



# Turfgrass Disease Profiles

## Necrotic Ring Spot

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Necrotic ring spot is caused by a root-infecting fungus (*Leptosphaeria korrae*), that affects Kentucky bluegrass and annual bluegrass on golf courses, sports turf, professional landscapes, and home lawns. Although it is not often a devastating disease that kills large areas or turf, moderate to severe outbreaks will disturb the appearance of the turf stand and may adversely affect playing surfaces (Fig. 1). Golf greens with mixed annual bluegrass and creeping bentgrass assume a blotchy or mosaic appearance as a result of necrotic ring spot development. Necrotic ring spot often is considered a disease of relatively young (3 – 10 years) turfgrass stands, but disease development in older turf (30+ years) also is not unusual.



Figure 1



Figure 2

### Disease Characteristics

Initial outbreaks of the disease normally occur during cool wet weather in spring or fall months. Symptoms first appear as small (6" – 8" in diameter) clustered patches of gray-tan colored turf (Fig. 2). Because it is a root disease, initial above ground symptoms include die-back from the leaf tips followed by collapse of the leaf and decline of the entire plant. Infected roots appear stunted and necrotic when compared to healthy roots (Fig. 3). Microscopic inspection of affected roots will reveal the presence of numerous runner hyphae (Fig. 4). Over several years, patches enlarge and turf that was not killed at the initial outbreak site will recover, giving the affected turf what is known as a 'frog eye' symptom (Fig. 5).

The pathogen survives as mycelium in dead and decaying root tissues. It is spread with the transport of soil with infected roots, primarily through maintenance operations such as core aeration. Infection occurs during cool (60 – 75°F) wet periods in spring and fall months. However, symptoms may continue to be expressed during summer months, as plants with infection-impaired root systems suffer drought stress. The expression of necrotic ring spot symptoms in summer often leads to confusion of this disease with summer patch.



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**

## Disease Control

### Resistance to Disease

There appear to be a few Kentucky bluegrass varieties that have moderate resistance to necrotic ring spot. Consequently, it is advised to locate those varieties or use another turfgrass species, such as perennial ryegrass (*Lolium perenne*) for over-seeding damaged areas in the fall. The Kentucky bluegrass varieties America, Majestic, and Midnight are among several with moderate resistance to the disease. A complete list of Kentucky bluegrass varieties with their relative susceptibility to necrotic ring spot is available from the National Turfgrass Evaluation Program (NTEP) at [www.ntep.org](http://www.ntep.org).

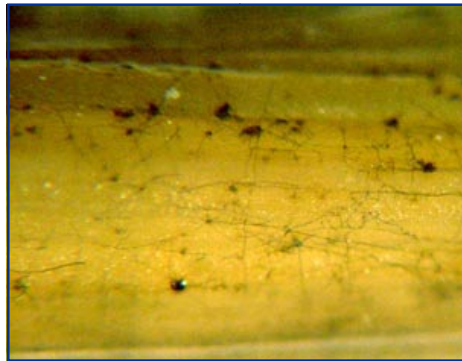


Figure 4



Figure 5

increase the number and variety of competing microorganisms in the root zone should contribute to a suppression of pathogen activity.

### Chemical Control Options

Effective chemical control of necrotic ring spot involves timely application of systemic fungicides in spring. Preferred fungicides include thiophanate-methyl (Cleary's 3336F<sup>®</sup> and Fungo Flo<sup>®</sup>) and DMI fungicides such as propiconazole (BannerMaxx<sup>®</sup>) and fenarimol (Rubigan<sup>®</sup>). Sprays should be applied when environmental conditions favor pathogen activity in the soil, i.e. when soil temperatures at the 3" depth average 60 - 70°F. Since fungicides need to reach the roots in order to be effective, practices that facilitate delivery of the fungicide to the root zone may result in improved fungicide performance.

These include irrigation before and after fungicide application and aeration prior to the fungicide application.

### Home Lawn Help

Managing necrotic ring spot in the home lawn is not much different from the approach taken by professional turf managers. Emphasis is placed on avoiding outbreaks through the use of resistant varieties of Kentucky bluegrass, or lessening the severity of the outbreak through cultural practices. Core aeration or deep tine aeration in spring or fall will encourage deep rooting, improving the chance of turfgrass survival and recovery. Relieving summer stress through irrigating properly, implementing a balanced nitrogen fertilizer program, and raising mowing heights to 3" will reduce demands on the root system and help diminish the likelihood of turf decline during hot dry conditions. Fungicide application should be considered only if other options have been thoroughly exhausted, and then should be contracted through custom spray applicators.

### Cultural Practices to Suppress Disease

Cultural control practices are targeted towards minimizing 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 are designed to 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 the use of deep and infrequent irrigation and/or syringing as part of a program to reduce the effects of summer stress on infected turf.

### Biological Control Applications

There are no published data that report the effectiveness of specific biological control applications against necrotic ring spot. However, as with other root diseases of turfgrass, applications or practices that