

Turfgrass Diseases: Pythium Blight (FS-2024-0707)

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Turfgrass Diseases: Pythium Blight

Turfgrass is a vital component of green spaces and landscapes, especially in urban areas. It serves as a recreation ground, enhances aesthetics, absorbs stormwater, and reduces the urban heat island effect. However, turfgrass can be affected by various diseases. Pythium blight is one of the most common diseases affecting turfgrass in golf courses, athletic fields, home lawns, and sod farms in the Mid-Atlantic region. Pythium blight can affect both cool-season and warm-season turfgrass species. While the disease impacts warm-season species such as bermudagrass, the damage is more significant on cool-season species. Among these, creeping bentgrass, perennial ryegrass, and annual bluegrass are most affected, whereas Kentucky bluegrass and tall fescue are more tolerant.

Causal Agent

Pyth  EN ^ s caused by several species of Pythium, with *P. aphanidermatum* being the primary pathogen. The fungus thrives in wet and humid environments, and it can survive in soil, organic debris, and



Figure 1. Pythium blight lesions on turfgrass leaves. Note the greasy appearance symptoms on leaves and sheaths. Photo by John E. Kaminski, Pennsylvania State University

plant residues up to several years. The pathogen has a high reproductive capacity and spreads easily through rain splash, irrigation water, and mowing equipment. Therefore, it can cause extensive damage in a short period, especially under favorable environmental conditions.

Signs and Symptoms

The first symptoms of the disease are small, circular, water-soaked lesions that appear on the leaves and stems of the turfgrass plant. The lesions usually do not have a distinct margin and have a greasy appearance (Figure 1). With the progress of the disease, circular or irregularly shaped patches of blighted turfgrass appear, ranging in size from a few inches to several feet in diameter. The affected turfgrass has a water-soaked, slimy, dark brown to black appearance. As the disease progresses, the blighted areas coalesce, forming larger, irregularly shaped patches that can quickly spread throughout the turfgrass stand (Figure 2). In wet conditions, the mycelium of the pathogen can be visible on the surface of the affected grass, forming a white, cottony growth (Figure 3). In severe cases, the affected turfgrass stand wilts and dies, leaving behind large dead patches. The disease is most severe during hot and humid weather conditions and under conditions of high moisture and poor air circulation. Additionally, areas of turfgrass that are stressed or weakened by other factors, such as drought, nutrient deficiencies, or insect damage, are more susceptible to infection by Pythium blight.



Figure 2. Pythium blight symptoms on a turfgrass stand. Photo by John E. Kaminski, Pennsylvania State University



Figure 3. Mycelium of the *Pythium* sp. pathogen around the symptomatic area on perennial ryegrass. Photo by Fereshteh Shahoveisi, University of Maryland.

Favorable Environment for Disease Management

Pythium blight disease thrives in warm, wet, and humid environments, especially when the temperature is between 86 and 95° F (30-35°C) with night temperatures above 68°F (20°C). The disease is prevalent during the summer months when the humidity is high. Relative humidity above 90% for 14 hours or longer with minimum temperature of 68 °F provide a favorable condition for Pythium blight development. The disease also occurs in poorly drained areas, compacted soils, and turfgrass stands that receive excessive nitrogen fertilizer.

Disease Management:

Cultural Management

Cultural practices are crucial in preventing and controlling Pythium blight disease. The following practices can help reduce the severity of the disease:

- **Proper Irrigation:** Overwatering and poor drainage create an ideal environment for Pythium blight disease to thrive. It is essential to water the turfgrass deeply and infrequently to encourage deep root growth and minimize soil moisture. Avoid irrigating during the evening or night hours, as this can prolong leaf wetness and increase the risk of infection.



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Aeration: Compacted soils can reduce soil oxygen levels, leading to root stress and risk of Pythium blight. Core aeration can help alleviate soil compaction, increase soil oxygen levels, and promote water infiltration.

- **Proper Fertilization:** Excessive nitrogen fertilizer can promote lush, succulent tissues, which are more susceptible to infection. It is essential to follow recommended fertilization rates and schedules to avoid overfertilization.
- **Mowing Height:** Mowing too low can weaken the turfgrass and increase the risk of Pythium blight disease. Maintain the recommended mowing height for the turfgrass species; i.e., a 3-inch height of cut for tall fescue home lawns. Mow the infected area last, especially if the pathogen is actively growing and mycelium is visible on the leaves.
- **Air Circulation:** Poor air circulation can prolong leaf wetness and increase the risk of disease development. Prune overhanging branches to improve air circulation and thin out dense turfgrass stands through dethatching or aeration to reduce the risk of disease outbreaks.
- **Other cultural practices:** Regular turfgrass management practices, including thatch removal, aeration, and topdressing, also alleviate disease pressure.

Biological Management:

This method involves the use of living organisms or their byproducts to control the disease. Research at different universities demonstrates some efficacy of certain beneficial microorganisms, such as *Trichoderma spp.*, in reducing Pythium blight severity. However, it is important to note that biological agents alone are often inadequate for effective disease management and cannot be solely relied upon as the primary method of control.

Chemical Management:

Several preventative and curative fungicides are commercially available for the management of Pythium blight. Some products such as phosphites (e.g., potassium phosphite) are less toxic to non-target organisms and environment but have medium efficacy in managing Pythium diseases (Clarke et al., 2020). Combining or rotating such products with more effective fungicides could assist in proper disease management and protect the environment. Turfgrass managers should consider preventative fungicide applications under favorable weather conditions and especially if the turfgrass species are susceptible to Pythium. See Table 1. It is essential to follow the manufacturer's label instructions when using fungicides and to rotate fungicides with different modes of action to prevent the development of fungicide-resistant populations of the pathogen. Researchers have reported resistance to some fungicides such as QoIs (Fungicide Resistance Action Committee (FRAC) Code 11), mefenoxam, and metalaxyl (FRAC Code 4) in some isolates of the pathogen. The following table indicates some of the effective fungicides and the appropriate intervals of applications.

Table 1. List of some effective fungicides for the management of Pythium blight. Fungicide labels should be checked for the rates, carrier volume, registration for residential turfgrass areas, and other information. Use of a product name does not imply endorsement of the product to the exclusion of others that may be suitable.

Fungicide	Efficacy	Interval (days)	FRAC Code-resistance risk
Azoxystrobin (Heritage) ¹	Very good	10-14	11-high
Cyazofamid (Segway) ¹	Very good to Excellent	14-21	21-high
Fluoxastrobin (Fame) ¹	Very good	7-14	11-high
Fosetyl-Al (Chipco Signature, Signature Xtra Stressgard) ¹	Very good	14-21	33-low
Mefenoxam (Subdue MAXX, Quell, Fenox, Subdue G) ¹	Very good ²	7-21	4-high
Propamocarb (Banol)	Very good	7-21	28-low
Azoxystrobin + acibenzolar-S-methyl (Heritage Action)	Very good	10-14	11+P1- high
Azoxystrobin + cyazofamid (Union) ¹	Excellent	14-21	21+11- high

- ¹ One or all commercial products are registered for commercial and residential turfgrass areas in most U.S. states. Check the label for restrictions in specific sites and states.
- ² Resistance to mefenoxam and metalaxyl has been reported in some isolates of the pathogen.
- *Some information in this table was adapted from Clarke, B., Vincelli, P., Koch, & P., Munshaw, G. Chemical control of turfgrass diseases 2020. University of Kentucky, 2020.
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Conclusion

Pythium blight is a significant concern in turfgrass management. The disease thrives in warm, humid conditions and can rapidly devastate turfgrass due to its high reproductive capacity and ease of spread through water and mowing equipment. Symptoms include watersoaked, greasy lesions that coalesce into large, blighted patches, often exacerbated by poor drainage and air circulation, and excessive nitrogen. Effective management involves a combination of cultural practices such as proper irrigation and fertilization, soil aeration, and maintaining appropriate mowing heights. While biological control could reduce disease severity, it is typically not sufficient alone. Chemical management remains a critical strategy, though rotation or tank mixing of products with different FRAC groups is necessary to reduce the risk of fungicide resistance development in the pathogen. Integrated disease management practices assist in maintaining turfgrass health and minimizing the impact of Pythium blight.

For more information



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