

Nitrogen, Phosphate, and Potassium Rates Applied Fall thru Spring

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Research on primary nutrient nitrogen, phosphorus and potassium ratios have suggested that maintaining the proper balance of the nutrients is critical to disease mitigation. However, research on nitrogen, phosphorus and potassium ratios relevant to annual bluegrass and *Microdochium* patch is not available. Contrary to traditional recommendations, recent research has also suggested that fall thru spring nitrogen applications can improve annual bluegrass playing conditions and disease resistance, however, *Microdochium* patch will increase if nitrogen rates are too high. The objective of this research is to evaluate the effects of fall thru spring applied nitrogen, phosphorus and potassium rates on *Microdochium* patch development within an annual bluegrass putting green in the absence of traditional fungicides.

Field research was initiated in September 2018 on a sand-based putting green constructed in 2009 at the Lewis-Brown Horticulture Farm, Corvallis, Ore. Experimental design is a $2 \times 2 \times 2$ factorial randomized complete block design with four replications; factors include nitrogen, phosphorus and potassium rates. All of these treatments receive monthly applications of phosphorous acid (Duraphite 12, applied at 3.7 kilograms H_3PO_3 /hectare) and sulfur (Sulfur DF, applied at 12 kilograms sulfur/hectare), both of which are fungicide alternatives that have shown promising results for control of *Microdochium* patch. Traditional fungicides will not be applied to this experiment for the duration of the study, except for summer anthracnose control.

Preliminary observations showed that monthly applications of high rates of nitrogen (9.8 kilograms/hectare) during the winter resulted in the highest percent disease, while low rates (4.9 kilograms/hectare) resulted in the lowest percent disease. Potassium applied at 4.9 kilograms/hectare reduced percent disease when compared with treatments that did not receive potassium. The effect of phosphorus rate and the interactions among nitrogen, phosphorus and potassium were not significant. Findings suggest that fall thru spring applications of nitrogen and potassium at 4.9 kilograms/hectare each can mitigate *Microdochium* patch activity (Table 1).

Table 1. Effects of nitrogen, phosphorus and potassium rates on percent disease over on an annual bluegrass putting green on Feb. 22, 2018 in Corvallis, Ore.

Nitrogen rate [†] (lbs N/1,000ft ²)	% disease cover (0%-100%)
0.10	19.1 a‡
0.20	29.0 b
Phosphorus rate	
(lbs P/1,000ft ²)	
0.0	24.4 ns
0.025	23.7 ns
Potassium rate	
(lbs K/1,000ft ²)	
0.00	27.2 b
0.10	20.9 a

[†]Nitrogen, phosphorus and potassium were applied at the given rates every two weeks beginning in September 2018.

[‡]Means in the same column followed by the same letter are not significantly different.