

## CROWN ROTTING ANTHRACNOSE: FRIEND OR FOE?

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### History

Crown rotting anthracnose (CRA) can be a difficult disease to control on annual bluegrass. Crown rotting anthracnose is caused by the fungus *Colletotrichum graminicola*. J. Drew Smith first reported the disease on annual bluegrass in Britain in 1954. His paper describes diseased annual bluegrass as being “measly and piebald”. With those two words, Smith describes the symptoms perfectly. According to the dictionary, measly means “wretchedly poor” and piebald means “having spots of black and white or other colors”. Plants having CRA are often poor in quality and the symptoms resemble black spots on the crown of the plant. After Smith’s initial report, there was little or no research investigating the disease until the mid 1980’s. In the mid 1980’s several factors combined to bring about conditions conducive for CRA. Conditions that have been shown to be conducive to CRA include: decreased nitrogen levels, decreased mowing heights, and increased sand topdressing frequencies. The initial studies during this time focused on the effects of nitrogen and disease levels, and conditions necessary for infection. Researchers found that causing CRA in controlled experiments was difficult. Several projects had difficulty producing conclusive results. Most of the results seemed to indicate that this disease was induced by plant stress. Recently, researchers have begun to incite disease in the laboratory and this has allowed researchers to study the potential this pathogen has for the biological control of annual bluegrass.

### Symptoms and Disease

Crown rotting anthracnose causes disease when the pathogen infects a root of a plant. The infection generally spreads to the crown region of the plant causing plant death. Plants infected with CRA often appear bronze colored, and the base of the plant is blackened as a result of the infection. Initially CRA was reported to cause disease during the cooler times of year, but we now diagnose CRA all season long. Crown rotting anthracnose is most severe where multiple plant stresses occur. Stresses that have been linked to severe CRA outbreaks include: low nitrogen fertility, drought stress, water logged soils, topdressing injury, aerification injury, and shaded conditions.

### Biological control

The fungus that causes CRA is *Colletotrichum graminicola*. Fungi from the same group of pathogens as *Colletotrichum graminicola* have been studied as possible biological control agents. Some of these agents have been very successful. The characteristic that makes these fungi so attractive as biocontrol agents is the host specificity they possess. *Colletotrichum graminicola* also seems to be host specific. Research at MSU is currently focusing on this area to determine if CRA has potential as a biological control agent. Studying the potential this fungus has as a biological control agent will also allow us to learn more about the disease and the possible avenues of control for it.

### Control

Controlling CRA has been extremely challenging. Foliar anthracnose, a disease caused by the same pathogen, has been relatively easy to control. The differences lie mainly in the site of infection. Foliar anthracnose is a disease of the leaves and shoots. Therefore, applying fungicides to control the disease is relatively simple. Crown rotting anthracnose however, causes disease in the crown and root regions where it is much more difficult to deliver fungicides to the site of infection. The chemicals and rates used for these diseases are also different. Table 1 lists fungicides generally recommended for foliar anthracnose control. Table 2 lists fungicides generally recommended for CRA control. The major difference between the two lists is the volumes of water used to apply the chemicals. The added volumes for controlling CRA is to ensure that the fungicide gets down to the site of infection so that control is possible. This type of practice may contribute to variability in effectiveness due to the variation from how the volume of water is delivered. Another difference in the two lists is the use of the fungicide Heritage for control of CRA. This particular fungicide has performed well in university trials across

the country. Currently, the major setback in the control of CRA is the lack of any reliable methods for timing preventative applications. Preventative applications are important for the control of this disease because after the plant is infected turf loss will occur. Because the crown of the plant is the target site, any plants that are infected will be lost, and future applications will only serve to prevent new infections. Currently we suggest that records of previous outbreaks serve as starting point for your preventative applications.

### Conclusions

Crown rotting anthracnose can be a very difficult disease to control. With good record keeping and timely management strategies, the amount of damage CRA could cause to your turf can be minimized. Continued research into the potential of this disease as a biological control agent will allow us to learn more about how to control the disease wherever it is undesirable and maximize disease when it is being used as a biological control for annual bluegrass.

**Table 1- Fungicides for foliar anthracnose control**

<i>Fungicide</i>	<i>Company</i>	<i>Rate</i>
DMI's	Various	Normal label rates
Benzimidazole's (Clearys 3336, Fluid Fungicide, Systec 1998)	Various	2-4 oz active ingredient/ 1000 sq ft

**Table 2- Fungicides for crown rotting anthracnose control**

<i>Fungicide</i>	<i>Company</i>	<i>Rate</i>
Heritage	Zeneca	0.4oz/1000ft <sup>2</sup>
Benzimidazole's (Clearys 3336, Fluid Fungicide, Systec 1998)	Various	2-4 oz active ingredient drenched with water
Banner	Novartis	2oz/1000ft <sup>2</sup> in 5 gal carrier volume or equivalent
Bayleton	Bayer	2oz/1000ft <sup>2</sup> in 5 gal carrier volume or equivalent