

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: 2006

Project Duration: two years

Total Funding: \$60,000

Anthracnose is a destructive disease of annual bluegrass and bentgrass putting green turf throughout the United States. The disease, caused by the fungus *Colletotrichum cereale*, begins as small areas of yellowed turf (1 to 2 inches in diameter) with individual leaf blades eventually senescing. The frequency and severity of anthracnose outbreaks on golf course putting greens has increased over the past decade perhaps due to practices employed to improve playability and increase ball roll distances on putting greens.

An evaluation of how irrigation management practices influence anthracnose was initiated in 2006. Three consecutive years indicate that deficit irrigation (40% daily ET_0 replacement) generally had the greatest amount of disease compared to plots with higher soil water content. Disease tended to decrease as irrigation increased; that is, 60% ET_0 replacement had less disease than 40% ET_0 , and 80% ET_0 had less disease than 60% ET_0 . Replacing 100% ET_0 daily (excessive soil water) had levels of disease similar to 40% ET_0 treatments in August 2006 and 2008. While this relationship was not observed in 2007, turf quality of 100% ET_0 plots was

greatly reduced by August in all three years of study. Irrigation at 80% ET_0 often resulted in the least disease and best turf quality. An additional study was initiated in 2008 to evaluate the effect of mowing timing relative to daily irrigation at 100% ET_0 . Disease severity was the same regardless of whether irrigation was applied before or after mowing.

A study to follow up on previous work was initiated in 2006 and compared the effect of lightweight roller type on anthracnose. Both roller types (i.e., sidewinder and triplex-mounted vibratory) reduced disease compared to non-rolled turf under moderate disease pressure in 2007 and 2008. The heavier sidewinder roller had less disease than the triplex mounted vibratory roller on 4 of 13 rating dates over two years. Turf areas where rollers changed direction of travel and received a "clean-up" mowing at the edge of a putting green had less disease compared to the area where rollers traversed with no clean-up mowing on 6 of 13 rating dates.

A study was initiated in 2007 to determine the effect of variable rate and frequency of summer soluble N fertility on anthracnose severity. Nitrogen applied at 0.1 lb per 1000 ft^2 every 7 days or 0.2 lb per 1000 ft^2 every 14 days had the greatest reduction in anthracnose severity throughout both years. Nitrogen applied at 0.1 lb per 1000 ft^2 every 14 days was the lowest N treatment to reduce disease severity. Summer soluble N fertilization at 0.1 lb per 1000 ft^2 every 28 or 56 days had the greatest anthracnose severity.

A study was initiated in 2007 to evaluate the effects of sand topdressing and foot traffic

(golf shoes) on anthracnose severity. Sand topdressing initially increased anthracnose in 2007; however, continued weekly applications of sand reduced anthracnose severity by August 2007 and throughout 2008. Sand topdressing reduced anthracnose severity regardless of foot traffic, and foot traffic decreased anthracnose in the presence or absence of sand topdressing. 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.

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.
- Adequate nitrogen fertility to sustain moderate growth was needed to reduce anthracnose severity. Nitrogen applied every 7 (0.1 lb per 1000 ft^2) or 14 days (0.2 lb per 1000 ft^2) provided the greatest reduction in anthracnose severity. Applications every 14 days at 0.1 lb per 1000 ft^2 also reduced disease, but to a lesser extent.
- Sand topdressing initially increased anthracnose in 2007. Continued weekly applications of sand reduced anthracnose severity by August 2007 and throughout 2008. Sand topdressing reduced anthracnose severity regardless of foot traffic. Moreover, daily foot traffic decreased anthracnose severity. 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.



Light frequent sand topdressing buries and protects crowns and leaf sheaths. Note depth of crowns in the middle (1 ft^3 per 1000 ft^2 per week) and right (2 ft^3 per 1000 ft^2 per week) profile samples are deeper than the profile sample on the left (no topdressing).