DISEASES

Necrotic ring spot in turfgrass no. 2.900

by L. Pickett Pottorff [1]

Quick Facts...

Necrotic ring spot (NRS) is one of several patch diseases caused by the fungus Leptosphaeria korrae.

NRS often appears as scattered small, circular light green to straw-colored patches.

To diagnose NRS, examine root and crown tissues.

NRS occurs most commonly when wet weather is followed by hot, dry periods.

Core aerate lawns once a year (spring or fall) to help reduce thatch build up and improve soil condition.

Introduction

Necrotic ring spot (NRS), caused by the fungus *Leptosphaeria korrae*, is one of several patch diseases that affect turf in the United States. For many years a patch disease causing circular to serpentine necrotic patterns in turf was believed to be caused by *Fusarium* fungi and hence, the name "Fusarium Blight Syndrome" evolved. Current research shows that *Fusarium* fungi are not the cause of this disease. The "Fusarium Blight"/ "Fusarium Blight Syndrome" is known to consist of at least two separate patch diseases, summer patch cause by the fungus *Magnaporthe poae* and necrotic ring spot caused by *Leptosphaeria korrae*.

Figure 1: Often tufts of apparently healthy grass remain in the center of this circular area of semi-dead grass, producing a "frog eye" pattern.

In Colorado, it is most commonly found that turf with typical patch disease symptoms is infected by the fungus *Leptosphaeria korrae*, the cause of necrotic ring spot (NRS).

Symptoms

In the early stages, symptoms of NRS often appear as small, scattered, circular light green to straw-colored patches. As the symptoms progress, the patches become sunken or crater-like and appear as rings or arcs of dead turf. These arcs range in size from a few inches to 3 feet or more in diameter. Often tufts of apparently healthy grass remain in the center of this circular area of semi-dead grass, producing a "frog eye" pattern (Figure 1). Symptoms of the disease may increase in severity at particular sites and then decrease.

In order to diagnose NRS, examine root and crown tissues. Darkly pigmented (brown or black) fungal threads appear on the surface of the root when viewed through a stereoscope or hand lens. These fungal threads are called ectotrophic mycelium or dark runner hyphae. If "frog eye" symptoms and dark runner hyphae are present, NRS may presumptively be diagnosed. To confirm the presence of NRS, however, send samples to a diagnostic clinic.

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About the Disease

The pathogen responsible for NRS survives year to year as mycelium (fungal threads) in dead plant debris, in the thatch layer, and in infected plant parts. NRS most commonly occurs when wet weather is followed by hot dry periods. Symptoms of the disease on Kentucky bluegrass appear under cool, moist conditions, so it is common to see NRS from mid-spring through late fall. The fungus is most active when temperatures are between 50 and 70 degrees F.

Kentucky bluegrass is the primary host of NRS but the disease also affects annual bluegrass, red fescue and Bermudagrass. (The disease is called Spring Dead Spot when Bermudagrass is the host.)

Environmental stresses, such as heat and lack of moisture, may weaken the host and make it more susceptible to the disease. Turfgrass may be more susceptible to infection when stressed for several years in a row. NRS is particularly evident two to three years after sod lawns are established.

In Colorado, NRS is more severe on Kentucky bluegrass that is established from sod on sites without proper soil preparation. The most common problem leading to NRS is laying sod on top of hard, compacted clay soil. The hard soil inhibits root development, enhances thatch build up, and is water-resistant, leaving the grass drought-stressed even though it is watered frequently. Proper site preparation before sodding a lawn may seem expensive at the time but results in a healthier, more pleasing lawn with overall lower maintenance costs.

Control

*As with most turf diseases, NRS is principally a disease of stressed turf. Research at Colorado State University shows that the disease can be controlled by a **combination** of proper cultural practices, which maintain the turfgrass at optimum vigor, and application of fungicide.*

Cultural Control

1. Use resistant varieties when establishing or reestablishing a lawn. The following Kentucky bluegrass varieties show some resistance to NRS: Adelphi, Eclipse, Midnight, Park, Wabash I-13.

2. Core aerate lawn once a year (spring or fall) to help reduce thatch build up and improve soil condition.

3. Mow grass as necessary to maintain a height of 2-1/2 to 3 inches. Make sure mower blades are sharp. Never remove more than one third of the grass blades at a time.

4. Water to a depth of 6 to 8 inches as infrequently as possible without creating water stress. Water in the morning or mid-day so that the surface of the leaf blades dry as fast as possible.

Dense turf with heavy thatch tends to be more prone to infection. Lawns with NRS have had 3-inch thick thatch layers (1/4 inch is normal).

5. Avoid excessive applications of nitrogen fertilizer that induce tender, succulent growth and more susceptible tissue. Apply nitrogen applications according to soil test results or at the rate of 1/2 to 1 pound per 1,000 square feet, four times a year: mid-May, June, September, and two to three weeks before frost. Never apply more than 4 pounds of nitrogen per 1,000 square feet in an entire year. If grass clippings are allowed to lie (not bagged), fertilize three times a year: June, September, and two to three weeks before frost.

6. (Optional) Overseeding with perennial ryegrass (a type of grass that is not susceptible to NRS) may also be done. However, the result may produce patches of perennial ryegrass mixed in with the existing Kentucky bluegrass. Colors and textures of these two grasses are not the same and therefore might result in a non-uniform stand of turf.

Chemical control. The systemic fungicide fenarimol (Rubigan) is effective in controlling NRS when combined with cultural practices (above). Make all applications in the spring or fall for at least two consecutive years at the rate of 2 to 4 ounces per 1,000 square feet. **Note**: Rubigan is a **non**-restricted use fungicide, however it is not marketed for homeowner use.

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