Necrotic ring spot (NRS) is an important fungal disease of bluegrass turf in the Pacific Northwest. Many plantings of Kentucky bluegrass in central and eastern Oregon are severely affected.

Necrotic ring spot occurs most commonly on certain cultivars of Kentucky bluegrass (*Poa pratensis*), especially if followed by red fescue. The disease is common on 2- to 5-year-old Kentucky bluegrass established from sod. Turf established from seed shows symptoms less frequently. NRS also can attack annual bluegrass (*Poa annua*), rough bluegrass (*Poa trivialis*), and red fescue (*Festuca rubra*).

Diseased patches are most active and easily seen in the spring and especially the fall. Symptoms of NRS often are confused with those of other turf diseases. Once the disease is identified correctly, however, there are several options for control of NRS.

**Symptoms**

Symptoms first appear in late spring or in late summer when daytime temperatures cool off to between 75 and 85°F. Initially, small, 3- to 4-inch diameter patches of light green to yellow plants appear during late spring or late summer.

As the disease progresses, plants along the margins of actively expanding patches develop a maroon-brown coloration that fades into a straw color (Figure 1). In areas of heavy thatch, crater-like depressions form when all the plants within the patch collapse and die.

Generally, grasses and weeds recolonize the center of the patch, giving it a ringlike appearance (Figure 2). Over several years, patches and rings may expand up to several feet in diameter. Rings may run together to form large areas.

Since the fungus is inactive during the summer, affected turf may seem to recover. Only to have

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symptoms reappear in the fall. Compacted, shallow, or very sandy soils may predispose plants to summer heat and drought stress, further intensifying symptoms in the fall.

Symptoms may increase in severity over a number of years and then subside after a few more years. Necrotic ring spot can be confused with other fungal diseases, such as yellow patch and fusarium patch. In addition to the symptoms described above, necrotic ring spot-infected plants lift easily from the soil and are characterized by a blackening of the roots and rhizomes.

Microscopic examination of the roots is the best way to confirm the presence of NRS. Several public and private laboratories can perform these tests. Call your county Extension office for information.

Life cycle

The fungus that causes necrotic ring spot, *Leptosphaeria korrae*, is thought to survive within infected plant debris or as microscopic, brown bodies called sclerotia. Thin fungal threads (mycelia) growing along the surface of the roots and crowns spread the disease from plant to plant. The plant tissue under the mycelial threads is invaded and eventually dies. Infected sod or contaminated mechanical equipment may spread the disease to new areas.

Table 1.—NRS-resistant and NRS-susceptible cultivars of Kentucky bluegrass.

<table>
<thead>
<tr>
<th>Resistant Cultivars</th>
<th>Susceptible Cultivars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic</td>
<td>Baron</td>
</tr>
<tr>
<td>Eclipse</td>
<td>Cheri</td>
</tr>
<tr>
<td>Majestic</td>
<td>Columbia</td>
</tr>
<tr>
<td>Merion</td>
<td>Glad</td>
</tr>
<tr>
<td>Midnight</td>
<td>Rom</td>
</tr>
<tr>
<td>Mystic</td>
<td>Sydsport</td>
</tr>
</tbody>
</table>

Conditions that favor disease development include cool temperatures and ample moisture. Symptoms usually do not appear until late summer, however, when heat and moisture stress cause the affected plants to die.

Prevention and control

Cultural control

Turf that consists solely of Kentucky bluegrass seems to have more damage from NRS than mixtures with perennial ryegrass, fine fescues, or resistant cultivars of Kentucky bluegrass (Table 1). A good prevention method is to seed or sod mixtures of turf species whenever possible.

Once your turf is established, it is important to maintain good growing conditions. Although proper turf care will not eliminate necrotic ring spot, it will minimize its severity and allow the turf to recover more rapidly during periods of disease activity.

Fertilizer. Apply fertilizers that provide a balance of nitrogen, phosphorous, and potassium, such as a 20-10-10 formulation. Apply 1 pound of actual nitrogen (i.e., 5 pounds of 20-10-10) per 1,000 square feet every 6 or 8 weeks. Avoid high nitrogen rates and quick-release fertilizers.

Irrigation. During cool weather, most turf in Oregon needs a total of 1–1.5 inches of water per week, applied in one application. During hot weather, apply 1.5–2.5 inches of water per week, split between two applications (Table 2).

Chemical control

Federally approved chemicals are available to supplement your cultural control program. Some chemicals are most effective when used once in the spring before symptoms appear. Consult the Pacific Northwest Plant Disease Control Handbook or contact your Extension office for more information.

Table 2.—Recommended irrigation on normal turfgrass.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Amount to apply when high temperature is &lt;80°F</th>
<th>Frequency</th>
<th>Amount to apply when high temperature is &gt;80°F</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>1&quot;</td>
<td>1 time per week</td>
<td>0.75&quot;</td>
<td>2 times per week</td>
</tr>
<tr>
<td>Loam</td>
<td>1&quot;</td>
<td>1 time per week</td>
<td>1&quot;</td>
<td>2 times per week</td>
</tr>
<tr>
<td>Clay</td>
<td>1.5&quot;</td>
<td>1 time per week</td>
<td>1.25&quot;</td>
<td>2 times per week</td>
</tr>
</tbody>
</table>
Table 3.—Recommended irrigation on NRS-damaged turf.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Amount to apply</th>
<th>Frequency</th>
<th>Amount to apply</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>0.5&quot;</td>
<td>2 times per week</td>
<td>0.5&quot;</td>
<td>3–4 times per week</td>
</tr>
<tr>
<td>Loam</td>
<td>0.5&quot;</td>
<td>2 times per week</td>
<td>0.5&quot;</td>
<td>3–4 times per week</td>
</tr>
<tr>
<td>Clay</td>
<td>0.75&quot;</td>
<td>2 times per week</td>
<td>0.75&quot;</td>
<td>3–4 times per week</td>
</tr>
</tbody>
</table>

county office of the OSU Extension Service for the most current information on registered products.

Renovating affected areas

It is best to revive NRS-damaged turf by applying 0.5–0.75 inches of water two to four times per week (Table 3). The goal is to keep the soil moist but not wet.

Overseeding affected areas with perennial ryegrass and/or hard fescue may alleviate the disease situation. However, overseeding with perennial ryegrass may result in increased problems with snow mold, a potentially serious foliar disease of turf. Successful overseeding depends on extensive renovation or the use of a slicer-seeder to seed the recommended rate of 3–5 pounds of seed per 1,000 sq ft. Seeding at a higher rate is not detrimental, but it is more expensive.

Overseeding with NRS-resistant cultivars of Kentucky bluegrass is possible, but is more difficult because of the slow germination rate of Kentucky bluegrass.

Sulfur applications are not effective in controlling necrotic ring spot. However, a balanced fertilizer that includes sulfur, such as 20-10-10-10, can help turf recover.

Severely damaged turf may require complete renovation.

For more information


Use pesticides safely!

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the pesticide label—even if you’ve used the pesticide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.
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