Effects of soil moisture on dollar spot on golf course putting greens

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OBJECTIVE

To determine how soil moisture affects dollar spot development caused by the fungus *Clarireedia jacksonii* on a creeping bentgrass green.

MATERIALS AND METHODS

The study was conducted at the O. J. Noer Turfgrass Research and Education Facility on a mixed stand of 'Penncross' creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*) maintained at 0.125 inches. Individual plots measured 3 feet by 5 feet and were arranged using a randomized complete block design with four replications. Every weekday morning the volumetric water content of each plot was measured using a TDR 300 (Spectrum Technologies, Aurora, IL). When plots were deemed to be in deficit of the soil moisture target, a calculated amount of water was added back to the plot based on how much of a deficit existed. All treatments were initiated on June 4, 2025. A custom-built rainout shelter was used to exclude all natural rainfall to the best of our ability. Number of dollar spot foci per plot and turfgrass quality (1-9, 9 being excellent, 6 acceptable, and 1 bare soil) were visually assessed every two weeks. Turf quality and disease severity were subjected to an analysis of variance and means were separated using Fisher's LSD (P = 0.05). Results of disease severity and turfgrass quality ratings can be found in Table 1 and 2, respectively. Area under the disease progress curve (AUDPC) and area under the turf quality curve (AUTQC) were calculated using the trapezoidal method and summarize the whole season disease severity and turf quality, and are included in tables 1 and 2, respectively.

RESULTS AND DISCUSSION

Dollar spot pressure was high throughout the study. The high soil moisture treatment did have the most dollar spot on most rating dates, but it was never statistically different than the other two treatments. Turf quality mirrored disease severity.

Table 1. Mean number of dollar spots per treatment at greens height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2025.

	Treatment	Target VWC%[a]	Dollar Spot Severity[b] July 23rd	Dollar Spot Severity Aug 6th	Dollar Spot Severity Aug 20th	Dollar Spot Severity AUDPC[c]
1	Low Soil Moisture	15%	22.8a	49.8a	104.5a	1984.5a
2	Medium Soil Moisture	20%	53.5a	79.8a	136.3a	3368.8a
3	High Soil Moisture	30%	74.5a	129.3a	163.0a	5544.0a
		LSD P=.05	74.09	94.37	123.79	5383.02

[a]Volumetric water content was assessed 5 days per week
[b]Dollar spot rated as number of dollar spot infection centers per plot. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).
[c]Area under the disease progress curve (AUDPC) was calculated using the trapezoidal method.

Table 2. Mean turfgrass quality per treatment at greens height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2025.

	Treatment	Target VWC%[a]	Turfgrass Quality[b] July 23rd	Turfgrass Quality Aug 6th	Turfgrass Quality Aug 20th	Turfgrass Quality AUTQC[c]
1	Low Soil Moisture	15%	5.0a	5.0a	4.8a	354.3a
2	Medium Soil Moisture	20%	4.8a	4.8a	4.5a	361.8a
3	High Soil Moisture	30%	4.8a	4.5a	4.3a	346.5a
		LSD P=.05	0.76	0.87	1.04	53.23

[a]Volumetric water content was assessed 5 days per week
[b]Turfgrass quality was rated visually on a 1 – 9 scale with 6 being acceptable. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).
[c]Area under the turf quality curve (AUTQC) was calculated using the trapezoidal method.