Pythium Biology Explains Plenty

BY KARL DANNEBERGER

Pythium blight is favored by warm, humid conditions. The disease initially starts as small spots (foci), but rapidly spreads to kill large turfgrass areas in a short period. The fungal species that cause pythium blight — and there are several — are primitive in nature to the point where they're not considered "true fungi," but are classified into a different kingdom known as protists.

A characteristic of protists, and specifically for *Pythium spp.*, is the production of zoospores, which are produced within the asexual structure known as sporangia. Sporangia are filamentous globose structures that are simple in nature and often hard to distinguish from regular hyphae.

Upon discharge, the entire content of the sporangia in the form of zoospores is released. The zoospores swim forward in a characteristic helical fashion. Zoospores can swim for several hours. And since they swim, the availability of free moisture enhances the spread of these spores.

Once the zoospore comes into contact with a suitable host's tissue, it encases itself as a cyst (encysted). The cyst has the potential to germinate immediately, producing a germ tube that can lead to plant penetration. The process from cyst to penetration can occur in less than 30 minutes. When conditions are favorable, the ability to infect quickly is one reason why plant death occurs rapidly.

The sexual structures that arise from zoospores known as oogonium and antheridium can produce an oospore. In some instances, it may take several weeks before an oospore will germinate. Oospores are often associated as a diagnostic key on pythium-blighted turfgrass samples.

The ability of *pythium spp.* to live saphrophytically, along with the ability to produce oospores that allow it to survive in dry soils for years, makes control difficult. Cultural practices to reduce the severity of pythium blight are related to the biology of the pathogen.

Although favorable temperatures for disease are not easy to manipulate, the presence of moisture can be minimized. Irrigation practices that cause overwatering enhance disease. The key is to water judicially and minimize periods where the turfgrass will remain wet, especially overnight. The best time to water is in the morning, which gives the turfgrass a chance to dry. Late-afternoon watering should be avoided.

CULTURAL PRACTICES TO REDUCE ITS SEVERITY ARE RELATED TO ITS SCIENCE

Providing good surface and subsurface drainage can reduce the presence of free moisture, which is conducive for zoospore movement. Also, avoid mowing wet areas when temperatures are favorable for disease. This will help minimize the spread of the infective spores. If infected turfgrass is mowed during favorable conditions, take the time to wash off the equipment prior to proceeding to unaffected sites.

In restricted air-flow areas, take the necessary actions to increase air flow across the turfgrass. In low-lying or shaded areas, the lack of air movement reduces evapotranspiration, resulting in slower moisture loss from the turfgrass. Removing trees and/or underbrush from around greens helps increase air movement across the turf. Where trees or underbrush can't be removed or thinned, the installation of fans can help.

Removing or reducing an excessive thatch layer can help improve water movement by avoiding a perched-water effect. Thatch can harbor pythium spore population as high or higher than the underlying soil. The combination of inoculums with a saturated thatch layer is conducive for disease.

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