

2017 Interim Progress Report

Rolling and Resistance: A Means to Reduced Fungicide Usage on Golf Course Greens

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Executive Summary:

A dollar spot management study investigating the combined use of cultural, genetic, and chemical practices was initiated in May, 2016 at the Hancock Turfgrass Research Center on the campus of Michigan State University in East Lansing, MI. In the research trial, two cultivars of creeping bentgrass including a commonly used dollar spot-susceptible cultivar, Penn A1, and a recently released dollar spot-resistant cultivar, Flagstick, were compared. For each cultivar, lightweight rolling conducted once or twice for five days weekly combined with reduced rate fungicide (boscalid) applications at 25% of the label rate on a monthly interval was evaluated for dollar spot incidence, turfgrass quality and playability as measured by greens speed. Dollar spot has been slow to develop in the study site this year, however, differences were observed in yellow tuft and brown patch development.

Update on Current Research Progress:

Research Methodology

To investigate combined management practices for dollar spot reduction, a research study was established in a 2 x 7 split plot design on a creeping bentgrass putting green at the Hancock Turfgrass Research Center, East Lansing, MI. Whole plot factors included two different creeping bentgrass cultivars which were replicated three times and included Penn A1, a commonly used susceptible cultivar, and Flagstick, a newly released, dollar spot resistant cultivar. Seven subplot treatments were established randomly within cultivar whole plots as listed below.

Fungicide applications were made monthly (every 28 days) using a CO₂-powered backpack sprayer with a double-nozzle boom containing two Tee Jet (8002 E) flat fan nozzles at a spray volume of approximately 900 L ha⁻¹. Fungicide applications were made with boscalid (Emerald) at 0.055 g m⁻² (full rate) or 0.014 g m⁻² (25% label rate) on 6/29/17, 7/28/17, and 8/25/17. Rolling treatments were applied 5 days each week beginning on 6/12/17 using a Tru-Turf R52-11T lightweight roller with a 1.3 m width. A single pass (1x) was made rolling from one end of each subplot to the other end. A double pass (2x) was made by rolling down and then immediately back within each subplot. Rolling treatments were applied between 7:00 and 9:00 am each day immediately following morning mowing. Within each Penn A1 and Flagstick replication, seven treatments were tested as listed below.

For each replicate of each creeping bentgrass cultivar (Penn A1 and Flagstick), the following subplot treatments were randomly located and applied:

1. Rolling once per day (single pass, 1x)
2. Rolling twice per day (double pass, 2x)
3. Rolling once per day (1x) with fungicide 0.014 g m⁻² (25% rate monthly)
4. Rolling twice per day (2x) with fungicide 0.014 g m⁻² (25% rate monthly)

5. Fungicide 0.014 g m⁻² (25% rate monthly)
6. Fungicide 0.055 g m⁻² (full rate monthly)
7. Untreated control

General Plot Maintenance

Plots were mowed 5 days weekly at 3 mm using a Toro Greensmaster 1000 walk-behind reel mower. Mowing height was adjusted periodically to alleviate environmental stress on the stand. Plots were lightly topdressed weekly through June, July, and August, 2017. The entire site was treated with carfentrazone-ethyl (Quicksilver) at 0.49 L ha⁻¹ on 7/6/17 for moss, Revolution at 9.54 L ha⁻¹ on 5/19/17, 6/2/17, and 8/1/17 for localized dry spots. On 8/31/17, plots were inoculated with a sand-cornmeal topdressing mixture infested with *Sclerotinia homoeocarpa*, the causal agent of dollar spot, to ensure uniform disease development. Foliar fertilizer was applied as needed, at approximately 4.39 kg N ha⁻¹ weekly.

Data Collection

Assessments for diseases (brown patch and yellow tufts to date) were made on a 0-100% scale by visually estimating the percentage of each plot exhibiting disease symptoms. Turfgrass quality was visually measured using a 1-9 scale, where 6 represents acceptable turfgrass quality, 9 is excellent, and 1 is poor. Turf color ratings, or greenness, were collected using a FieldScout TCM 500 NDVI Turf Color Meter, and turfgrass chlorophyll measurements were collected using a Fieldscout CM 1000 chlorophyll meter. For both NDVI and chlorophyll meter data, the mean of six measurements was used. Greenspeed was assessed weekly using a Pelz meter. Measurements consisted of the average six ball roll measurements, three in opposite directions. Photographs were taken periodically throughout the trial period. NDVI, chlorophyll meter, and pelz meter data were collected weekly beginning the week of 6/14/17. Statistical analysis of data will be made upon completion of data collection. Data analysis will be performed on all data collected using the most appropriate statistical model after analysis of variance tests are confirmed significant.

Current Results

Data tables will be provided in the detailed annual report. Preliminary data suggests that:

- 1.) Brown patch developed in the Penn A-1 plots but not in the Flagstick plots.
- 2.) In Penn A-1, rolled treatments averaged less brown patch than non-rolled treatments.
- 3.) Flagstick treatments exhibited significantly less yellow tufts than Penn A-1 treatments.
- 4.) In Penn A-1 plots, rolled treatments averaged less yellow tufts than non-rolled treatments.