

The Basic Biology and Etiology of Sclerotinia homoeocarpa, the Causal Agent of Dollar Spot

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Objectives:

1. Examine the development, including possible apothetical production, of the pathogen in creeping bentgrass greens and fairways when present in leaf or root tissue or as isolated stroma and to determine the length of survival of the pathogen in infected tissue or as stroma.
2. Measure the genotypic variation of the pathogen from similar and diverse geographical locations using RAPD analysis and anastomosis groupings.

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Project Duration: 3 years

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Dollar spot is one of the most damaging diseases of golf course greens over many areas of the United States. About 560,000 acres of golf course turf are treated each year in the U.S. to control this disease. However, unless the basic biology of the pathogen is understood, management tools necessary to control the disease are difficult to develop. An understanding of the life cycle of the organism will frequently reveal vulnerable stage(s) that can be targeted more economically than strategies directed toward total destruction of the fungus.

The first objective was to examine the development, including possible apothetical production, of the pathogen in creeping bentgrass greens when present in leaf or root tissue, or as isolated stroma, and to determine the length of survival of the pathogen in infected tissue or as stroma. Our data suggest that the basic biology of *Sclerotinia homoeocarpa*, including the form in which it exists when it is not causing disease, is not known. Further, there may be at least two stages of the life cycle: one is a slow-growing quiescent phase and the other is a pathogenic and aggressive phase. However, even the quiescent phase could not be detected in sites where the pathogen killed turf.

We have not determined where it survives or the form that it is in. Preliminary observational data indicated that the dollar spot lesion itself does not contain living hyphae, but rather that the pathogen is located outside of the lesion. An understanding of this life cycle should provide



Dollar spot is a common disease found on bentgrass putting greens and fairways.

new capabilities of controlling the pathogen, including intercepting the pathogen before significant disease occurs as a consequence of secondary infection.

The second objective was to measure the genotypic variation of the pathogen from similar and diverse geographical locations using RAPD analysis and anastomosis groupings. A collection was made that contains a range of isolates from different areas and different hosts. This collection has been sorted to indicate differences in genetic diversity.

There is a substantial level of genetic heterogeneity in the strain collection. Resistance to pesticides appears to differ substantially between strains. It may be that variability exists in the resistance to fungicides and that continued application results in selection of resistant phenotypes.

Studies on the relationship between genetic diversity and pathogenicity to different cultivars of bentgrass are underway. Differences in pathogenicity must be understood in order for control programs,

ranging from resistant varieties to chemical or biological control, to be optimally successful. Our first data suggest that aggressiveness of isolates differ between bentgrass cultivars. If so, then the native diversity within *Sclerotinia homoeocarpa* isolates must be considered in breeding or other efforts to develop disease-resistant bentgrass.

Summary Points

- The basic biology of the disease still is not known (i.e., unable to determine where it survives or the form).
- There are at least two stages of the life cycle: one is a slow-growing quiescent phase and the other is a pathogenic and aggressive phase; however, the quiescent phase could not be detected in sites where the pathogen killed turf.
- The dollar spot lesion itself does not contain living hyphae, but rather that the pathogen is located outside of the lesion.
- Genotypic variation of the pathogen from similar and diverse geographical locations was determined using RAPD analysis and anastomosis grouping.
- Resistance to fungicides appears to differ substantially between strains.