

Management of Bacterial Wilt of Creeping Bentgrass caused by *Acidovorax avenae*

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Objectives:

1. *Identify specific pesticides or other plant health promoting materials that can reduce the severity of bacterial wilt symptoms on golf course putting greens.*
2. *Determine the effect of plant growth regulators on the incidence, severity and occurrence of bacterial wilt on golf course putting greens.*
3. *Identify cultural practices that may limit the spread and severity of the disease on golf course putting greens.*

During the 2012 field season, bacterial wilt management trials were established at Saucon Valley Country Club in Bethlehem, PA and Laurel Creek Country Club in Moorestown, NJ. An additional location was sought in Rhode Island or Massachusetts but none of those that were identified had a significant enough population of bentgrass to undertake the trial. Trials were conducted on practice greens with a previous history of the disease. The practice green at Saucon Valley consisted of 100% creeping bentgrass (A1/A4) and the practice green at Laurel Creek was approximately a 50/50 mix of annual bluegrass and creeping bentgrass (multiple varieties).

Applications began in the first two weeks of May and were repeated biweekly, for a total of six separate applications. Twenty different treatments were applied at both locations and included the following products at various rates: Signature, Daconil Action, Daconil Weatherstik, two general fungicide programs for broad spectrum disease control that included Daconil, Floradox Pro, Pro-liff Plus, Primo Maxx, Cutless, Tide Paclo, Agrimycin, Mycoshield and a foliar fertilizer treatment utilizing Precision Labs 20-0-15.

On July 16th, significant levels of etiolation (between 50–70% of each replicated plot) were observed on all of the replicates from a single treatment: where high levels of fertilizer and Primo Maxx were applied simultaneously. In this treatment, Primo was applied at 0.26 fl oz/1000 ft² and the Precision Labs fertilizer was applied at 0.25 lbs N/1000 ft² biweekly. While no other

Figure 1. Etiolation is the elongation and yellowing of turfgrass leaves and shoots. The bentgrass shoot on the left is showing signs of etiolation. Many causes have been implicated and research is needed to determine the cause of these symptoms.



plant growth regulators were applied to this surface, it was fertilized by golf course staff with 0.36 lbs N/1000 ft² in both June and July, in addition to the nitrogen applied during the experiment. Treatment plots containing just Primo

Maxx or the Precision Labs fertilizer at these rates did not result in any bacterial wilt related etiolation. Etiolation was not observed in any of the other treatment plots within the experiment or the control plots. Etiolation was not observed at any other time throughout the experiment. Currently, it is unknown how high levels of nitrogen and Primo interact to result in the disease.

No bacterial wilt related etiolation was observed at the Laurel Creek site. While bacterial wilt was not severe in 2012, it seems likely that practices undertaken at Laurel Creek has a dramatic impact on reducing disease severity. Specifically, the superintendent switched his PGR program from Primo to Cutless, reduced total N (particularly in July, to a rate of 0.1 lb N/1000 ft²), switched away from ammonium based fertilizers, cut every day (even when the course was closed– to prevent scalping) and lowered heights on collars to increase density. In addition, a significant number of trees were removed and air circulation was improved where ever possible. This comprehensive approach to dealing with the disease appears to have been highly effective.

It should also be noted that high levels of ammonium–based nitrogen appears to be important in stimulating the disease. Golf courses that have moved away from these types of fertilizer (and substitute methylene urea, for example) have experienced reduced levels of etiolation and accompanying disease. Many golf courses do use ammonium–based fertilizers for the sole purpose of lowering pH to combat take–all patch and this may contribute to some of the incidence of etiolation and bacterial wilt. In addition, superintendents who applied a DMI based fungicide during disease outbreaks reported seeing substantially

less etiolation for 5–7 days. Both Cutless and paclobutrazole are DMI materials and have been observed to reduce etiolation on golf courses, suggesting that DMI fungicides may have a similar level of activity.

Finally, bacterial wilt on creeping bentgrass appears to reduce the percentage of creeping bentgrass on mixed greens after multiple years of disease. Golf course superintendents that have battled the disease for a number of years report significant reductions in creeping bentgrass coverage with corresponding increases in *Poa annua* coverage.

In future years, this project will incorporate treatments to systematically examine the timing and rate of fertilizer and PRG applications on the incidence and severity of bacterial wilt related etiolation.

Summary Points

- 2012 was a mild year for bacterial wilt of creeping bentgrass in the Northeast and symptoms were observed at only one of the two trial sites.
- Because disease pressure was mild, none of the treatments had a positive effect on reducing disease because none was present in the control treatments.
- High levels of nitrogen plus high levels of Primo Max stimulated bacterial wilt related etiolation.
- Management practices appear to have a significant impact on mitigating disease, in conjunction with careful chemical and fertilizer application.