Controlling Necrotic Ring Spot
Cool Season Grasses

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Introduction
Necrotic ring spot (NRS), *Ophiосphaerella korrae* (formerly *Leptosphaeria korrae*) is a disease that resembles small fairy rings in lawns when it reaches the advanced stages (Figure 1). NRS is often confused with several other patch diseases and regularly misdiagnosed as Fusarium patch, *Magnaporthe poae*.

NRS was discovered when a fungicide was unsuccessfully used to treat Fusarium blight, which is a common cool-season lawn disease. When the scientists studied the problem, they discovered NRS was causing the patches instead of Fusarium.

Necrotic ring spot is found in many regions throughout the United States, but especially in the Pacific Northwest, the Great Basin, and northeastern and north central parts of the United States.

It affects a number of different turfgrass species but is particularly destructive to Kentucky bluegrass (*Poa pratensis* L.). Other cool-season grasses prone to the disease include creeping red fescue (*Festuca rubra*), annual bluegrass (*Poa annua*), creeping bent grass (*Agrotis palustris*), Chewings fescue (*Festuca rubra* var. *communata*) and perennial ryegrass (*Lolium perenne*).

Symptoms
Symptoms of NRS appear as individual circular patches of dead or dying lawn during cool, wet weather. At the primary stages of infection, the grass turns a light green color. As the infection progresses, small patches of the grass
turn reddish brown, and then gradually to a straw color. The infected area of grass then becomes a sunken patch and may range in size from 2 inches to 3 inches, to 2 feet to 6 feet in diameter.

As the infected area moves from the center outward, tufts of healthy green grass grows in the middle, creating a small circle of dead grass (Figure 2). In the advance stages of infection, the roots and rhizomes of the turfgrass turn brown, then black. When this occurs, the infected leaves are easily lifted from the soil. At this stage the disease takes-on a doughnut-shaped appearance (Figure 3).

![Fig. 2. Early stages of infection of Necrotic Ring Spot on Kentucky bluegrass (Photo courtesy of Bill Carlos).](image)

At this phase as it grows it is confused with other common turf diseases, summer or yellow patch, Fursarium patch and fairy ring.  

**Disease Cycle**

Necrotic rings spot is most common during wet cool weather in spring and fall. It develops when temperatures are 60 degrees Fahrenheit, but becomes inactive at 88 degrees Fahrenheit. However, heat and drought conditions intensify symptoms such as sunken dead rings of grass.

NRS survives within infected grass leaves, roots and stems as microscopic, over wintering compact fungal tissue called sclerotia. In early spring the sclerotia germinate and produce fungal threads called mycelia. The mycelia infect and kill the crowns and roots of the grass by colonizing the plant tissue.

**Conditions for the Disease**

The disease becomes more aggressive and more noticeable in 3-year-old to 5-year-old-stands of grass. This happens because their young root systems are shallow and too weak to defend against infection especially when sod is laid on hard compacted soil. Also, when the grass is frequently fertilized with high-nitrogen fertilizers, such as ammonium sulfate 20-0-0 and ammonium nitrate 34-0-0, the succulent blades of the grass become prone to attack. In addition, when a lawn is drought stressed and diseased, the symptoms become more noticeable.

In other parts of the country, serious outbreaks of the disease have been recorded during April and May. In northern Nevada, our cooler and unstable spring weather conditions may favor the disease as early as late February or March.
How it Spreads
The disease is spread several ways.
- Spores maybe transported by free flowing irrigation water.
- Core aerating infected turf without treatment.
- Power-raking (dethatching).
- Planting infected sod in other parts of the yard.

How to Prevent the Disease
Prevention is your first line of defense against necrotic ring spot. Listed below are several ways to reduce infection.
- Maintain a 2-inch or greater mowing height.
- Avoid drought stress. Keep the soil moist but not too wet or dry.
- Core-aerate non-infected lawns to relieve soil compaction. This will allow roots to penetrate through the thatch layer. Roots will grow deep and become less prone to drought.
- Sterilize tools and mechanical equipment with a mild solution of bleach and water that have been used in infected lawns.
- Reduce foot traffic in infected turf to stop the spread of the disease.
- Apply frequent low rates of fertilizer (half the recommend rate).
- In early spring or fall use slow-release forms of fertilizers, such as sulfur-coated urea or Isobutylidene Diurea (IBDU).
- Use only half the recommended rate (1/2 lb of actual nitrogen /1000 square feet of lawn) of fast-release fertilizers like ammonium sulfate and ammonium nitrate.
- When over seeding infected areas of the lawn in the spring or fall, choose resistant cultivars of Kentucky bluegrass such as, ‘Classic’, ‘Eclipse’, ‘Majestic’, ‘Merion’, ‘Midnight’ and ‘Mystic’.

Chemical Treatment
After core aerifying the lawn, treat the infected area with a fungicide. Aerifying improves the effectiveness of the chemical. Apply the appropriate fungicide when soil temperatures reach 60 degrees Fahrenheit in the spring. (Visit our Web site at www.unce.unr.edu/western for soil temperatures and Click on “Water Like the Pros.”). Continue to apply fungicides at the recommended rates until summer.

When applying a fungicide, mix an adequate volume of water with the fungicide to wet the soil and root zone thoroughly. If this is not done, the fungicide may not reach the infected area, minimizing its effectiveness. Additionally, apply the material when the grass is wet and the soil is moist to a depth of 4 inches to 6 inches. The fungicide needs to reach a soil depth of 3 inches to be effective.

Apply fungicides at 30-day intervals and alternate fungicides (the active ingredients) to decrease pesticide disease resistance. Read the pesticide label and follow the recommended application rates before applying any pesticide.

Active ingredients found in many fungicides that are used to control necrotic ring spot include:
- Azoxystrobin
- Cyproconazole
- Fenarimol
- Iprodione
- Myclobutanil
- Propiconazole
- Thiophanate methyl
Summary

Necrotic ring spot can be controlled with proper preventive measures and cultural and chemical practices. However, because NRS exhibits field symptoms of other lawn diseases, have it identified first before applying a fungicide. Call your local University of Nevada Cooperative Extension office for assistance.

References:


Use or nonuse of chemical names does not imply product endorsement by University of Nevada Cooperative Extension.