

# Turfgrass Disease Profiles

## Necrotic Ring Spot

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Necrotic ring spot is caused by a fungus (*Ophiosphaerella korrae*) that infects the roots of Kentucky bluegrass on golf courses, sports turf, professional landscapes, and home lawns. Although it is seldom a devastating disease that kills large areas of turf, moderate to severe outbreaks will disturb the appearance of the turf stand and may adversely affect playing surfaces (Figure 1). Necrotic ring spot often is considered a disease of relatively young (3-10 years) turfgrass stands, but symptom expression in older turf is not unusual.

### Disease Characteristics

Symptoms first appear in summer as small (6-8 inches in diameter), clustered patches of gray-tan turf (Figure 2). Because necrotic ring spot is a root disease, initial aboveground symptoms include dieback from the leaf tips, followed by collapse of the leaf and decline of the entire plant.

Infected roots appear stunted and necrotic compared to healthy roots (Figure 3). Microscopic inspection of affected roots will reveal numerous dark runner hyphae (Figure 4). Over several years, infected patches enlarge and turf that did not die at the initial outbreak site will recover, giving the affected turf what is known as a “frog eye” pattern (Figure 5).

The pathogen survives as mycelium in dead and decaying root tissues. It is spread by transporting soil containing infected roots, primarily during maintenance operations such as core aeration. Infection occurs in wet soils, when soil temperatures range between 65° and 80°F. Symptoms usually are expressed during periods of heat and/or drought stress. Because infection-impaired roots are unable to sustain plant vigor, symptoms may be evident throughout the summer and early fall.

Necrotic ring spot symptoms in the summer are often confused with summer patch (see Purdue Extension publication BP-115-W, *Turfgrass Disease Profiles: Summer Patch*, [www.extension.purdue.edu/extmedia/BP/BP-115-W.pdf](http://www.extension.purdue.edu/extmedia/BP/BP-115-W.pdf)).

### Disease Control

#### Resistance to Disease

There appear to be a few Kentucky bluegrass varieties that have resistance to necrotic ring spot. These varieties, or another turfgrass species such as perennial ryegrass (*Lolium perenne*), can be over-seeded in damaged areas in the fall.



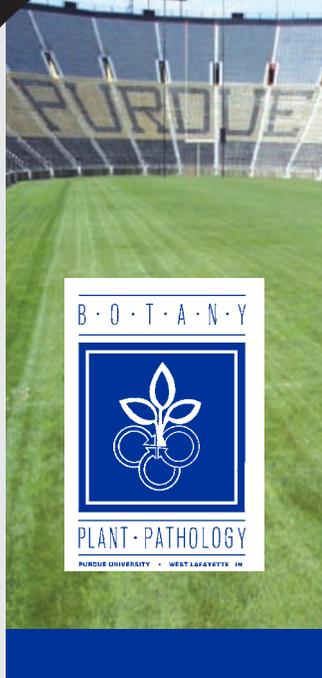
Figure 1



Figure 2



Figure 3



Gray Snow Mold

Pink Snow Mold

Leaf Spot/Melting Out

Red Thread

Dollar Spot

Brown Patch

Gray Leaf Spot

Anthraxnose

Pythium Blight

Leaf Rust

Powdery Mildew

Slime Mold

Fairy Ring

Take All Patch

Summer Patch

**Necrotic Ring Spot**

Rhizoctonia Large Patch

Yellow Patch

Smut Diseases

The Kentucky bluegrass varieties Adelphi, Midnight, and Wabash are among several with moderate resistance to the disease.

A complete list of Kentucky bluegrass varieties and their relative susceptibility to necrotic ring spot and other diseases is available from the National Turfgrass Evaluation Program (NTEP) Web site, [www.ntep.org](http://www.ntep.org).

### **Cultural Practices to Suppress Disease**

Cultural control practices are targeted to minimize the effects of necrotic ring spot infection. Management practices that promote deep rooting during spring and fall will help reduce the extent of necrotic ring spot symptom expression.

Also, the effects of infection will be reduced with practices that relieve summer stresses associated with compaction, drought, and nitrogen deficiency. These include implementing a balanced nitrogen fertilizer program (preferably with slow-release sources of N), re-directing traffic where feasible, and judicious use of irrigation.

Although there are differences of opinion, most researchers favor deep, infrequent irrigation as part of a program to reduce the effects of summer stress on infected turf.

### **Chemical Control Options**

As with all root diseases, chemical control of necrotic ring spot is expensive because multiple applications are often necessary to mitigate turf damage. Furthermore, there is no guarantee of satisfactory results. Where chemical control is warranted, preferred fungicides include demethylase inhibitors (DMI) such as propiconazole, myclobutanil, triadimefon, and triticonazole. Fungicides should be applied according to label instructions when environmental conditions favor pathogen activity in the soil — when soil temperatures at a depth of 3

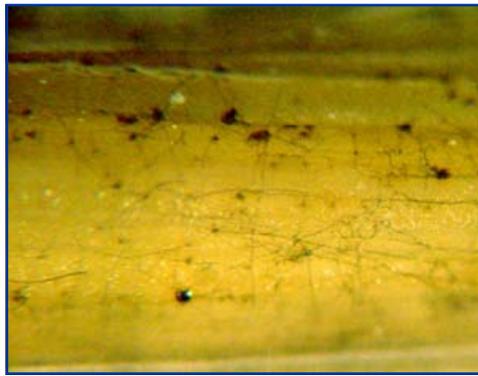


Figure 4



Figure 5

inches approach 65°F. In central Indiana, soil temperatures may reach this threshold from mid-May through early June.

Since fungicides need to reach the roots to be effective, practices that help deliver the fungicide to the root zone may result in improved fungicide performance. These include irrigation before and after fungicide application, and aeration prior to application.

Symptoms usually are not apparent when initial infections occur. One of the difficulties associated with chemical control of this disease is that fungicides must be applied before symptoms are evident for best results. Therefore, an accurate diagnosis and good knowledge of the site history is important for avoiding unnecessary fungicide applications.

### **Home Lawn Help**

Managing necrotic ring spot in the home lawn is not much different from

the approach taken by professional turf managers. To avoid outbreaks, use resistant varieties of Kentucky bluegrass, or lessen the severity of outbreaks through cultural practices.

Core aeration or solid tine aeration in spring or fall will encourage deep rooting, which improves the chance of turfgrass survival and recovery. Relieving summer stress through proper irrigation, implementing a balanced nitrogen fertilizer program, and maintaining mowing heights to at least 2.5 inches will reduce demands on the root system and help diminish the likelihood of turf decline during hot, dry conditions.

Fungicides should be considered only if other options have been thoroughly exhausted, and then should be contracted through custom spray applicators.

For other Turfgrass Disease Profiles, visit [www.agry.purdue.edu/turf/publicat.htm#BP](http://www.agry.purdue.edu/turf/publicat.htm#BP).

*All photos by Richard Latin.*

