



PYTHIUM BLIGHT OF TURFGRASSES

Pythium blight, also known as grease spot, spot blight, and cottony blight, is caused by 15 or more species of soilborne fungi in the genus *Pythium*, especially *P. aphanidermatum* (*P. butleri*) and *P. graminicola*. All cultivated turfgrasses, especially bentgrasses, annual bluegrass, and ryegrasses are susceptible to attack. Pythium blight can be devastating during hot (80° to 95°F or 26° to 35°C), wet, or very humid weather when the grass is dense and lush and there is little air movement. Minor attacks of Pythium blight can occur at cold or cool temperatures in winter, spring, and fall during prolonged wet weather when temperatures are 60° to 65°F (10° to 18°C). The disease is usually most severe on heavy (fine-textured), poorly drained soils. During hot (90° to 95°F or 32° to 35°C), very humid weather, an outbreak of Pythium blight may develop and spread very rapidly, killing large areas of seedling or established turf overnight.



Figure 1. *Pythium* blight spots on Kentucky bluegrass.

SYMPTOMS

Small, distinct, round to irregularly shaped, sunken spots, which are generally one to two inches (2 to 5 centimeters) in diameter or as large as 6 to 12 inches (25 to 30 cm), suddenly appear during hot or cool, very wet, calm weather. The grass leaves at first are water-soaked, slimy (“greasy” to the touch), and dark during the early morning. They quickly fade from reddish brown to a light tan as the grass blades dry out and shrivel and become matted (Figure 1). Clusters of blighted plants may merge to form large irregular areas 1 to 10 feet in diameter or to form long streaks up to a foot or more wide. The patterns apparently develop because spores and mycelium of the *Pythium* fungus (or fungi) are easily spread by surface drainage water, foot traffic, and by mowing when the grass is wet. When the air is moisture-saturated, especially at night or in the early morning, the watersoaked grass leaves collapse and appear matted together by a fluffy, white to purplish gray, cobweb by mass of fungus mycelium—hence the name cottony blight.

If the growth of the *Pythium* fungus is checked by a sudden drop in temperature or humidity before entire leaf blades are blighted, distinct straw-colored spots or lesions develop. These spots resemble those of dollar spot but do not have brown or reddish brown borders. *Pythium*-infected grass blades commonly twist, collapse, and die (Figure 2).

For further information contact Nancy R. Pataky, Extension Specialist and Director of the Plant Clinic, Department of Crop Sciences, University of Illinois at Urbana-Champaign.

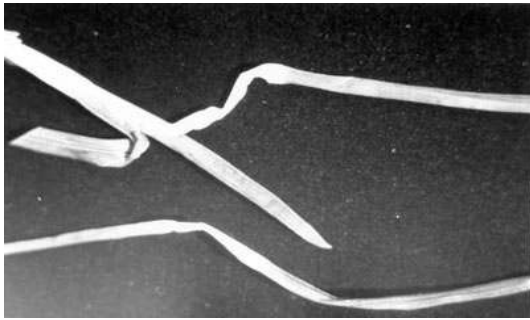


Figure 2. Straw-colored spots, caused by *Pythium*, on leaf blades of Kentucky bluegrass (W.C. Stienstra).

Grass seedlings affected with *Pythium* blight develop a watery rot, or they may wilt, collapse, and die (damp-off) in irregular patches. This condition is very common in a seedbed that is overly wet or waterlogged and where surface drainage is poor.

Species of *Pythium* cause more root rot and damage to the crowns of grass plants in cool (60°F or 15°C), warm, and hot weather than is generally recognized, especially in highly maintained golf putting greens and home lawns. *Pythium aristosporum*, *P. arrhenomanes*, and *P. periplocum* colonize the secondary roots of creeping bentgrass in golf greens.

Infection results in slower growth, an off color to the grass, stunted white or discolored roots, a general decline, and a thinning out of plants. *Pythium* blight is often followed by other organisms such as blue and green algae and species of *Bipolaris*, *Curvularia*, *Drechslera*, *Exserohilum*, *Trichoderma*, and other fungi. There is also some evidence of a close association between species of *Pythium* and certain plant parasitic nematodes.

DISEASE CYCLE

Species of *Pythium* are water-mold fungi that are common in the grass thatch or mat and are widely distributed in many soils. Besides *P. aphanidermatum* and *P. graminicola*, other species of *Pythium* that may kill or blight turfgrasses include *P. afertile*, *P. aristosporum*, *P. arrhenomanes*, *P. catenulatum*, *P. debaryanum*, *P. dissotium*, *P. irregulare*, *P. iqayamai*, *P. myriophyllum*, *P. periplocum*, *P. rostratum*, *P. torulosum*, *P. ultimum*, *P. vanterpoolii*, and *P. vexans*. Only an expert with a good compound light microscope and the right stage of fungal development can identify species of *Pythium* (Figure 4); two or more species may be present and killing turf at any one time.

Pythium fungi are commonly present in diseased turfgrass, thatch debris, and soil in the form of delicate, nonseptate mycelium and round, thick-walled resting spores (oospores) embedded in dead grass tissue. Under favorable temperature and moisture conditions, the mycelium resumes rapid growth while the oospores

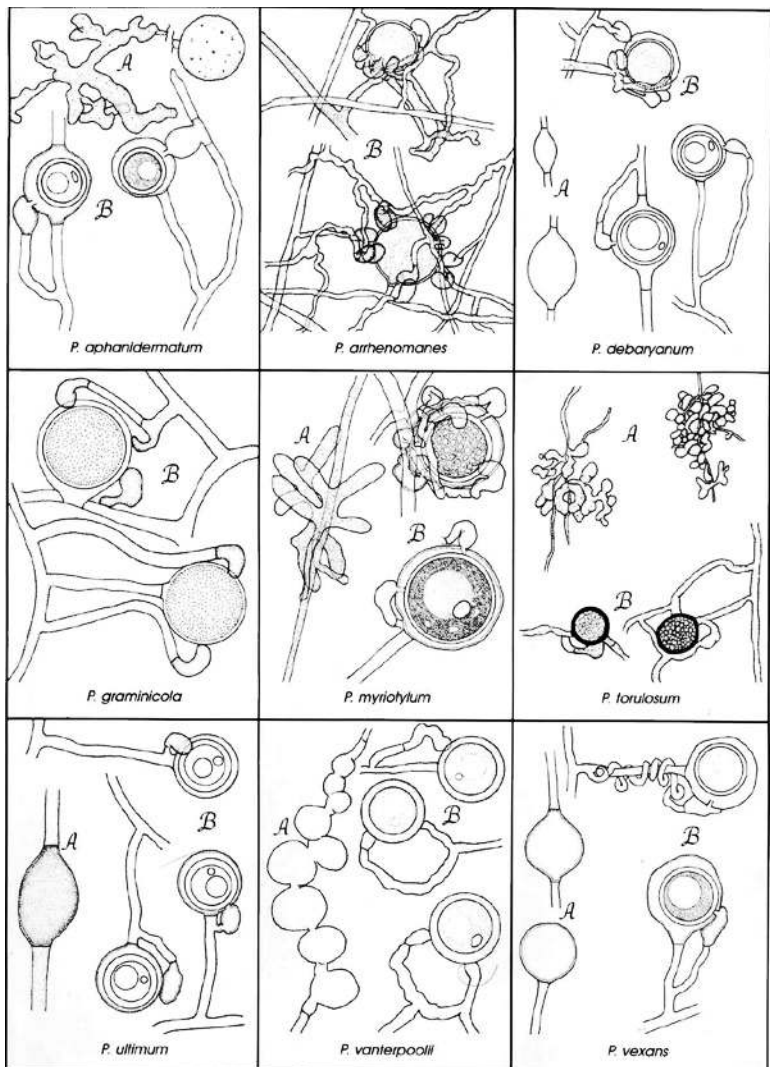


Figure 3. Nine species of *Pythium* that cause diseases of turfgrasses as seen under a light microscope: (a) various types of sporangia; (b) types of sex organs (oogonia with oospores and antheridia) (L. Gray).

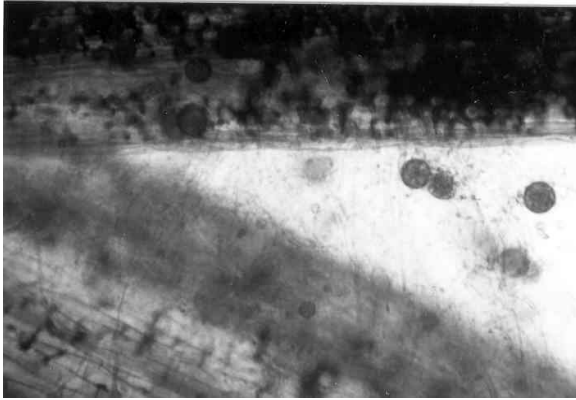


Figure 4. Oospores of *Pythium* sp. in bentgrass leaf tissue as seen under a high-power microscope (G.W. Simone).

germinate to produce sporangia (bearing conidia) or hyphae. The sporangia, in turn, may germinate to produce either motile zoospores or hyphae. All spores can germinate and produce hyphae capable of infecting grass plants within an hour or two.

Living and dead grass plants that were invaded earlier in the season or during the previous season commonly serve as infection centers as disease develops by means of a cobweb like, hyphal growth of the fungus from leaf to leaf and plant to plant. Rapid growth occurs when oospores and zoospores, diseased plant parts, or *Pythium* infested soil, which is moved by mowers, maintenance equipment, surface water, shoes, or animals, spreads the disease.

The blighting of grass and the growth of *Pythium* species are most rapid and severe in moisture-saturated air when air temperatures are 85° to 95°F (29° to 35°C), with a minimum of 68°F (20°C) at night. At temperatures of 90° to 95°F (32° to 35°C) a much shorter time is required to destroy a stand of grass completely. *Pythium* blight is especially severe in dense lush grass in low-lying areas that have poor soil drainage and air movement. Disease may become more severe in alkaline soils than in acid soils. Algae often invade diseased patches and may produce a hard dark crust.

Disease development is greater with a thatch exceeding 3/4 inch thick and with high nitrogen fertility or a high level of balanced fertility than with a low fertility level. Some species of *Pythium* are most active when temperatures are 52° to 70°F (11° to 21°C) and others are dominant at 73° to 93°F (23° to 34°C).

CONTROL

1. Provide for good surface and subsurface drainage when establishing a new turf area. Eliminate low spots where water may stand. If soil amendments such as peat moss, calcined clay, sand, topdressing, and compost are added, mix those uniformly into the soil. Test the soil reaction (pH) and follow suggestions in the soil report. A pH level between 6 and 7 is best.
2. Do not overwater. Water as infrequently as possible for good gaseous exchange between the air in the soil and that above it. Avoid frequent light sprinklings, especially in the late afternoon or evening. During summer or early fall drought periods, water established turf infrequently and deeply, moistening the soil at each watering to a depth of six inches or more.
3. Buy top quality seed, sod, sprigs, or plugs from a reputable dealer. Sow seed treated with captan or thiram plus Koban or Apron. Seed at the suggested rate. If possible, plant when the weather is cool and dry. The seedbed should be well prepared and fertile. Avoid overwatering, especially from the time of seeding, plugging, or sprigging to seedling emergence or plant establishment. water early in the day so the grass can dry before night.
4. Avoid mowing when the grass is wet and periods of intense disease activity and foliar mycelium is evident. Severe damage from *Pythium* root rot may be minimized by increasing the mowing height.

5. Maintain a proper balance of nitrogen, phosphorus, and potassium (H-P-K) according to local recommendations and soil test reports which vary with the kinds of grasses grown and their use. Do not over fertilize, especially with a water-soluble, high nitrogen source in hot weather. Use slow-release nitrogen sources during spring or summer fertilizations.
6. Increase light penetration, air movement, and rapid drying of the grass surface by pruning or selectively removing dense trees and shrubs bordering the turf. Space landscape plants properly to allow adequate air movement and to avoid excessive shade. Some golf courses employ large electric fans to circulate air around secluded putting greens.
7. Remove thatch in early spring or late summer when it has accumulated to 1/4 to 1/2 inch using a vertical mower, power rake, aerifier, or similar equipment which can be rented at garden supply or tool rental stores.
8. Follow suggested weed-control programs for the area and for the grasses grown.
9. There are no known resistant cultivars of any turfgrass species except bermudagrass, which is only adapted to areas of the southern third of Illinois. Most of the improved cultivars of the latter grass (e.g., 'Everglades', 'Florida 50', 'Texas 22', 'Texturf', 'Tiffine', 'Tiflawn', and 'Tifway') are highly tolerant to Pythium blight when mature.
10. During extended periods of hot, wet weather, a preventive fungicide spray program will be needed when the cultural practices outlined above (1 through 9) do not check the development of Pythium blight. The first spray application should be made as soon as night temperatures are expected to remain at 68°F (20°C) or above, when daytime air temperatures are 80°F (27°C) or higher, and when the forecast is for continued wet or very humid weather. Depending on the fungicide used, repeat applications as needed at 5- to 21-day intervals as long as the weather stays hot and humid. For the most effective control of Pythium blight on established turf, uniformly spray 1,000 square feet of turf with the proper fungicide mixture using 10 gallons of water. For fungicide recommendations consult chapter 13 in the current edition of Illinois Urban Pest Management Handbook. The fungicides suggested for control of Pythium blight may be alternated with another fungicide to control brown patch, dollar spot, or other diseases to give broadspectrum disease control.

To control Pythium blight on new seedlings, apply Banol L, Subdue 2E, Koban, or Terrazole at the suggested rates immediately after seeding. Repeat within 5 to 7 days if the soil is wet and environmental conditions remain favorable for disease development. When mixing or applying any fungicide, carefully follow the manufacturer's directions and precautions.