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

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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 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: 2 years
Total Funding: $54,000

In 1999, a new disease of creeping bentgrass was discovered. The pathogen represented a new species, *Ophiosphaerella agrostis*, and the disease was named bentgrass dead spot (BDS). Bentgrass dead spot is largely restricted to relatively young putting greens on new golf courses or where methyl bromide was used for renovating older greens. There is no information regarding the biology of *0. agrostis* or the epidemiology of bentgrass dead spot. The first phase of this BDS project was to study biological aspects of *O. agrostis*.

Ophiosphaerella agrostis can grow at temperature ranging from 10 to 35 C (50 and 95 F), but optimum growth occurs equally at 25 and 30 C (77 and 86 F). The pathogen generally can be presumptively identified on potato dextrose agar based on its distinctive rose-quartz colony color, however, one isolate produced gray to olive green-colored mycelium. Growth and infection of the pathogen, and resulting reactivation of the disease, occurred in 12 to 23 days following incubation of winter dormant diseased plugs at temperatures ranging between 20 and 30 C (68 and 86 F). The disease did not reactivate at lower (15 C; 59 F) or higher (35 C; 95 F) temperature extremes.

Pseudothecia containing mature ascospores were produced *in vitro* on a tall fescue-wheat bran medium in constant light within 23 days. Pseudothecia were not produced in darkness or in diurnal ambient light. Ascospores begin germinating in as little as two hours in the presence of light. Within four hours of incubation, most rapid germination occurred in light and in the presence of bentgrass leaves or roots. Large percentages of ascospores, however, germinated in darkness in the absence of leaves and roots after 18 hours of incubation.

Ascospores are the primary source of inoculurn for secondary spread of the pathogen and they are dispersed by wind and water. These studies have shown that the pathogen rapidly produces prodigious number of ascospores which germinate in large numbers in the presence of leaves or roots within a few hours.

Optimum growth of the pathogen and reactivation of the disease occurred at a simlar temperature range (20 -25 C; 68 - 77 F). This information provides basic biological information about *0. agrostis*. When combined with field data, these findings will provide valuable insights into the nature of the disease and will be used to develop a BDS disease cycle.

Dr. Peter Dernoeden (center) and his co-workers are conducting experiments to elucidate the temperature requirements and epidemiological faqctors for Ophiosphaerella agrostis *the causal organism of bentgrass dead spot .*

Summary Points

- 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 inoculurn for secondary spread of the pathogen and they are dispersed by wind and water.
- Optimum growth of the pathogen and reactivation of the disease occurred at a simlar temperature range (20 -25 C; 68 - 77 F).