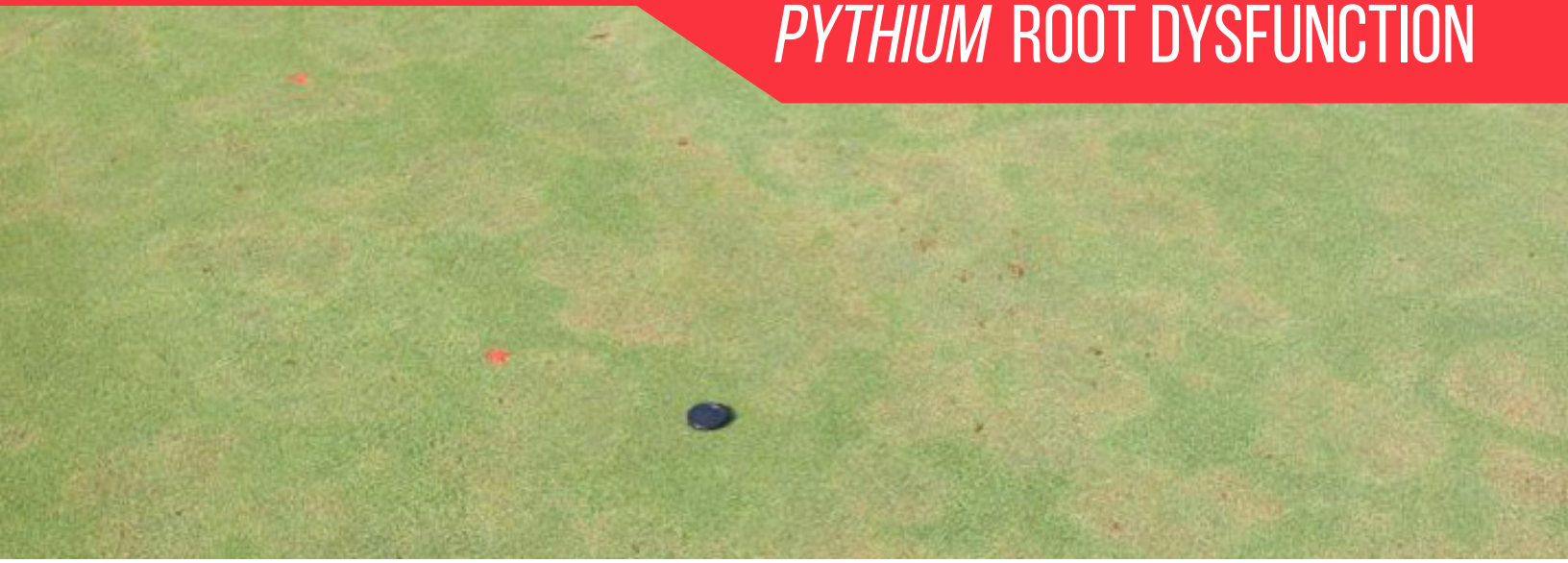
BEST MANAGEMENT PRACTICES
PYTHIUM ROOT DYSFUNCTION



Overview

Pythium root dysfunction (caused by *Pythium volutum*) is a disease that infects bentgrass greens that are less than 10 years old. Stresses occurring over the summer such as tournaments and increased play can impact disease severity as growth and vigor slow transitioning into the fall months when infection occurs. There are multiple *Pythium* species that have been identified as causing *Pythium* root dysfunction including *P. volutum* (found mainly in the Mid-Atlantic and Southeastern States), *P. aristosporum*, and *P. aphanidermatum* (found mainly in the Midwest). *Pythium* is an oomycete. Oomycetes are not true fungi as they have nonseptate mycelium, reproduce via oospores and cell walls composed of cellulose (versus chitin with fungi). Since *Pythium* is not a true fungus, it is important to correctly identify the disease so appropriate measures can be taken to achieve acceptable control.

Environmental Conditions Favoring Disease Development

This pathogen is active when soil temperatures are between 50° and 75°F during fall or spring. During this time, the pathogen begins to colonize creeping bentgrass roots of relatively newly established sand-based putting greens. *Pythium* root dysfunction does not cause root rot, rather it prevents the formation of root hairs that are responsible for the uptake of water and nutrients.

Symptoms and Identification

Pythium Root Dysfunction is a root disease that infects turfgrass in the fall or spring. Symptoms can be observed year-round, but the most severe symptoms appear in summer, when turfgrass becomes drought stressed. Turfgrass can appear wilted or drought stressed, however these symptoms quickly return after a normal irrigation cycle in turf infected with *Pythium* root dysfunction. Infected areas appear as tan to orange irregularly shaped patches that can reach several feet in size (Figure 1). Eventually, these patches will become necrotic and die, decreasing turfgrass density. Infected roots are tan-colored and lack root hairs. These tan-colored roots without root hairs are one way of determining the difference between root dysfunction and root rot. With *Pythium* root rot the roots are black and rotten. *Pythium* root dysfunction roots are still alive, but not functioning at a high level due to the lack of root hairs. In later stages of the disease infected roots will eventually die. Involving a qualified disease diagnostic lab would be

recommended for accurate diagnosis.

Management

Cultural

The primary focus of cultural management for *Pythium* root dysfunction involves management techniques to maintain root function, growth and development. Applying proper nitrogen and other essential nutrients throughout the year will encourage growth and development of new tissue. Spring and fall aerification and top dressing will provide needed gas exchange, water infiltration, and reduce compaction thus stimulating root growth. If symptoms develop during stressful growing times of summer, adjustments like increased mowing heights on putting surfaces, substituting mowing with rolling to maintain green speed, or using solid rollers instead of grooved rollers on mowers will also aid in reducing plant stress. Timely irrigation and hand syringing during summer will prevent drought stress in infected areas.

Chemical

Pythium root dysfunction is best managed by using a preventative fungicide application program. Applications should be applied in spring and fall when the pathogen is active. This corresponds to when soil temperatures are in the 50° to 75°F range. A proven preventative program would include two fall applications of Fame® SC Fungicide 21 to 28 days apart followed by spring applications at the same intervals.

Serata™ Fungicide applied at 0.6 oz/1,000 sq ft can also be used in rotation to control *Pythium* root dysfunction. Serata contains Picarbutrazox, a brand-new mode of action for Pythium disease control.

Fungicides should be lightly irrigated after treatment to move the fungicide down to the roots. Incorporating Fame SC and Serata into a program ensuring *Pythium* root dysfunction is kept at bay further protecting creeping bentgrass from this destructive disease.

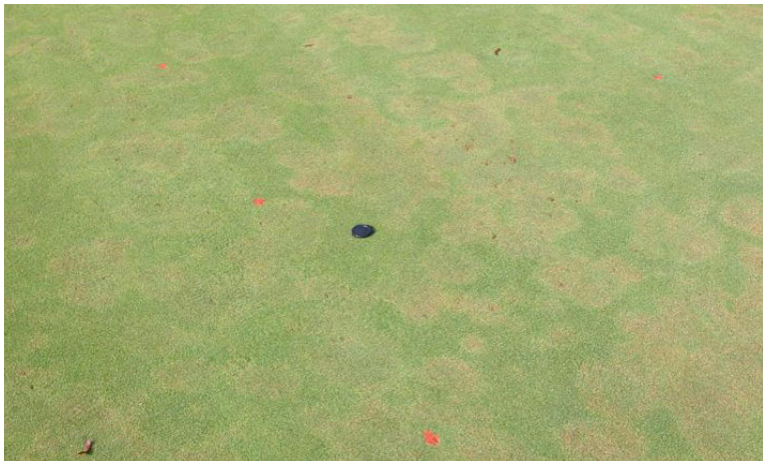


Figure 1 *Pythium Root Dysfunction, NCSU Turf Files*

References

Smiley RW, Dernoeden PH, Clarke BB. 2017. Compendium of Turfgrass Diseases, Third Edition. American Phytopathological Society. St. Paul, MN. Pp. 71-77.

Latin, R. 2011. A Practical Guide to Turfgrass Fungicides. The American Phytopathological Society. St. Paul, MN. pp. 186-188.

J. Kerns and L. Butler. 2019. Pythium Root Dysfunction in Turf. www.TurfFiles.ncsu.edu.

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