Take-all Patch Management on Golf Course Fairways

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OBJECTIVE

To determine length and degree of efficacy of different fungicides and fungicide combinations in preventing take-all patch caused by the fungus *Gaeumannomyces avenae*.

MATERIALS AND METHODS

The study was conducted at Blackwolf Run in Kohler, WI on a stand of creeping bentgrass (*Agrostis stolonifera*) maintained at 0.5 inches. The individual plots measured 3 feet by 5 feet and were arranged in a randomized complete block design with four replications. Treatments were applied at a nozzle pressure of 40 psi using a CO_2 pressurized boom sprayer equipped with one Teejet AI9508EVS nozzle. All fungicides were agitated by hand and applied in the equivalent of 1.5 gallons of water per 1000 ft^2. All treatments were initiated on October 2nd, 2024 and re-initiated on May 6th, 2025. All products were watered in with approximately 0.125 in. of water from overhead irrigation immediately following application. Initial stand symptoms prior to treatment application were rated on Jul 23, 2024. Reduction in disease following treatment applications was calculated based on this initial rating. Disease severity (percent take-all patch per treatment) and turfgrass quality (1-9, 9 being excellent, 6 acceptable, and 1 bare soil) were visually assessed on Jun 17 and Jul 23, 2025. 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 the disease severity and turfgrass quality ratings can be found in table 1 and 2, respectively. Replication three of treatments was excluded from final data analysis due to low disease pressure within that replication. 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

Symptom expression was moderate during the summer of 2025 with nontreated controls averaging 16.7% disease on the Jun 17 rating date. Five of the nine public treatments tested reduced disease relative to the non-treated control. Turf quality mirrored disease severity. Phytotoxicity was not observed with any treatment.

Table 1: Mean take-all severity per treatment at fairway height at Blackwolf Run in Kohler, WI during 2025.

	Treatment	Rate	Application Code [a]	Take-all Severity [b] June 17th	Take-all Severity July 2nd	Take-all Severity AUDPC[c]
1	Nontreated Control			16.7abc	15.0ab	5172.5abc
2	Densicor	0.196 fl oz/1000 ft2	ABC	13.3a-e	10.0bc	4835.8a-d
3	Resilia	4.0 fl oz/1000 ft2	ABC	10.0b-f	9.0bcd	3706.7b-e
4	Castlon	0.36 fl oz/1000 ft2	ABC	6.7def	8.3cde	3402.5cde
5	Tartan	1.5 fl oz/1000 ft2	ABC	2.3f	2.3ef	1789.7e
6	CEU-40280-F-ME	0.136 fl oz/1000 ft2	ABCD	7.3c-f	9.0bcd	3796.3b-e
7	CEU-40280-F-ME	1.36 fl oz/1000 ft2	ABCD	15.0a-d	11.7bc	4860.8a-d
8	Renovo	3.93 fl oz/1000 ft2	ABCD	21.7a	15.0ab	6306.7a
9	Renovo	7.7 fl oz/1000 ft2	ABCD	13.3a-e	10.0bc	2465.0cde
			LSD P=0.05	9.51	6.49	2240.69

[a]Application Code: A = Oct 2, 2024, B = Oct 23, 2024, C = May 6, 2025, D = May 27, 2025
[b] Take-all severity was visually assessed as percent disease. 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 plot at fairway height at Blackwolf Run in Kohler, WI during 2025.

	Treatment	Rate	Application Code [a]	Turf Quality [b] June 17th	Turf Quality July 2nd	Turf Quality AUTQC[c]
1	Nontreated Control			5.3 de	5.0 c	1887.0 cde
2	Densicor	0.196 fl oz/1000 ft2	ABC	5.7 cde	5.7 bc	1894.5 cde
3	Resilia	4.0 fl oz/1000 ft2	ABC	6.0 bcd	6.0 abc	2009.2 bcd
4	Castlon	0.36 fl oz/1000 ft2	ABC	6.7 ab	5.7 bc	2121.3 abc
5	Tartan	1.5 fl oz/1000 ft2	ABC	7.0 a	6.7 ab	2295.8 a
6	CEU-40280-F-ME	0.136 fl oz/1000 ft2	ABCD	6.3 abc	6.0 abc	2011.7 bcd
7	CEU-40280-F-ME	1.36 fl oz/1000 ft2	ABCD	5.3 de	5.7 bc	1837.2 de
8	Renovo	3.93 fl oz/1000 ft2	ABCD	5.0 e	5.0 c	1774.8 de
9	Renovo	7.7 fl oz/1000 ft2	ABCD	5.7 cde	5.7 bc	2113.8 abc
			LSD P=0.05	0.98	1.01	258.77

[a]Application Code: A = Oct 2, 2024, B = Oct 23, 2024, C = May 6, 2025, D = May 27, 2025
[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.

Table 3: Change in percent disease from fall to summer per plot at fairway height at Blackwolf Run in Kohler, WI during 2024-2025.

	Treatment	Rate	Application Code [a]	% Reduction [b]	% Reduction
				June 17th	July 2nd
1	Nontreated Control			3.3 a	1.7 ab
2	Densicor	0.196 fl oz/1000 ft2	ABC	-1.7 a	-5.0 bc
3	Resilia	4.0 fl oz/1000 ft2	ABC	-1.7 a	-2.7 abc
4	Castlon	0.36 fl oz/1000 ft2	ABC	-6.7 a	-5.0 bc
5	Tartan	1.5 fl oz/1000 ft2	ABC	-6.0 a	-6.0 bc
6	CEU-40280-F-ME	0.136 fl oz/1000 ft2	ABCD	-7.7 a	-6.0 bc
7	CEU-40280-F-ME	1.36 fl oz/1000 ft2	ABCD	1.7 a	-1.7 abc
8	Renovo	3.93 fl oz/1000 ft2	ABCD	6.7 a	0.0 ab
9	Renovo	7.7 fl oz/1000 ft2	ABCD	6.7 a	3.3 a
			LSD P=0.05	11.89	7.97

[a] Application Code: A = Oct 2, 2024, B = Oct 23, 2024, C = May 6, 2025, D = May 27, 2025

[b] Percentage of reduction in disease was taken by subtracting summer 2024 evaluations from summer 2025 evaluations. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).