

Growth and Pathogenicity of *Ophiosphaerella agrostis* and Epidemiology of Bentgrass Dead Spot, a New Pathogen and Disease of Creeping Bentgrass

Peter H. Dernoeden
University of Maryland

Objectives:

1. Determine the cardinal temperatures for growth of *O. agrostis* and describe morphological characteristics of the fungus *in vitro*.
2. Determine temperatures required for reactivation of the pathogen and bentgrass dead spot (BDS) in winter dormant plugs with inactive disease symptoms.
3. Develop a technique to produce fruiting bodies and spores *in vitro* (i.e., pseudothecia and ascospores, respectively).
4. Evaluate factors that promote ascospore germination.

Start Date: 2001

Project Duration: 3 years

Total Funding: \$87,000

Creeping bentgrass is a widely used turfgrass species on golf course putting greens throughout the United States. Bentgrass dead spot (BDS) is a relatively new disease of creeping bentgrass which is incited by *Ophiosphaerella agrostis*. This investigation is focusing on the epidemiology of the BDS in the field and collecting molecular data to differentiate genetic diversity among *O. agrostis* isolates and among other *Ophiosphaerella* species.

The primary research objectives are: 1) to determine environmental conditions that are necessary for infection and development of disease symptoms; 2) to determine the hourly release of ascospores in the field and subsequent secondary infections and pseudothecia production; 3) to determine how the pathogen overwinters; 4) to examine genetic diversity of *O. agrostis* isolates



During the early stage of bentgrass dead spot development, new spots appear reddish-brown or bronze. As diseased spots increase in diameter, the periphery of active spots maintains a reddish-brown appearance, while dead tissue in the center appears tan.

from several turfgrass species grown in various regions in the United States; and 5) to develop a species-specific oligonucleotide amplification primer to detect the presence *O. agrostis* in creeping bentgrass plants and seed.

Initial BDS symptoms appear between mid-May and early June. Environmental factors suggest that the appearance of new infection centers occurs two to four days following periods of extended leaf wetness duration and average air temperature between 18 and 27 C. Infection was greatest between late June and early August, but no new infection centers appeared after early October.



Location of creeping bentgrass and bermudagrass greens confirmed to be infected by *Ophiosphaerella agrostis* in the United States between 1998 and 2002.

Major ascospore release events (>200 ascospores per hour) generally occurred at dawn and dusk and during rain events or periods of extended leaf wetness. When the disease is active, *O. agrostis* can be found in leaves, sheaths, crowns, stolons, and roots. During the winter



Unlike other turfgrass pathogens within the genus *Ophiosphaerella*, *O. agrostis* commonly produces flask shaped fruiting bodies known as pseudothecia on necrotic leaf, sheath and stolon tissue.

months, the pathogen was most commonly isolated from creeping bentgrass crowns, stolons and roots and from overwintering pseudothecia. Genetic diversity and development of molecular primers currently are being investigated.

Summary Points

- Initial BDS symptoms appear between mid-May and early June and was greatest between late June and early August, but no new infection centers appeared after early October.
- The pathogen rapidly produces prodigious number of ascospores, which germinate in large numbers in the presence of leaves or roots within a few hours.
- Ascospores are the primary source of inoculum for secondary spread of the pathogen and they are dispersed by wind and water.
- During the winter months, the pathogen was most commonly isolated from creeping bentgrass crowns, stolons and roots and from overwintering pseudothecia.