are available at www.uaex.uada.edu.

Additional information about turfgrass management is available at turf.uark.edu/.

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