

Pythium Blight

Pythium spp. cause various turfgrass diseases known as the following:

- Pythium blight
- grease spot
- spot blight
- crown and root rot
- root dysfunction
- cottony blight
- snow blight

All turfgrasses are susceptible to *Pythium* spp. attack. Pythium blight commonly affects golf course turfs, athletic fields, and landscape turfgrass settings under favorable conditions.

Pythium Diagnosis



Credit: PACE Turf

Causal agents

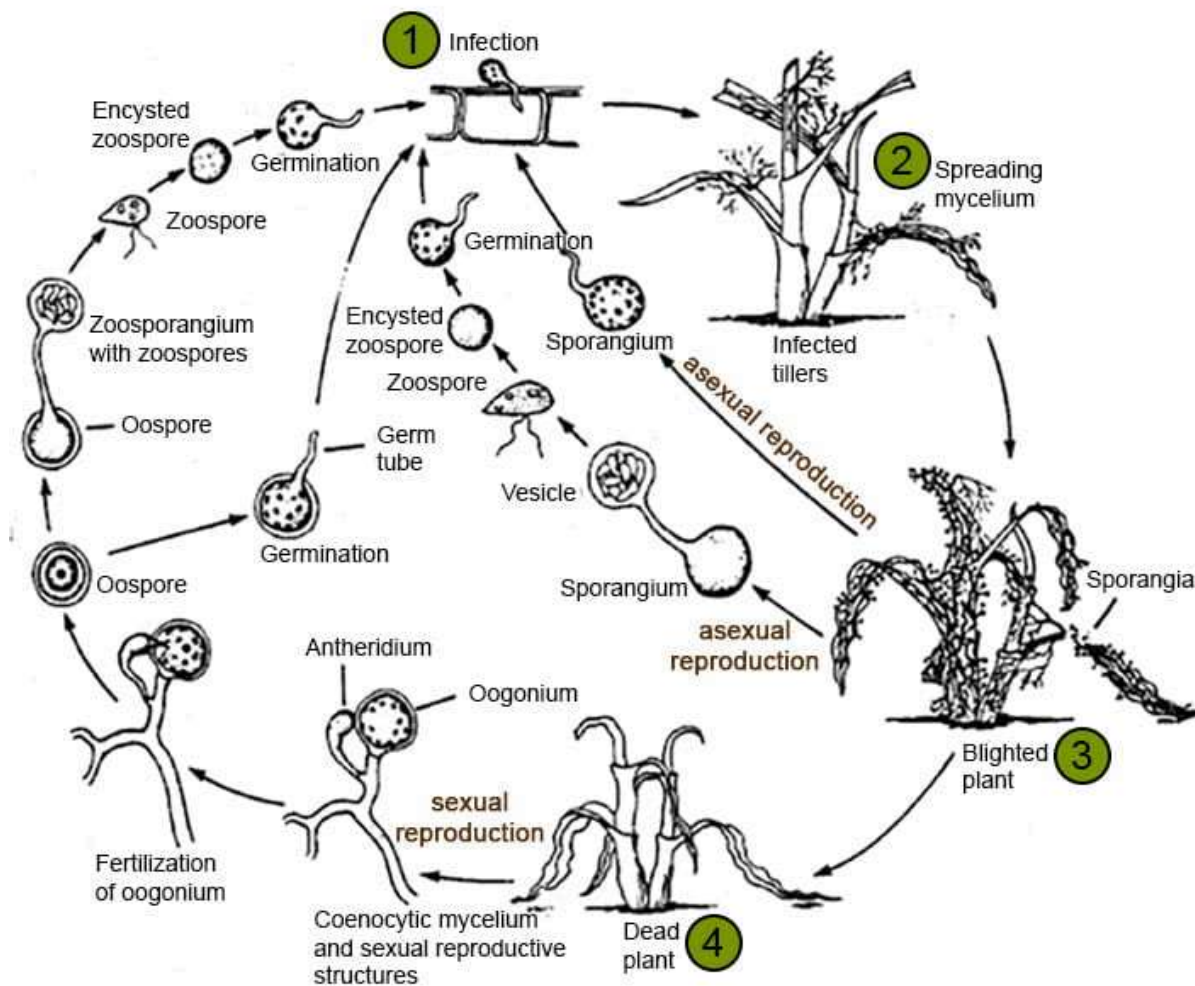
Several pathogenic species of *Pythium* and *Globosporangium* are associated with Pythium blight, including *P. aphanidermatum* (primary pathogen), *P. arrhenomanes*, *P. graminicola*, *P. myriotylum*, *P. torulosum*, *P. vanterpoolii*, *G. irregulare*, and *G. ultimum*.

Primary Hosts

All turfgrasses are susceptible to attack by *Pythium* spp.

Disease Cycle

The occurrence of Pythium blight primarily depends on environmental conditions and the host species. Mycelium, sporangia, zoospores, and oospores of *Pythium* can be transported by running water over significant distances. Zoospores are small (10 µm in diameter) and move rapidly in free water, allowing the pathogen to spread along water drainage patterns. Additionally, *Pythium* can spread from leaf to leaf through the rapid growth of mycelium, which directly penetrates leaves. The pathogen can be transported over large areas when mycelium, infected plant tissues, or infested soil are carried by water or maintenance equipment.



Credit: Penn State University

Figure 14.2.1: Diagram of the pythium blight disease cycle. Major events include (1) infection, (2) spread of mycelium within host plant, (3) secondary inoculum develops and spreads from blighted host plant, and (4) host plant dies. Additional infections can continue from asexual and sexual reproductive structures.

Epidemiology

Pythium blight thrives in wet conditions and causes extensive damage. In cool-season grasses, the disease is most severe during hot, humid, or rainy weather with warm nights, typically when temperatures range from 30 to 35°C (86 to 95°F). Researchers have developed a weather-based forecasting model that identifies the most favorable conditions for Pythium blight, including relative humidity exceeding 90% for at least 14

hours and a minimum temperature of 20°C (68°F). When these conditions occur, *Pythium* blight tends to develop on cool-season grasses.

Warm-season turfgrasses are susceptible to *Pythium* blight during extended periods of humid, rainy, and/or cloudy weather throughout the year, as long as temperatures remain above 10°C (50°F). Lush and dense grasses that receive high nitrogen fertilization are particularly vulnerable to attack. The disease may be more severe in alkaline soils compared to acid soils. Different *Pythium* species exhibit varying levels of activity at different temperature ranges, with some being most active at temperatures of 11 to 21°C (52 to 70°F), while others dominate at 23 to 34°C (73 to 93°F).

Symptoms

Cool-season grasses

Circular spots of 2 to 15 cm in diameter appear suddenly during hot, humid weather. In closely mowed grasses, small discolored spots enlarge rapidly. In higher-cut grasses, patches are larger and irregular in shape. Leaves in affected areas appear dark and water-soaked, feeling oily. "Grease spot" refers to this symptom. On golf greens, orange or bronze-colored spots with gray "smoke rings" may be present. In higher-cut grasses, spots may be copper-colored or water-soaked. Infected leaves turn tan to brown, becoming shriveled and matted when dry. Matted leaves may be covered with white or gray mycelium.

Warm-season grasses

On *Cynodon* spp. putting greens, *Pythium* blight begins as small black or purple spots that expand into irregular areas during humid, rainy, or cloudy weather. These symptoms resemble leaf spot, requiring microscopic evaluation for diagnosis. Leaves in affected areas are matted, black or dark gray, and greasy. Abundant foliar mycelium is rarely observed, but it may appear after incubation in a humid chamber.



Credit: John Kaminski/Penn State University

Figure 14.2.2: Pythium blight is one of the most feared diseases as it can (a) quickly kill large areas in a short period of time. On creeping bentgrass, the disease typically starts as (b) small reddish-brown spots that (c) can coalesce and move in water. Distinct lesions are generally not found on affected turfgrass, but a (d) purpling of leaves may be present. Picking up and rubbing infected plants between your fingers usually has the feeling of a slime.

Signs

Most *Pythium* spp. produce oospores and/or sporangia on artificial media. They have coenocytic (no septations) mycelia and differ in antheridia, oogonia, and sporangia characteristics. Oospores in tissue vary from 15 to 30 μm in diameter.



Credit: John Kaminski/Penn State University

Figure 14.2.3: (a) Zoospores are motile in water and therefore disease symptoms that follow the flow of water is indicative of Pythium blight infections. Signs include (b) white or (c) grayish mycelium that (d) has no cross walls, known as coenocytic.

Management

Cultural

Cultural management practices are essential for managing Pythium blight. These include the following:

- ensure proper drainage
- use fungicide-treated seed during turf establishment
- avoid overwatering and watering late in the day
- remove excessive thatch
- practice balanced nitrogen fertilization
- refrain from mowing during moist, hot weather

- promote light penetration and air circulation
- practice selective pruning

Chemical

Under high disease pressure, it is important to **implement short spray intervals of 7 to 10 days**, even when using the most effective fungicides. For curative situations, research suggests that **cyazofamid, mefenoxam, and propamocarb** are the most efficacious options. However, **tank-mixes of mancozeb and chloroneb may provide poorer control**, so it's best to use each fungicide alone when necessary. When using fosetyl-Al, which is effective in preventing Pythium blight, multiple consecutive applications may be needed under severe disease pressure. However, **fosetyl-Al might not be as effective for curative control** of the disease.

Applying phosphite (phosphonate) materials like **fosetyl-Al directly to plant surfaces**, rather than syringing after application, is crucial since they may undergo chemical changes in the soil, reducing their effectiveness. To **manage resistance, avoid excessive use of mefenoxam or metalaxyl**, as resistance to these fungicides in *Pythium aphanidermatum* has been observed in various turfgrass species. For new seedings, **consider using seed treated with mefenoxam or metalaxyl**, particularly for seedings made in the summer prior to early September, to protect turfgrass species like Kentucky bluegrass, tall fescue, and fine fescues. Creeping bentgrass seed is typically not treated with fungicides, so treating the soil at seeding or shortly after with systemic fungicides like cyazofamid, mefenoxam, or propamocarb is advisable.

Be cautious with flutolanil, as it has been shown to increase Pythium blight activity if conditions favor Pythium, especially when used for brown patch control. Another fungicide, **Koban (ethazole)**, may cause phytotoxicity if applied during hot weather, especially with low spray gallonage.

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