Under Pressure: Diagnosing and Managing Turfgrass Anthracnose

By Dr. Jim Kerns, *Department of Pathology, University of Wisconsin - Madison*

Turfgrass anthracnose is a devastating disease of creeping bentgrass and especially annual bluegrass. However, turfgrasses are not the only plants that are affected by anthracnose diseases. Matter of fact anthracnose as a word, is a symptom characterized by a dark, sunken lesion. Anthracnose is a devastating disease of strawberries, sorghum, corn, and many other fruits and vegetables. In strawberries, when the anthracnose pathogens are detected the crop is immediately destroyed! So imagine have 100 or 200 acres of strawberries and having to till the crop under because of a mild outbreak of anthracnose! The point is, anthracnose is a scary disease for turfgrass professionals as well as agronomic professionals.

Turfgrass anthracnose is caused by *Colletotrichum cereale* (formally *C. graminicola*) and is also a pathogen of sorghum. So why did the name change? With recent advances in molecular biology, researchers at Rugters University determined that the turfgrass anthracnose pathogen was more closely related to the sorghum anthracnose pathogen (*C. cereale*) than to the corn anthracnose pathogen (*C. graminicola*). There are two types of turfgrass anthracnose: foliar anthracnose and basal rot anthracnose. The latter is the phase of the disease that terrifies turfgrass managers. A question that always comes up is-what comes first, the foliar or basal rot?? Well essentially this is like asking what came first the chicken or the egg. What we are really concerned with is accurately diagnosing turfgrass anthracnose and managing the disease. However, in my opinion I think the pathogen infects the leaf first, then as the plants are subjected to stress the pathogen migrates to the crown. Again that is my opinion and may be wrong.

So back to the two types of turfgrass anthracnose, it's really not important to know if you have foliar or basal rot anthracnose because they are induced by the same organism. Both phases of the disease are destructive and controlled with the same chemicals and cultural practices. Symptoms of anthracnose during warm weather initially appear reddish brown or yellow and the turf thins out in irregularly shaped patterns (Figure 1). Affected areas may exceed several feet in diameter or more and stand symptoms may develop into brown, circular patches that may be confused with brown patch. Before plants die, they turn bright yellow or orange yellow (Figure 2). This phase of anthracnose can be confused with summer patch on annual bluegrass. Plant symptoms for anthracnose include oblong reddish, brown lesions (Figure 3). Leaf lesions may or may not be present when stand symptoms are observed. Crowns may be water-soaked, rotted and

Figure 1. Stand symptoms of anthracnose of an annual bluegrass fairway. Note the irregularity of the symptom and that creeping bentgrass is surviving.

Figure 2. Close-up of stand symptoms of anthracnose basal rot of annual bluegrass putting green. Note the orange tint of the affected plants.

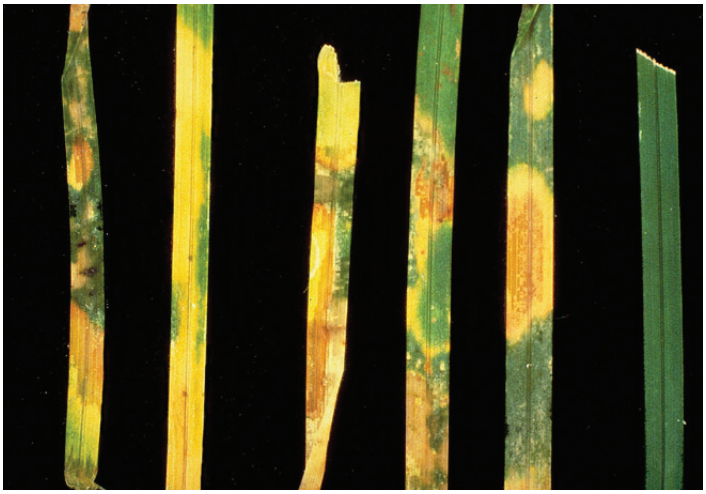

Figure 3. Anthracnose foliar blight symptoms on Kentucky bluegrass, note that the lesions are also an orange tint.

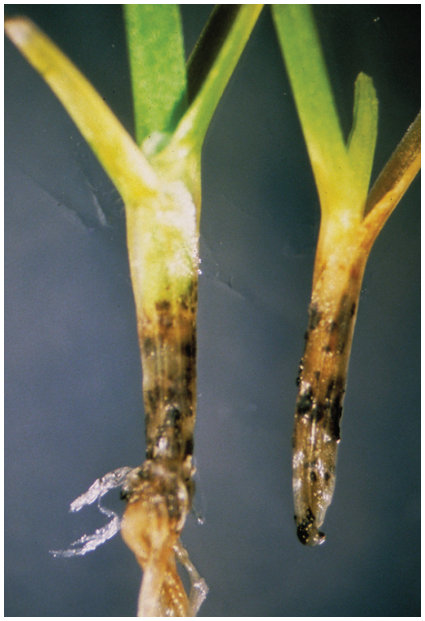

Figure 4. Plant symptoms of anthracnose basal rot on annual bluegrass. Note the necrosis and water-soaking of the crown and the acervuli populating the necrotic or water-soaked areas

blackened. If you have a microscope you will observe the pathogen's fruiting body (acervuli) on rotted crowns, leaves, or stems (Figure 4). Acervuli are saucer shaped structures with spikes (setae) emanating from the structure's surface

One note of caution with examining declining turfgrass under a microscope, acervuli are commonly found on turf that is healthy and completely dead. The key is observing the acervuli with the appropriate stand and plant symptoms described above. Another word of caution, many other fungi associate themselves with the anthracnose pathogen. If you are unsure if anthracnose is inducing a decline in your turf stand, please submit a sample to the TDL. Misdiagnosing anthracnose can lead to severe losses in turf.

What are the conditions that favor development of turfgrass anthracnose on annual bluegrass and creeping bentgrass? In annual bluegrass stands, anthracnose can develop throughout the year. Yet, the vast majority of disease development occurs during the summer months when the plants are subjected heat and drought stress. Anthracnose typically only develops on creeping bentgrass when plants are subjected extreme heat and drought stress. For us in Wisconsin, we are concerned with anthracnose on annual bluegrass. If anthracnose develops on creeping bentgrass then good luck! Just kidding, anthracnose on creeping bentgrass can be difficult to manage, but not impossible.

Anthracnose is a stress induced disease. Therefore low mowing heights and extreme temperatures are usually required for disease development. Anthracnose is more severe when nitrogen levels are low. Symptoms initially appear on upland areas that prone to moisture stress. Extremely abrasive cultural procedures such heavy topdressing and dragging may also predispose turfgrasses to anthracnose. Finally disease development is favored by compacted soils and soils that drain poorly. The bottom line with anthracnose is, any stress may predispose your turf to infection by the anthracnose pathogen.

Management of Anthracnose:

The remainder of this article will focus on best management practices of anthracnose and I will rely heavily on the article published in Golf Course Management (August 2008) by Murphy et al. If you have not read this article and you deal with anthracnose, READ this article! I will summarize the major points in this section of the article.

For annual bluegrass stands, applications of Signature (4 oz/M), Daconil Ultrex (3.2 oz/M), Alude (6 fl oz/M), or combinations of Signature (4 oz/M) and Daconil Ultrex (3.2 oz/M) or Alude (6 fl oz/M) and Daconil Ultrex (3.2 oz/M) work very well. For creeping bentgrass anthracnose epidemics, tank mixing

Signature (4 oz/M) and Daconil Ultrex (3.2 oz/M) work very well for limiting anthracnose development. If you are trying to target more diseases with an anthracnose application, DMI's such as Banner Maxx, Tourney, and Triton FLO are also effective for anthracnose control. Consult the label for these chemicals for the appropriate rates. However, be congnizant of growth regulating effects of the DMI's if they are applied during the summer. When anthracnose is a persistent disease problem, preventative applications are recommended-even though the benzimidazoles, DMI's and QoI chemistries have excellent curative activity. Furthermore, curative applications may facilitate the development of fungicide resistance.

I understand that I have skimmed over chemical control of anthracnose, but for good reason. What is very interesting about the article published in GCM, is the use of cultural practices to control anthracnose. While writing this article, I was in Thailand with Dr. Soldat speaking on sustainable management of golf courses in Southeast Asia. The climate there is perfect for growing warm-season grasses, but there are times of the year that disease can develop. During our trip we visited Dr. Micah Woods' (director of the Asian Turfgrass Center) research area and saw that diseases can be effectively managed with good, aggressive cultural management. I know the area does not receive a lot of traffic, but still he has never applied a fungicide to the property!

Please do not misinterpret the statement above. I understand full well that chemicals are effective and many times necessary for controlling turfgrass diseases. My point is to get you to think about modifying your cultural practices or try new things in an effort to limit fungicide applications. So my final paragraphs will summarize the cultural practices that affect anthracnose development.

First, if you attended the spring business meeting you remember that I talked about nitrogen fertility. Well the GCM article shows that light, frequent applications (every 7 d at 0.1 lbs N/M/) of foliar applied nitrogen help alleviate the anthracnose symptoms. The authors also mention that applications of N every 14 d increased fungicide efficacy for control of anthracnose. It is noted in the article that 3 lbs N/M/year with a greater proportion applied in the fall seemed to reduce anthracnose development on annual bluegrass fairways. More work is still needed in this area however.

Chemical growth regulators such as Embark, Proxy and Primo do not intensify anthracnose severity and occasionally they may slightly reduce anthracnose severity. Combining light, frequent nitrogen applications with seedhead suppressors such as Embark or Proxy have been shown to significantly reduce anthracnose development.

For those turfgrass managers that have a chronic anthracnose problem, raising the mowing height ever so slightly (0.015 inches) can decrease disease severity. If raising the mowing height is not an option because of an important club event, double-cutting and lightweight rolling do not magnify anthracnose development while maintaining fast putting surfaces. Light frequent applications of sand topdressing at 1 to 2 cubic feet / M quickly and effectively reduced anthracnose severity. Moreover, applications of sand topdressing every 21 or 42 days at a higher rate also provided significant reductions in anthracnose development. During this experiment, the authors also tested the effects different sand incorporation methods and sand particle sizes on disease development. The researchers found that incorporation methods (at least the ones tested in this particular study) did not amplify anthracnose severity. Both sources of sand used in the experiment enhanced anthracnose severity when first applied in July, yet continued topdressing reduced disease severity in August and September of subsequent years.

This is a very basic summary of the article published in GCM and I highly recommend reading this article. However, I am not advocating that you applied these strategies without testing them yourself. If you interested in trying these management techniques, then pick an area of the golf course that has chronic anthracnose problems and tinker with some of the cultural practices described in this article. Understandably the climate and management practices in Wisconsin are different from those in New Jersey and North Carolina; yet when not try a new technique for anthracnose control. Who knows it may just work and your course may save a buck or two while still maintaining good quality playing surfaces!