Bentgrass Dead Spot: A Review of an Emerging Disease

By Steve Abler and Dr. Geunhwa Jung, *Turfgrass Diagnostic Lab, Department of Plant Pathology, University of Wisconsin-Madison*

Bentgrass Dead Spot

Bentgrass Dead Spot (BDS) was first described from golf course putting green samples in Maryland, Virginia, and Ohio in the fall of 1998, and was found in ten additional states in 1999 and 2000 (Dernoeden, 1999; Kaminski and Dernoeden, 2002a). Although the disease has been reported in Illinois and Michigan, there have been no reports of BDS in Wisconsin. It is reasonable to assume that this disease is already present in Wisconsin and is being underdiagnosed because of its novelty to golf course superintendents and that symptoms of BDS are similar to Sclerotinia dollar spot, take-all patch, copper spot, Microdochium patch, black cutworm damage, and ball mark damage. A TDL site visit was made to an East Central Wisconsin golf course with symptoms similar to BDS in September 2003. Unfortunately, the cause of the patches could not be verified because the symptoms had already started to recover and the green had recently been verticut and topdressed (Figure 1).

Figure 1. Depressed patches of a suspected BDS case on a Wisconsin golf course putting green (Photo by Dr. Seog-won Chang).

The Pathogen

BDS is incited by the newly described fungus *Ophiosphaerella agrostis* (Câmara et al., 1999). Other turfgrass diseases that are caused by *Ophiosphaerella* species include necrotic ring spot (*O. korrae*) and spring dead spot of bermudagrass (*O. korrae, O. herpotricha,* and *O. namari*). Unlike the aforementioned root and crown-infecting pathogens, *O. agrostis* mainly infects and colonizes leaf, sheath, and stolon tissue. Additionally, O. agrostis is the only species in the genus that is virulent to bentgrasses, and has been implicated in causing a new disease of bermudagrass (bermudagrass dead spot) as well (Krausz et al., 2001).

BDS Symptoms

In the Midwest, symptoms of BDS generally appear from July to October and are first noticed as small, reddish-brown spots that are approximately 0.5 to 1 inch in diameter. These spots are often depressed and resemble ball mark injury. As the disease progresses, the center of the patches become tan or straw colored while the margin of the patches remain reddish-brown. Individual patches may expand to an overall diameter of three to four inches and rarely coalesce. Close examination of diseased leaves with a hand lens often reveals dark-colored, flask-shaped fruiting structures (pseudothecia) of the pathogen (Vaiciunas et al., 2000).

At certain stages of disease development, BDS may be difficult to distinguish from Sclerotinia dollar spot, take-all patch, copper spot, and Microdochium patch. BDS can be differentiated from Sclerotinia dollar spot which has smaller, bleached lesions that coalesce and produce abundant mycelium during humid periods. Also, leaves colonized by *Sclerotinia homoeocarpa* do not exhibit fruiting structures on leaves that are characteristic of BDS. *Gaeumannomyces graminis* var. *avenae*, the causal agent of take-all patch, also produces depressed, bronze-colored patches on bentgrasses that resemble BDS patches when conditions become warm and dry. Patches of take-all patch are generally larger than BDS patches and it is more common to find dark-brown runner hyphae on the roots of bentgrasses colonized by *G. g.* var. *avenae* than *O. agrostis*. Additionally, it is uncommon to find fruiting structures of *G. g.* var. *avenae* on diseased plants whereas they are common on necrotic leaf and sheath tissue colonized by *O.*

agrostis. Copper spot and Microdochium patch are more active during cooler, wetter weather than BDS, and do not have the characteristic fruiting structures on affected leaves.

Favorable Conditions for Disease Development

Conditions that are favorable for BDS symptom expression are periods of dry weather with moderate temperature (75-85°F). BDS symptoms are most severe on exposed greens or portions of greens that are elevated, receive full sun, and have ample air circulation. To date, BDS has only been described from sand based putting greens (at least 80% sand) usually one to four years after establishment or reconstruction, however, the disease has been less frequently documented on greens less than one year, and as old as six years after seeding. The disease is usually most severe the first or second year symptoms are noticed and decline in subsequent years. It is hypothesized that newly constructed and fumigated greens have low microbial populations when compared to established greens or native soil greens. The buildup of organisms that are antagonistic to *O. agrostis* over time may explain the why disease is more prominent on young greens and decrease in severity with the passage of time. A similar decrease in disease severity over time has been demonstrated to occur with take-all patch of bentgrasses (Kaminski and Dernoeden, 2002a). The pathogen overwinters in leaf and stolon tissue as well as the resilient pseudothecia. In the following year, *O. agrostis* resumes growth when the air temperature reaches 68°F and peaks between 77°F and 86°F (Kaminski and Dernoeden, 2002b). BDS is spread by the mechanical movement of colonized plant debris as well as windblown ascospores that are released from mature pseudothecia. There is no evidence to suggest that BDS is seed transmitted (Wetzel and Butler, 2000).

Control of BDS

Cultural control techniques that may help reduce the severity of BDS include maintaining adequate soil moisture when conditions are favorable for disease development and planting resistant cultivars. Kaminski and Dernoeden (2002a) found significant differences in disease susceptibility between fifteen commercially available creeping bentgrass and two velvet bentgrass (Bavaria and SR7200) cultivars. The cultivars from most resistant to most susceptible are: Bavaria, Penncross, Backspin, Crenshaw, Pennlinks, Penn A-2, SR1119, Penn G-1, Providence, Penn G-6, Bardot, Century, Imperial, Penn A-4, L-93, Penn A-1, and SR7200. Several fungicides and combinations of fungicides have proven to provide adequate preventative control of BDS, whereas tank mixes of chlorothalonil + thiophanate methyl and chlorothalonil + iprodione have proven to be the most efficacious for curative applications. Recovery from BDS takes several weeks and patches may not heal before winter, therefore, it is recommended to frequently apply light rates of nitrogen to enhance regrowth of the plants (Wetzel and Butler, 1999; Wetzel and Butler, 2000; Towers et al. 2000).

If you have any questions regarding BDS please contact the TDL at 608-845-2535 or swa@plantpath.wisc.edu. Additionally, if you notice BDS symptoms on your greens, please contact the TDL or send in a sample so we can confirm the presence of this newly discovered pathogen in Wisconsin and begin working with it.

Works Cited

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