Neurotic about Necrotic Ring Spot?

By Tom Hsiang

Necrotic Ring Spot is a serious disease of Kentucky bluegrass (*Poa pratensis*). This disease was generally referred to as Fusarium Blight prior to the 1980's. At that time, several different diseases were grouped under the name Fusarium Blight, and what they shared in common was a “frog-eye” symptom (Fig. 1) or a dead patch symptom (Fig. 2), as well the occurrence of *Fusarium* fungi on the dead leaf blades. Many species of *Fusarium* grow on dead tissues, and they are easy to find on yellowed or dead leaf blades. What was not known at that time was that many fungi causing frog-eye symptoms attack the roots, and hence searching for fungal spores or fungal hyphae on leaf blades would not reveal their presence. Other diseases that were formerly included in Fusarium Blight complex included take-all patch on creeping bentgrass and summer patch on annual bluegrass/Poa. These two diseases, plus the newer disease, bentgrass dead spot, are all caused by fungi that are closely related to the Necrotic Ring Spot fungus: they all primarily attack roots, and the symptoms and fungal hyphae may look similar.

The fungus causing Necrotic Ring Spot was first isolated from Bermudagrass and named *Leptosphaeria korrae* in 1972 by researchers in Australia (Walker and Smith 1972). In the mid-1980's, researchers in Wisconsin (Worf et al. 1986) found this fungus attacking Kentucky bluegrass and named the disease necrotic ring spot. Other researchers in Washington (Chastagner et al. 1984), New York (Smiley et al. 1984), Rhode Island (Jackson 1984) and other areas also found this disease and isolated the necrotic ring spot fungus. In 1989, Canadian mycologists renamed the fungus *Ophiosphaerella korrae* (Shoemaker & Babcock 1989). Many researchers have accepted this second name as the correct one, but *Leptosphaeria korrae* is also still commonly used. In 1989, the presence of this fungus was confirmed in British Columbia (MacDonald 1990), as the first report in Canada. In 1991, the fungus was positively identified in Ontario causing Necrotic Ring Spot (Hsiang et al. 1992).

One of the reasons that this disease became more prominent in the early 1980's was because of the use of improved Kentucky bluegrass varieties. Prior to the 1960's, the most important disease of Kentucky bluegrass was leaf spot/melting out, and the symptoms were so severe that other diseases such as Necrotic Ring Spot may have gone unnoticed. After the release of Kentucky bluegrass cultivars with resistance to leaf spot/melting out, Necrotic Ring Spot became noticeable, and was found to cause widespread damage in many locations across North America. Another factor that may have increased the incidence of Necrotic Ring Spot was the building boom that occurred in the 1980's and 1990's where houses were built very quickly with very little attention paid to ensuring proper soil conditions for lawns.

The major host of Necrotic Ring Spot is Kentucky bluegrass, but this disease is known to occur on fine fescues (Smiley et al. 2005) and annual bluegrass/Poa (Landschoot 1996). This fungus also can cause diseases on warm season grasses such as spring dead spot on Bermudagrass. The conditions associated with severe outbreaks of disease including the following: compacted soils, frequent irrigation, heavy thatch, and conditions which impair root growth.

The symptoms of this disease are dead rings (Fig. 1) or arcs or dead circular patches (Fig. 2) up to 1 m across (more frequently less than 30 cm across). The leaf blades just outside the dead zone may be purplish indicating plant stress. The inner zone may be colonized by weeds, or become a sunken patch where the thatch is degraded and the dead grass overgrown by algae. Patches are perennial and can occur in the same location for
several years, enlarging slowly. The disease is most prominent during the summer when there is drought stress. Other symptoms of this disease include thin dark threads on the root surface called runner hyphae (Fig. 3).

Figure 1. Frog-eye symptom where a brown ring contains a green centre. Many different diseases can cause a dead ring symptom, but this was caused by Necrotic Ring Spot on Kentucky bluegrass.

Figure 2. Dead patch caused by Necrotic Ring Spot on Kentucky bluegrass.
Although the fungus is most active in the spring, with a second round of infection in the fall, the disease is not seen until the roots are under water stress, and often the disease is not seen until at least a year after initial infection. The life cycle of this organism is as follows:

**SPRING:** spores or mycelium in thatch/root zone infect roots, symptoms appear 12 to 18 months later

**SUMMER:** summer heat & dry conditions stop fungal growth, but dead rings more prominent with drought stress

**FALL:** cool and moist conditions allow fungus to resume growth and infect more turf roots

**WINTER:** fungus survives in roots and lower crowns, and on dead plant tissues

Control recommendations for this disease include the following: encourage deep rooting; promote growth in spring & fall but reduce summer succulence; overseed or resod with resistant cultivars; and control thatch to promote vigor. There are no fungicides registered for the control of Necrotic Ring Spot in Canada, but several are registered in the U.S. including Eagle, Banner MAXX, Senator and Rovral. For details on fungicide efficacy, please see GreenMaster 41(2):38-44. Because Necrotic Ring Spot is a root disease, the fungicide needs to be drenched into the soil before
it dries on the foliage. A common practice is to overseed the dead areas with perennial ryegrass, which is not susceptible to this disease. There is also some research which indicates that some Kentucky bluegrass cultivars have less susceptibility to this disease, but none have been found with full resistance (Hsiang & Chastagner 1997).

References


