

Developing Best Management Practices for Anthracnose Disease on Annual Bluegrass Putting Green Turf

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Objectives:

1. The multiple objectives of this research were organized into four field studies on annual bluegrass putting green turf that were designed to evaluate the main effect and interactions of : 1) irrigation quantity, 2) lightweight rollers and mowing equipment, 3) topdressing and foot traffic, and 4) nitrogen fertilization on anthracnose disease.

Start Date: 2008

Project Duration: three years

Total Funding: \$90,000

Anthracnose, caused by *Colletotrichum cereale*, is a destructive disease of annual bluegrass putting green turf throughout the United States. The disease begins as small areas of yellowed turf (1 to 2 inches in diameter) with individual leaf blades eventually senescing resulting in an overall thinning of the turf canopy.

The frequency and severity of anthracnose outbreaks on putting greens has increased over the past decade and management practices employed to improve playability and increase ball roll distance on putting greens have been observed to be partly responsible.

Research completed in 2008 generated the following conclusions: 1) deficit irrigation causing wilt stress (e.g., 40% daily ET_0 replacement) increased the severity of anthracnose compared to greater irrigation quantities; 2) both sidewinder and triplex mounted vibratory rolling reduced disease severity compared to non-rolled turf under moderate disease pressure; and 3) sand topdressing reduced disease severity under both foot trafficked and non-trafficked conditions; unexpectedly, foot traffic decreased anthracnose regardless of sand topdressing level.

Previous research indicated that adequate N fertility to sustain moderate growth can reduce anthracnose severity. A study was initiated in 2007 to determine the effect of rate and frequency of summer soluble-N fertilization on anthracnose severity. Disease severity had a negative linear response to increasing amounts of N fertilization within the range of treatments studied. Nitrogen applied at the highest rate (0.1 lb per 1000 ft² every 7 days or 0.2 lb per 1000 ft² every 14 days) had the greatest reduction in anthracnose severity throughout all years. Nitrogen applied at

0.1 lb per 1000 ft² every 14 days was the lowest N treatment to reduce disease severity compared to N fertilization at 0.1 lb per 1000 ft² every 28 or 56 days (greatest anthracnose severity).

A second soluble-N study was initiated in the summer of 2009 to determine the effect of greater soluble-N fertilization rates on anthracnose severity. Early in the season, 0.1 lb per 1000 ft² every 7 days had the greatest anthracnose severity within the range of treatments



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studied. As the season progressed, the N rates of 0.4 and 0.5 lb per 1000 ft² every week resulted in the greatest anthracnose severity. The lowest anthracnose severity during the 2009 season was observed on plots treated with N at 0.2 lb per 1000 ft² every week.

Spring granular-N fertilization reduced disease severity compared to autumn granular-N fertilization on all but the last sampling date (August 26, 2009). The interaction between season and granular-N rate (4 of 7 rating dates) indicated that greater granular-N rates reduced disease severity but only within the spring N-fertilization timing. Summer soluble-N fertilization influenced disease severity throughout most of the summer; N applied at 0.094 lb per 1000 ft² every week had the

greatest reduction in anthracnose severity compared to N fertilizations every 2, 4, and 0 weeks. Plots that received no summer soluble N fertilization had the greatest anthracnose severity.

Summary Points

- Deficit irrigation (40% ET_0) induced wilt stress and intensified anthracnose severity. Irrigation at 80% ET_0 often resulted in the lowest anthracnose severity and best turf quality.

- Lightweight rolling every other day with either roller type (i.e., sidewinder or triplex-mounted vibratory) effectively increased ball-roll distance and decreased anthracnose severity under moderate disease pressure.

- Sand topdressing initially increased anthracnose in 2007; however, continued weekly applications of sand reduced anthracnose severity by August 2007 and throughout 2008 under both foot trafficked and non-trafficked conditions. Moreover, daily foot traffic decreased anthracnose severity regardless of sand topdressing level. The combination of daily foot traffic with weekly sand topdressing resulted in the lowest disease severity and best turf quality in both 2007 and 2008.

- Nitrogen applied every 7 (0.1 lb per 1000 ft²) or 14 days (0.2 lb per 1000 ft²) during the growing season provided the greatest reduction in anthracnose severity; N applied every 14 days at 0.1 lb per 1000 ft² also reduced disease, albeit, to a lesser extent. Nitrogen applied at rates of 0.3 to 0.5 lb per 1000 ft² every 7 days increased anthracnose severity.

- Spring granular-N fertilization decreased anthracnose severity compared to autumn fertilization. Increasing granular-N rate within the spring fertilization timing reduced disease severity but had no effect during the autumn timing. Increased monthly soluble-N rate during the summer also decreased anthracnose severity.