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Effects of winter applied nitrogen, phosphate and potassium rates on Microdochium patch

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Introduction:

Microdochium patch is particularly problematic on golf course putting greens from September through May in the Northwest. Historically, more money is spent on fungicides to combat this disease in the Northwest than any other turfgrass disease. Considering increasing concerns associated with pesticide use the turfgrass industry as a whole is in need of pesticide alternative control practices and strategies.

Research on primary nutrient (N, P and K) ratios have suggested that maintaining the proper balance of the nutrients is critical to disease mitigation. However, research on N, P, and K ratios relevant to annual bluegrass and Microdochium patch is not available. Contrary to traditional recommendations, recent research has also suggested that winter applications of N can improve annual bluegrass playing conditions and disease resistance.

Therefore, the objective of this research is to evaluate the effects of winter applied N, P and K rates on Microdochium patch development within an annual bluegrass putting green in the absence of traditional fungicides.

Materials and Methods:

This field trial began on September 29, 2017. Factors within this experiment included nitrogen rate, phosphorus rate, and potassium rate. Nitrogen (Urea - 46-0-0) rate include 0.10 lbs. N/1,000 ft² and 0.20 lbs. N/1,000 ft². Merchant Grade Phosphoric Acid (0-52-0) rates include an untreated control and 0.025 lbs. P/1,000 ft². Potassium Chloride (0-0-60) rates include an untreated control and 0.10 lbs. K/1,000 sq. ft². Nitrogen, phosphate and potassium rates were developed using N:P:K ratios that reflect tissue sampling data, and standard extension recommendations for putting greens.

Current Applications:

Nitrogen is being applied once per month at a rates of 0.1 or 0.2 lbs. N/1,000 ft² from October 2017 to April 2018 (totaling 0.7 and 1.4 lbs. N/1,000 ft² applied in the winter months). From October to April all treatments are receiving monthly applications of phosphite (Duraphite 12 applied at 3.14 oz/1,000 ft²) and sulfur (Sulfur DF applied at 0.25 lbs. elemental S/1,000 ft²), fungicide alternatives that have shown promising results for control of Microdochium patch. With these rates and intervals of phosphite and sulfur, we would not expect complete control but significant suppression to avoid disease levels from overwhelming plots. Anderson's 28-5-18 + micros fertilizer will be applied biweekly over the entire trial from May until September. Traditional fungicides are being applied to this experiment during the summer to control

anthracnose for the duration of the study. All treatments will be repeated from October 2018 to April 2019, and again from October 2019 to April 2020.

Response Variables:

Turf quality and percent disease severity data is being collected every other week from October to April. Turf quality will be visually assessed using the NTEP rating system; 9 being outstanding or ideal turf and 1 being poorest or dead. A rating of 6 or above is generally considered acceptable. To determine percent disease severity (0-100%) digital images will be collected using an enclosed light box and then analyzed using digital Sigma Scan Pro. Visual percent disease ratings will also be taken every other week.



Image 1: Reps 2 & 3 (November 28th): Annual bluegrass putting green in Corvallis, OR. The field trial began on September 29, 2017 and final data collection for the year will be taken in April 2018. Treatments are being applied monthly.