



Deciphering Helminthosporium Diseases

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What Are Helminthosporium Diseases?

Most of the serious leaf-spotting fungi belong to a group collectively termed the Helminthosporium diseases. The word "Helminthosporium" is rooted in Greek and is translated to mean "worm spore". Anyone who has looked at the spores of these fungi under a microscope will quickly notice that they closely resemble fat, segmented worms (Figure 1). These diseases are so named because all of the pathogens used to be classified in the genus *Helminthosporium* before being split out into two different genera, *Bipolaris* and *Drechslera*. Because of similarities in symptoms and overlap in periods of occurrence, there is often a great deal of confusion when trying to determine which Helminthosporium disease is active on your course. Compounding this confusion is the fact that there are numerous species of fungi with spores that have only subtle morphological difference causing these diseases. There are over twenty species of *Drechslera* and *Bipolaris* that cause damage to warm and cool season turfgrasses. (Couch, 1995, Smiley et al., 1992, Smith et al., 1989). I will cover the symptoms and control of the five most devastating Helminthosporium diseases in Wisconsin.

Melting-Out of Kentucky Bluegrass

The first report and description of melting-out of Kentucky bluegrass in the United States was made by Dr. Charles Drechsler (a distinguished 1914 graduate of the UW-Madison, Department of Plant Pathology and USDA scientist for whom the genus *Drechslera* was

named) from collections in Wisconsin and seven other states (Drechsler, 1922; 1930). The disease is incited by *Drechslera poae* and is most severe on Kentucky bluegrass and other bluegrass species (see table below). During cool, wet weather, this disease is characterized by dark purple lesions that often have a light brown or bleached center as they expand. The pathogen often colonizes the entire leaf sheath, girdling the blade and causing it to wither. The girdled leaves fall off the plant and give the turf stand a thin or bare appearance (Figure 2). During periods of warmer weather in the early summer, plants colonized by the pathogen develop a crown and root rot. Melting-out is a well studied disease, and many factors that enhance disease development have been identified and used as models for other Helminthosporium diseases. Environmental conditions and agronomic practices that increase disease severity include low clipping height, shade, and high

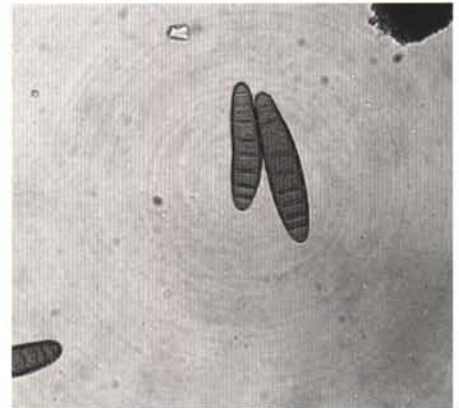


Figure 1. Worm-like spores of *Bipolaris sorokiniana*.



Figure 2. Two Kentucky bluegrass breeding plots severely diseased by melting-out.

Five Important Helminthosporium Diseases and Their Turfgrass Hosts

Disease	Kentucky Bluegrass	Annual Bluegrass	Creeping Bentgrass	Colonial Bentgrass	Velvet Bentgrass	Perennial Ryegrass	Annual Ryegrass	Tall Fescue	Fine Fescue
Melting-Out	••	••				•	•	•	
Drechslera Leaf Blight	•		••	••	••	•		•	•
Helminthosporium Blight	•				•	•	••	••	••
Helminthosporium Leaf Spot	••	••	••	••	••	•	•	••	••
Red Leaf Spot			••	••	••				
	•• Severe Damage • Minimal Damage								

nitrogen fertilization (Lukens, 1970). Studies of the production and spread of *D. poae* spores has revealed that the primary source of inoculum for new incidents of disease is colonized leaf litter and that the production and dispersal of spores begins around the time of new leaf initiation in the spring and peaks in the month of May (Hagan and Larsen, 1985). Additionally, spore dispersal was dramatically increased on days in which the turf area was disturbed by the process of mowing (Nutter et al., 1982).

Drechslera Leaf Blight of Bentgrass

Drechslera leaf blight of bentgrass is caused by *Drechslera catenaria*. This pathogen causes reddish tan lesions or bands on creeping bentgrass and colonial bentgrass leaves during cool, wet

weather. On closely mown bentgrass, individual lesions may be difficult to see without the use of a hand lens. The colonized leaves die back from tip and gradually become necrotic (Spilker and Larsen, 1985). As the weather becomes warmer in the late spring and early summer, the pathogen progresses to the base of the plant where it causes the crown to rot (Larsen et al., 1981). Affected areas have a red to brown colored blight and may resemble the symptoms of red leaf spot of bentgrass described below.

Helminthosporium Blight of Fescue, Ryegrass, and Bluegrass

Helminthosporium blight is most common on tall fescue and fine fescue species in Wisconsin. The causal agent of the disease is *Drechslera dictyoides*, which is a

cool, wet weather leaf-spotting fungus. On tall fescue, individual lesions are first noticed as dark brown bars that form perpendicular to the midvein of the leaf. These lesions usually coalesce with longitudinal streaks of necrotic tissue giving the affected area a net-like appearance. Individual lesions on fine fescue species are irregular shaped, brown spots that often girdle the leaf. These girdled leaves turn yellow and die back from the tip. During warmer weather, areas of red fescue up to three feet in diameter may rapidly turn yellow, resembling patch diseases caused by other pathogens (Couch, 1995).

Helminthosporium Leaf Spot of Cool Season Turfgrasses

Helminthosporium leaf spot incited by *Bipolaris sorokiniana*

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Figure 3. Helminthosporium leaf spot lesions on Kentucky bluegrass leaves.

is a major warm, wet weather disease of most cool season grasses. On taller cut grasses such as those found in golf course roughs, symptoms of the disease are seen as dark purple lesions with tan or white centers resembling those of melting-out. Contrary from melting out, the leaf spotting phase of Helminthosporium leaf spot occurs during the warm weather of late spring through early fall, and *B. sorokiniana* is less likely to infect and colonize the leaf sheath (Figure 3). On bentgrass greens, the disease looks like irregular areas of purpling grasses up to a few feet across. The centers of these patches quickly turn yellow to brown and the margins will retain the purple color resembling a "smoke ring". *B. sorokiniana* produces extracellular enzymes that break down cellulose and pectin, the main constituents of the cell walls of plants. Therefore, blighted plants are often matted down and slimy to the touch. Because of similarity in symptoms and time of occurrence, Helminthosporium leaf spot on bentgrass greens is often misdiagnosed as Pythium blight or Rhizoctonia blight (Couch, 1995).

Red Leaf Spot of Bentgrass

Red leaf spot incited by *Drechslera erythrospila* is a warm, wet season disease that is exclusive to bentgrass species. Symptoms of the disease are dark red to brown

lesions that may have a straw colored center. The turf stand appears to have a red colored sheen which progresses to brown and then tan (Couch, 1995). The individual lesions may be hard to detect on bentgrasses mown at putting green height, so examination of plants in the apron of the green may be needed to detect leaf spot symptoms of the disease. Also, when healthy plants have a layer of dew in the morning, dew is absent from plants affected by this pathogen.

Control of Helminthosporium Diseases

There is a lot of information for turfgrass pathologists to digest when considering all of the subtle differences between the symptoms and timing of the Helminthosporium diseases. Luckily, because these fungi are taxonomically closely related, there are several important characteristics that all of the Helminthosporium diseases have in common that allows golf course superintendents to treat them as one single group of pathogens. New outbreaks of all of these diseases are initiated through seed transmission of the pathogen or from colonized turfgrass crowns and leaf debris in

established turf stands. All of the Helminthosporium pathogens produce foliar leaf spots or blighting during either cool, wet or warm, wet weather. Additionally, a very important aspect that all of the pathogens have in common is their ability to cause crown and root rots (effectively killing the plant) during the summer months. Other things that enhance disease severity are high humidity, close mowing, and nitrogen applications.

Cultural control methods that will help minimize disease intensity include reducing humidity by improving drainage, air movement, irrigation practices, and light intensity. Also, raising mowing heights and maintaining sharp mower blades in problem areas is recommended when feasible. Applications of fertilizers that are high in readily available nitrogen should be avoided prior to and during conditions favorable for disease development. If fertilizer must be applied during weather conducive for disease, applications should either be split into two applications, contain a high proportion of slow release forms of nitrogen, or be followed by a preventative fungicide application.

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Probably the best news for golf course superintendents is that all of the *Helminthosporium* diseases are controlled by the same fungicides. There are thirteen fungicides that are currently labeled for the control of *Drechslera* and *Bipolaris* species, of which iprodione, vinclozolin, and mancozeb have consistently been proven to be very efficacious. If you have any questions regarding *Helminthosporium* diseases or the efficacy of other fungicides in controlling them, please do not hesitate contacting the Turfgrass Diagnostic Lab.

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