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

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Objectives:

The objectives of this research were initially organized into four field studies on annual bluegrass (ABG) putting green turf that were designed to evaluate the impact of cultural practices including: 1) nitrogen source, 2) rate of nitrogen fertilization during summer, 3) sand topdressing programming, and 4) mid-season cultivation on anthracnose severity.

Start Date: 2011
Project Duration: 3 years
Total Funding: $60,000

Anthracnose, caused by *Colletotrichum cereale*, is a destructive disease of annual bluegrass putting green turf. The frequency and severity of anthracnose outbreaks on putting greens have been attributed, in part, to management practices employed to improve playability on putting greens. A trial to determine the effect of soluble-N sources on anthracnose severity was initiated in the summer of 2010. Five soluble-N sources (ammonium nitrate, ammonium sulfate, calcium nitrate, potassium nitrate, urea) were applied at 0.1 lb per 1,000 ft^2 every week or biweekly for 12 and 16 weeks in 2010 and 2011, respectively.

Nitrogen applied every week reduced disease severity 9 to 26 % on 7 out of the 9 rating dates in 2010 and 2011 compared to biweekly applications. Interaction data from 2011 indicated that weekly applications of potassium nitrate reduced disease severity compared to all other N sources; whereas, weekly applications of ammonium sulfate increased disease severity. Two additional trials were initiated in 2011 to identify the mechanisms involved with N-source effects. These trials were designed to determine whether potassium nutrition or soil pH have effects on anthracnose severity.

A trial was initiated in 2009 to determine the optimum rate of summer soluble-N fertilization to suppress anthracnose severity and whether excessive rates may enhance disease. N fertilization rates of 0.4 lb per 1,000 ft^2 every 7 days consistently produced the lowest anthracnose severity during the first half of the season.

However, from mid-July to late-August, theses rates enhanced anthracnose severity compared to 0.2 lb per 1,000 ft^2 every 7 days which provided the greatest reduction in disease severity. Over the three year study, a cumulative soluble-N rate of 3.4 to 3.9 lb N per 1,000 ft^2 during the summer (12 weeks) provided the greatest overall reduction in disease severity.

Spring topdressing at 8 ft^3 per 1,000 ft^2 provided the greatest suppression of disease (all dates).

A three-factor trial was initiated in 2010 to determine whether autumn topdressing (medium sand) interacts with the effects of either spring or summer topdressing on anthracnose severity. The first year of data indicated that autumn topdressing at 4 ft^3 per 1,000 ft^2 lessened disease severity on 5 of 12 rating dates, whereas topdressing at 8 ft^3 per1,000 ft^2 provided a greater reduction in disease (10 of 12 dates).

Spring topdressing at 4 ft^3 per 1,000 ft^2 had a stronger and more consistent effect than autumn topdressing, reducing disease severity on 9 of 12 rating dates. Spring topdressing at 8 ft^3 per 1,000 ft^2 provided the greatest suppression of disease (all dates). Biweekly topdressing at either ¼- or ½ ft^3 per 1,000 ft^2 during the summer did not affect anthracnose severity during 2011.

Mechanical injury from cultivation practices during the summer did not influence anthracnose severity. One trial examined the effect of scarification depth (0, 0.05, or 0.3 in) on anthracnose severity and indicated that scarification, regardless of depth, had no effect on the disease. A second trial investigated whether the apparent increase in anthracnose severity observed after verticutting in a previous trial was an artifact of defoliation or was due to an actual increase in disease.

Trials evaluating a fifth objective, the effect of important factors on anthracnose fungicide efficacy, will be initiated in spring of 2012. Potential factors to be investigated in these trials include: N fertility, topdressing, and mowing height. These factors will be combined with fungicide factors such as application timing (calendar vs. threshold applications) and application sequence (rotation vs. limited-rotation strategies) to determine the impact of best management practices on fungicide requirements for the control of anthracnose on annual bluegrass turf.

Summary Points

- Potassium nitrate applications suppressed anthracnose severity compared to all other N sources; whereas, ammonium sulfate applications resulted in the greatest disease severity. Potassium nutrition and soil pH are being investigated as possible mechanisms involved in these N source effects.
- Three years of trial work indicate that a soluble-N rate of 0.2 lb per 1,000 ft^2 every 7 days applied during late spring and summer was optimal for suppressing anthracnose severity. Greater rates of N (0.4 and 0.5 lb per 1,000 ft^2 every 7 days) initially reduced disease severity better than lower rates but resulted in the greatest disease severity by the end of each season.
- Spring topdressing was more effective than autumn topdressing at reducing anthracnose severity. Spring topdressing at 8 ft^3 per 1,000 ft^2 provided the greatest suppression of disease, regardless of autumn topdressing.
- Mechanical injury from verticutting does not appear to increase anthracnose severity. Thus, superintendents should continue to use verticutting to manage surface organic matter accumulation without concern of intensifying the severity of this disease.