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DISEASE MANAGEMENT

Anthracnose Update

Cultural practices affect spread of disease in Northwest

By Paul Backman, Gwen Stahnke and Eric Miltner

Anthracnose basal rot (ABR) is a serious and common disease of annual bluegrass and creeping bentgrass putting greens. Incidence and the severity of ABR outbreaks greatly increased throughout the Midwest, Northeast and the Pacific Northwest in the late 1980s and 1990s.

This highly destructive disease rapidly became one of the most difficult and challenging management issues for many superintendents.

Anthracnose basal rot is caused by the pathogen *Colletotrichum graminicola*. Once established, ABR can quickly destroy the stems, crowns and roots of susceptible turf, compromising plant health, playability and appearance. This disease is highly destructive, difficult to manage and quite variable in symptom development and expression. Anthracnose basal rot development has been associated with nutrient deficiencies, low mowing heights, compaction, poor drainage and wounding caused by aerification and topdressing.

ABR was first confirmed in Washington in 1995. Several years prior to this, researchers noted that following aerification and topdressing, some *Poa* greens would wilt and collapse, but a disease or causal organism was not identified. This wilting typically followed a hot, dry period when the superintendent had been

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Combination of fungicides stems tide in mid-Atlantic

By David Spak

The increasing demand for tournament-level course conditions on a daily basis puts a strain not only on superintendents, but also the greens they're maintaining. The ill effects of the intensive manicuring needed to produce such conditions are no more visible than in the mid-Atlantic region, where basal rot anthracnose, once only a summer stress phenomenon, has become a nearly year-round, annual problem on courses.

Basal rot and foliar blight are the two dominant biotypes of anthracnose, a fungal disease first reported on greens in the United Kingdom in the 1950s. Principally a disease of *Poa annua* and creeping bentgrass greens, basal rot is the more prolific and widespread of the two and has begun appearing in March through November on *Poa* greens in the mid-Atlantic.

Early basal-rot infections have done the most damage on older mid-Atlantic courses. Henry Wetzel, superintendent at St. David's GC in Wayne, Pa., has encountered basal-rot anthracnose problems on his 76-year-old greens since the mid-1980s.

"These are old *Poa* greens built in 1926," Wetzel says. "Back in 1985, we had our first problem with basal rot, and we've been battling it ever since."

Difficult diagnosis

Basal rot infections in *Poa annua* first appear during cooler, moist weather conditions,

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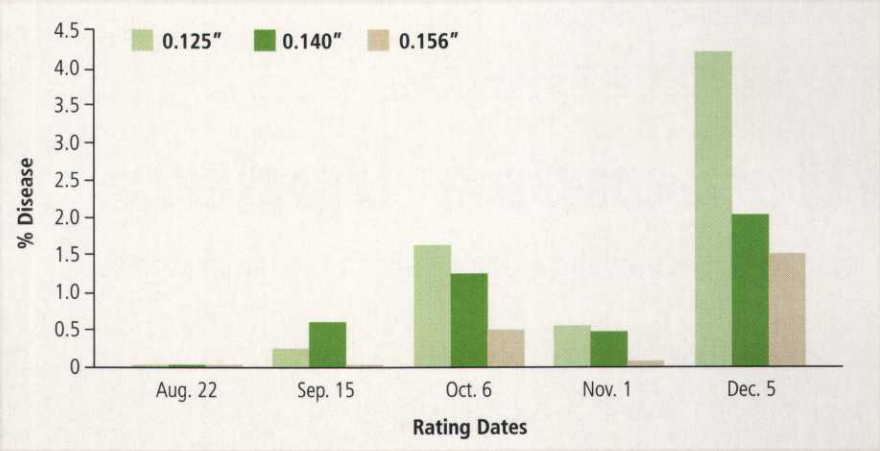
FIGURE 1

Effects of three mowing heights on anthracnose basal rot severity



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spoon-feeding the greens with minimal fertility. In recent years, some superintendents have shifted their fall aerification practices several weeks earlier in the season to promote quicker healing.

Light brushing has also been used in these cases instead of dragging the sand into the surface. Dragging with a heavy mat opens up more wounds on turfgrass plants where infection can occur. When azoxystrobin became available to superintendents nearly five years ago, it provided exceptional control of ABR when it was used preventatively. However, there have been reports of possible anthracnose resistance to azoxystrobin after several years of use in the Pacific Northwest.

West of the Cascades

In the Pacific Northwest, west of the Cascade Mountains, the greens on older, established golf courses are predominantly annual bluegrass. The newly constructed golf courses are almost all planted with newer cultivars of creeping bentgrass.

The annual bluegrass greens are usually more susceptible to anthracnose infection than the creeping bentgrass greens. However, in early summer 2002, when temperatures were 85 degrees to 95 degrees Fahrenheit for several days, there were some cases of anthracnose infection on creeping bentgrass. Certain cultural practices, such as verticutting and heavy sand topdressing, may have increased the severity of anthracnose infection.

Due to increased frequency of irrigation, the anthracnose infection on the leaves moved into the crowns of the plants. Aerification, overseeding and fungicides were used to stop the spread of the fungus and speed recovery.

If ABR does occur, early and correct diagnosis is essential for management. On newly infected annual bluegrass plants, a dark brown to black color appears in the crown. Then the foliage begins to turn yellow, initiating at the tips of the outer, oldest leaves first. Then it progresses to the sheath.

Turfgrass suffering from these symptoms form mottled or irregular patterns, roughly 1 to 12 inches in diameter. Those patches often affect large areas.

ABR symptoms are most severe when the turfgrass is experiencing physiological stress, particularly if the stress occurs when the weather conditions are optimal for infection.

Stress can result from a wide range of factors, including nutrient deficiencies, low mowing heights, compaction, poor drainage, wounding caused by aerification and topdressing, or shade.

Research goals

The research discussed in this article was designed to minimize the occurrence of basal or crown rot through cultural practices. The objectives of this study were threefold:

- to evaluate how mowing heights and nitrogen fertility predispose annual bluegrass to ABR and determine how the same cultural factors help annual bluegrass recuperate from ABR damage;
- to document the environmental factors that contribute to ABR outbreaks in the Pacific Northwest; and
- to develop an effective ABR management strategy for superintendents, based on sound cultural practices.

At the Washington State University-Puyallup Turfgrass Research Facility, a 4,800-square foot annual bluegrass putting green was established using hollow-tine aeration cores acquired from putting greens at local golf courses.

Mowing heights of .125 inch, .141 inch and .156 inch were established. Each mowing height was fertilized at three different nitrogen rates: 3 pounds, 5 pounds and 7 pounds of nitrogen per 1,000 square feet per year.

In 1998, a severe ABR outbreak occurred in early September as a result of prolonged hot summer conditions, which required frequent irrigation. It was after symptoms developed that the mowing height and nitrogen treatments were put in place. The results of the project clearly showed that the highest mowing height and highest nitrogen rate produced the best turf quality and significantly increased the turf's recuperative ability from ABR.

In 1999 and 2000, mowing heights and nitrogen treatments were in place prior to the appearance of ABR symptoms. Again, the plots that were mowed the highest rate and received the most nitrogen produced the highest quality ratings and the least amount of ABR symptoms.

The poorest quality plots exhibiting the most ABR were those that were maintained at the lowest mowing height and received the lowest nitrogen rate.

In the Pacific Northwest, ABR can occur in spring, summer, fall or winter. Over the duration of this study, heat stress in the summer was the most critical environmental condition leading to ABR. Hot, dry summers can lead to severe symptoms in the summer or earlier symptom development in the fall. Mild summers lead to symptom development in late fall or winter.

To summarize the impacts of management practices on ABR:

- Mowing heights and fertilization intensity have a significant impact on the quality and health of annual bluegrass putting turf.
- Healthy turfgrass is more resistant to ABR outbreaks.
- Prolonged heat stress predisposes annual bluegrass to severe ABR outbreaks.
- Lower mowing heights and lower nitrogen rates increase annual bluegrass' susceptibility to ABR.
- Once an ABR outbreak has occurred on annual bluegrass, fungicides are not effective at eliminating the symptoms.

This project showed that raising the mowing heights and increasing the nitrogen levels could reduce ABR symptoms that are already present in the turf stand.

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