

# Necrotic Ring Spot of Lawn

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## Introduction

Necrotic ring spot, caused by the fungus *Ophiosphaerella korrae* (formerly *Leptosphaeria korrae*), resembles small fairy rings commonly found in lawns. It was first described in 1986 in Wisconsin as a spring and fall disease. Since then, it has been detected in the Pacific Northwest, Great Basin, northeast and north central United States.

The disease infects many species of turf grasses but is most destructive to Kentucky bluegrass (*Poa Pratensis*), creeping red fescue (*Festuca rubra*) and annual bluegrass (*Poa annua*). Other lawn species susceptible to the disease include: creeping bent grass (*Agrotis palustris*), Bermudagrass (*Cynodon dactylon*), Chewing's fescue (*Festuca rubra* var. *communtata*) and perennial ryegrass (*Lolium perenne*).

## Disease Cycle

The fungus causing Necrotic ring spot survives unfavorable conditions or winter time as microscopic sclerotia and/or mycelia in infected tissue or plant debris. When conditions are favorable or during early spring, the sclerotia germinate and produce infectious mycelia growing into the crowns and roots of the grass. Infected grass is killed as the fungus intensively

colonizes the plant tissue. Spores and sclerotia develop on infected plant parts. Dead or affected area expands as the infection spreads from plant to plant.

## Symptoms and Development

Necrotic ring spot is one of root-and-crown diseases. It favors cool and wet conditions. Typical symptom of the disease is characterized as circular patches of dead or dying grasses. During initial infection, a small number of grass plants show light green color. As infection proceeds, more plants are affected and begin to show a small patch of reddish brown or ultimately straw color. Infected plants die quickly and collapse showing sunken patches (Fig.1). The size of patch ranges from two inches to six feet in diameter. As the fungus moves from central dead area to the edge of the patch to invade more healthy plants, grasses in the center may resume growth and survive the infection, showing a ring-like appearance (Fig. 2). Because of this, the disease can be confused with other diseases such as yellow patch, *Fusarium* patch, and even fairy ring diseases.



Fig 1. Early stage of necrotic ring spot showing necrotic dead patch in the lawn (Photo by William Carlos).

The disease is active during cool and wet weather because the fungal growth is stimulated by cool and wet conditions. The optimum temperature for the fungal growth is 20-28°C. When the temperature reaches below 10°C or above 30°C, the fungal growth is inhibited. Because of this, the disease occurs in spring and autumn. During the summer, symptoms of necrotic ring spot may less frequent to occur and existing patches may fade to some extent as the fungal activities are inhibited by hot temperature. However, heat and drought stress may increase the chance of reoccurrence of this disease in the summer. In other parts of the country, severe outbreaks of the disease during April and May have been documented, but in the Northern Nevada, it may occur earlier due to cooler and unstable spring weather conditions.



Fig. 2. Advanced stage of necrotic ring spot showing a dead ring in the lawn (Photo by William Carlos).

The disease also favors three to five-year-old stands of grass. This may be due to shallow and weak root systems. It has also been documented, that when the turf is heavily fertilized, particularly with nitrogen, and drought stressed, the symptoms are more noticeable and the pathogen becomes more active and aggressive. In natural conditions, the disease can be spread by the movement of water or soil that contains the pathogen. Long-distance transmission of the disease can be caused by using infected sod. Regular lawn maintenance practices such as core aeration, vertical mowing and power raking for de-thatching can also spread the disease to non-infected areas.

### Diagnosis

Necrotic ring spot can be spotted by the circular patches of infected turf during cool and wet seasons. In the Northern Nevada, it is more noticeable in the spring and fall. Although other diseases may have similar foliar symptoms and timing of occurrence, necrotic ring spot can be suspected by presence

of blackening necrosis on roots and rhizomes. Further diagnosis can be made through microscopic examination to reveal dark brown ectotrophic hyphae on dying roots, rhizomes or crowns. Presence of black fruiting bodies of the fungus on dead or dying tissues will provide conclusive evidence to the diagnosis.

### **Management**

Prevention is the first strategy to manage necrotic ring spot disease in the lawn. To establish a new lawn or to renovate an existing lawn, select varieties resistant to the disease. For example, varieties of bluegrass such as; 'Classic', 'Eclipse', 'Majestic', 'Merion', 'Midnight', and 'Mystic' are believed to be resistant to the disease.

Sterilization of tools or mechanical equipment that has been used in the infected lawn prevents further spreading of the disease to non-infected areas. Human activities on patched areas should be avoided or reduced to minimize the risky of contamination of the fungus throughout the lawn.

Proper cultural practices are important to maintain a healthy lawn and prevent the necrotic ring spot disease. Watering is always an important issue in lawn disease management. Proper watering reduces drought stress and therefore reduces the chance of necrotic ring spot. When mowing a lawn, a two-inch mowing height is recommended. Core aeration of the lawn is critical to improve water penetration and relieve soil

compaction. Nitrogen fertilizer should be applied frequently at low rates or in slow release forms such as sulfur coated urea or Isobutylidene Diurea (IBDU) in early spring or fall. This prevents flushes of succulent growth that may be prone to the disease.

When fungicide treatment becomes necessary to control the disease, begin treating infected areas when soil temperatures reach 16°C (approximately 60°F) in spring (Visit [www.extension.-unr.edu](http://www.extension.-unr.edu) for soil temperatures, then click on "Water Like the Pros", then the weather station illustration), and continue until summer. Use an adequate volume of water to wet the soil and root zone during the application of a fungicide. Always follow the label of the product.

Many fungicides contain active ingredients such as Azoxystrobin, Cyproconazole, Fenarimol, Iprodione, Myclobutanil, Propiconazole, and Thiophanate methyl, which have been reported to be effective on necrotic ring spot. When using any of the fungicides, apply the product when the leaves are wet and when the soil is moist to a depth of 4 to 6 inches. It may be necessary to irrigate the grass before the application. Fungicides should be applied to a soil depth of at least three inches in depth. In addition, core aerifying the lawn before applying a fungicide will improve the penetration and distribution of the fungicide in the soil. Re-apply a fungicide at 30-day intervals. To avoid occurrence of resistance of the fungus to certain active ingredients, always alternate

fungicides with different active ingredients.

**Reference**

Couch, H.B. 2000. The Turfgrass Disease Handbook. Krieger Pub. Co. Malabar, Fl.

Bauer, M.E., and Pscheidt, J.W. 1995. Necrotic Ring Spot on Turf in Oregon. EC 1462. Oregon State University Cooperative Extension.

Gilstrap, D.M. 2003. A Historical Look at Home Lawns Diseases. Part II. 72<sup>nd</sup> Annual Michigan Turfgrass Conference Proceedings. Department of Crops and Soil Sciences. Michigan State University.

Hsiang, T. F., Chen, F., and Goodwin P.H. 2003. Detection and Phylogenetic Analysis of Mating Type Genes of *Ophiosphaerella korrae*.

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81:307-315

Thompson, S.V., Ockey, S.C. 1998. Summer Patch and Necrotic Ring Spot on Turf: No. 40. Utah State Department of Biology: Plant Pathology. Utah State Cooperative Extension.

Pottorff, L.P. 2004. Necrotic Ring Spot in Turfgrass. No.2.900. Colorado State University Cooperative Extension.

Smiley, R. W. Dernoedin, P.H. and Clarke, B. B. 1992. Compendium of Turfgrass Diseases. Second edition. APS Press, St Paul, MN.

Wong, F., Harivandi, M.A., Hartin, J. and Grebus, M.E. 2003. UC IPM Pest Management Guideline :Turfgrass. UC ANR publication 3365-T-Disease.

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