



Multiple Overnight Mowing Events for Fairway Dollar Spot Suppression

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Objective

To determine the efficacy of a single early morning vs multiple overnight mow events using an autonomous robotic mower for controlling dollar spot caused by the fungus *Clarireedia jacksonii* on a golf course fairway.

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 0.5 inches. Individual plots measured 6.56 ft by 19.68 ft and were arranged in a randomized complete block design with three replications. Each plot contained three 3.2 ft by 3.2 ft subplots. The robotic mower was a Husqvarna Automower 580L EPOS (Husqvarna Group; Charlotte, NC) fitted with a brush attachment. The only mowing that these plots received was from the robotic mower, and the goal was to remove dew either once at different times or to stack multiple overnight dew removal events and evaluate their effects on dollar spot development. Treatment timings were 11 AM, 5 AM, and continuous (every two hours from 8 PM-8 AM), and are outlined in Table 1. All treatments were initiated on June 18, 2026, and plots were mown 7 days per week. Number of dollar spot foci per plot, percent dollar spot infection, and turfgrass quality (1-9, 9 being excellent, 6 acceptable, and 1 bare soil) were visually assessed every 2 weeks. Dew was also collected from plots by placing pre-weighed filter paper on the dew covered plots at 7 AM and placing a constant weight on top. The paper then soaked up any dew present on leaves and the papers were weighed again, and the difference of their pre-weights was subtracted giving a 'dew mass' measurement. This dew measurement was taken once in July and once in August. Turf quality, disease severity (dollar spot counts and % infection), and dew mass were subjected to an analysis of variance and means separated using Fisher's LSD ($P = 0.05$). Results of disease severity (dollar spot counts and % infection), turfgrass quality ratings, and dew mass can be found in tables 1, 2, 3 and 4 respectively. Area under the disease progress curves (AUDPC), area under the turf quality curve (AUTQC) and area under the dew mass curve (AUDMC) were calculated using the trapezoidal method. These calculations summarize the whole season disease severity, disease percentage, turf quality, and dew mass, and are included in tables 1, 2, 3, and 4, respectively.

Results and Discussion

Dollar spot pressure was high starting in early August with nontreated controls averaging over 90 infection centers per plot on the peak disease rating date of Aug 12. The 11 AM treatment served as our non-treated control because there was no overnight dew disruption. Both treatments significantly reduced dollar spot severity in comparison to the non-treated control. The 5 AM

treatment had moderate disease breakthrough. The continuous treatment consistently had zero or almost zero dollar spot present on every rating date, indicating exceptional levels of disease control. Turf quality mirrored disease severity.

The dew mass measurements showed the most dew accumulating on the 11 AM treatment which is expected since there was no dew knockdown by an overnight mowing event. Both treatments showed less amounts of dew when measured at 7 AM, which was also expected since the dew was knocked down 1-2 hours prior. This dew measurement appears to be correlated with lower disease severity and higher turf quality.

The first year of this study shows that stacking multiple overnight dew removal events using autonomous mowers is a promising avenue of research as the continuous treatment demonstrated exceptional disease suppression. Further research will be completed and expanded upon in future growing seasons.

Table 1: Mean number of dollar spots per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2026.

Ref #	Treatment	Dollar Spot Severity Jul 29 th	Dollar Spot Severity Aug 12 th	Dollar Spot Severity Aug 26 th	Dollar Spot Severity AUDPC
1	11 AM Mow (Non-treated control)	13.1a	90.1a	46.6a	1890.56a
2	8 PM-8 AM Mow	0.0a	0.0b	0.0b	1.56b
3	5 AM Mow	0.6a	7.1b	18.7ab	253.28b
NA	LSD P=.05	13.46	29.04	33.42	828.67

Table Notes by Column Name

- **Dollar Spot Severity** - was 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).
- **AUDPC** - Area under the disease progress curve was calculated using the trapezoidal method.

Table 2: Mean dollar spot percentage per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2026.

Ref #	Treatment	Dollar Spot Percent Jul 29 th	Dollar Spot Percent Aug 12 th	Dollar Spot Percent Aug 26 th	Dollar Spot Percent AUDPC
1	11 AM Mow (Non-treated control)	2.0a	8.1a	5.3a	127.39a
2	8 PM-8 AM Mow	0.0b	0.0a	0.0b	0.29b
3	5 AM Mow	0.2b	0.7a	0.6b	19.44ab
NA	LSD P=.05	1.64	13.6	4.14	108.58

Table Notes by Column Name

- **Dollar Spot Percent** - was rated as percentage of plot area affected. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).
- **AUDPC** - Area under the disease progress curve was calculated using the trapezoidal method.

Table 3: Mean turfgrass quality per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2026.

Ref #	Treatment	Turfgrass Quality Jul 29 th	Turfgrass Quality Aug 12 th	Turfgrass Quality Aug 26 th	Turfgrass Quality AUTQC
1	11 AM Mow (Non-treated control)	5.2b	4.2b	4.3b	288.556b
2	8 PM-8 AM Mow	7.0a	6.2a	7.0a	381.111a
3	5 AM Mow	6.3a	5.7a	5.2b	343.778a
NA	LSD P=.05	0.8	1.22	1.01	53.407

Table Notes by Column Name

- **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).
- **AUTQC** - Area under the turf quality curve was calculated using the trapezoidal method.

Table 4: Mean dew mass per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2026. Measurements were taken at 7 am.

Ref #	Treatment	Dew Mass Jul 29 th	Dew Mass Aug 26 th	Dew Mass AUDMC
1	11 AM Mow (Non-treated control)	0.68a	0.22a	12.6a
2	8 PM-8 AM Mow	0.00b	0.08a	1.1b
3	5 AM Mow	0.11b	0.19a	4.2b
NA	LSD P=.05	0.21	0.24	3.88

Table Notes by Column Name

- **Dew Mass** - was the difference of filter paper weight before and after placement in the plot, measured in grams of dew per plot. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).
- **AUDMC** - Area under the dew mass curve was calculated using the trapezoidal method.