



Curative Fungicide Applications for Managing Dollar Spot

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Introduction

Dollar spot, caused by *Sclerotinia homoeocarpa* Bennett, is the most common perennial disease on intensively cultivated turfgrass in North America. Although adequate nitrogen fertility and cultural practices that reduce the period of leaf wetness duration are required to lessen dollar spot severity, turfgrass managers heavily rely on fungicides to control dollar spot. Typically, multiple applications of different fungicides are required every season due to the yearlong persistent nature of this fungus. Therefore, more money is spent in managing dollar spot than any other disease on golf courses.

It is important for turfgrass managers to develop an appropriate fungicide program that is based on information about fungicide efficacy evaluated under similar environmental conditions. The purpose of this research was to determine efficacy of various fungicides and tank mixtures for managing dollar spot once a disease outbreak had already taken place.

Experimental Methods

The field trials were conducted at the following three different sites: creeping bentgrass fairways at Big Foot Country Club in Fontana and Milwaukee Country Club in River Hills, WI and a creeping bentgrass green at OJ Noer Turfgrass Research and Education Facility in Verona, WI. Individual plots measured 3 x 5 ft, and were arranged in a randomized complete block design with four replications. The rating of dollar spot severity was measured

by counting dollar spot infection centers (DSIC's; approximate 2-inch diameter) per each plot. Multiple ratings of the disease were recorded and the dates of the ratings can be seen in Table 1. A total of 26 fungicide treatments (either single or mixtures of two) were evaluated for their curative efficacy of dollar spot control. Each treatment was applied twice to the plots. The first treatment was initiated when there was greater than an average of 30 DSIC's per plot. The second treatment followed two weeks later. The actual treatment dates can be seen in Table 1. Individual treatments were applied at a nozzle pressure of 40 p.s.i. using a CO2 pressurized boom sprayer equipped with two XR Teejet 8005 VS nozzles. All fungicides were shaken by hand and applied in the equivalent of 2 gallons of water per 1000 ft². The recorded data was put through an analysis of variance to find significant differences between the treatments.

Results and Discussion

Dollar spot was moderate at OJ Noer compared with Big Foot CC and Milwaukee CC. It wasn't until late July that there was enough disease pressure to start applying

the treatments at all three locations. At Big Foot CC there was twice the disease pressure of OJ Noer. Milwaukee CC had the highest disease pressure of any of the three locations. The lateness of the disease outbreak was likely because of unusual weather this year. It was too cold in the spring and rapidly changed to too warm and dry for dollar spot development in summer. We had the 4th warmest June on record in Madison. Because of these environmental conditions, the first applications were in late July or early August, which was later than originally intended.

At OJ Noer, most of the fungicide treatments significantly reduced dollar spot severity as compared to the non-treated controls. There were, however, major differences of efficacy among the treatments. Thiophante-methyl (treatment 8) did not work because resistant isolates of *S. homoeocarpa* are widely distributed at OJ Noer (Table 2). This has been confirmed in our petri dish in vitro assay (unpublished data). Of the contact fungicides, the high label rate (5 oz/M) of Daconil Ultrex (treatment 12) had good control but no acceptable control using the low rate (1.8

Table 1. Dates of applications and ratings for dollar spot curative conducted at OJ Noer, Big Foot CC and Milwaukee CC in 2005.

Location	Application dates		Rating dates		
	4-Aug	16-Aug	4-Aug	16-Aug	30-Aug
OJ Noer	4-Aug	16-Aug	4-Aug	16-Aug	30-Aug
Big Foot CC	29-Jul	12-Aug	29-Jul	12-Aug	26-Aug
Milwaukee CC	28-Jul	10-Aug	28-Jul	10-Aug	26-Aug

Table 2. Efficacy of fungicides and tank mixtures for reducing dollar spot severity at OJ Noer, Big Foot CC and Milwaukee CC in 2005.

Treatment	Rate		OJ Noer ^a		Big Foot CC ^a		Milwaukee CC ^b	
			Aug 4 ^c	Aug 30 ^d	Jul 29 ^c	Aug 26 ^d	Jul 28 ^c	Aug 26 ^d
1 Non-treated control			28.3	56.3 a	12.5	107.0a	71.8	15.0bc
2 Chipco 26GT	4	FL OZ/M	47.3	0.0d	25.5	0.8e	56.3	5.0cd
3 Chipco 26GT	2	FL OZ/M	45.0	1.5d	17.8	7.0e	68.8	5.0cd
4 Emerald	0.18	OZ/M	43.3	0.5d	7.5	0.0e	67.5	0.0d
5 Banner Maxx	2	FL OZ/M	42.3	4.5cd	54.3	2.0e	50.0	0.0d
6 Banner Maxx	0.5	FL OZ/M	31.5	8.8cd	10.3	23.5de	47.5	5.0cd
7 Spotrete	5	OZ/M	32.5	38.8b	31.3	69.0a-d	66.3	21.3b
8 3336F	4	FL OZ/M	22.8	14.5cd	27.3	85.3ab	67.5	31.3a
9 Curalan EG	1	OZ/M	14.5	0.3d	25.5	0.3e	53.8	2.5d
10 Turfcide 400	3	FL OZ/M	17.3	25.3bc	19.0	79.0abc	56.3	21.3b
11 Fore Rainshield	8	OZ/M	8.8	15.3bc	17.5	60.5bcd	57.5	30.0a
12 Daconil Ultrex	5	OZ/M	19.5	0.0d	25.8	0.8e	50.0	3.8cd
13 Daconil Ultrex	1.8	OZ/M	18.8	14.5cd	36.3	39.3cde	76.3	7.5cd
14 Rubigan AS	1.5	FL OZ/M	15.8	11.0cd	22.0	27.8de	52.5	5.0cd
15 Eagle	2.4	FL OZ/M	10.3	2.0d	26.3	7.0e	50.0	0.0d
16 Lynx	2	FL OZ/M	17.3	0.3d	18.8	1.8e	51.3	0.0d
17 Bayleton	1	OZ/M	9.0	0.3d	36.3	1.3e	48.8	1.3d
18 Bayleton	0.25	OZ/M	30.8	6.5cd	43.8	32.5de	61.3	6.3cd
19 Banner MAXX	2	FL OZ/M	10.8	0.0d	66.8	0.0e	62.5	0.0d
20 Chipco 26GT	4	FL OZ/M						
Banner MAXX	0.5	FL OZ/M	16.3	0.3d	27.5	0.3e	55.0	0.0d
21 Chipco 26GT	2	FL OZ/M						
Banner MAXX	2	FL OZ/M	27.0	0.0d	17.5	0.0e	61.3	0.0d
22 Curalan EG	1	OZ/M						
Banner MAXX	0.5	FL OZ/M	7.3	0.0d	40.3	0.3e	52.5	0.0d
23 Curalan EG	1	OZ/M						
Banner MAXX	2	FL OZ/M	14.8	0.0d	22.0	0.0e	65.0	0.0d
24 Daconil Ultrex	5	OZ/M						
Banner MAXX	0.5	FL OZ/M	18.5	3.8cd	14.0	9.0e	73.8	0.0d
25 Daconil Ultrex	1.8	OZ/M						
Banner MAXX	2	FL OZ/M	15.5	0.3d	36.5	0.0e	48.8	0.0d
26 Bayleton	1	OZ/M						
Banner MAXX	0.5	FL OZ/M	23.8	0.5d	28.3	8.3e	71.3	0.0d
Bayleton	0.25	OZ/M						

^a Number of dollar spot infection centers (DSIC's, 2-inch diameter) per 3 x 5 ft plot.

^b The percent dollar spot disease per 3 x 5 ft plot.

^c Initial dollar spot severity at the time of first application of treatments

^d Dollar spot severity two weeks after the second fungicide treatment and four weeks after the study began.

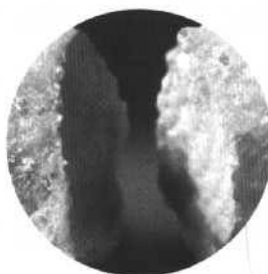
oz/M) (Table 2). Most demethylation inhibitor (DMI) fungicides had good control. Eagle 2.4 fl oz/1000 ft² (treatment 15) had an acceptable control but Bayleton 1 oz/1000 ft² (treatment 17) had the best effect in this study. The iprodione (treatments 2 and 3) and the vincozlin (treatment 9) all significantly reduced the disease. Other fungicides showing excellent control were Lynx (treatment 16) and Emerald (treatment 4) as in the other locations. Various combinations of two different fungicides worked well. In some cases, the half rates of tank-mixed fungicides had the same excellent dollar spot control as the full rates. Examples of this would be the half rate Chipco 26GT/Banner MAXX tank-mix (treatment 20) and Curalan EG/Banner MAXX (treatment 22) and the full rate mix of the same products, treatment 19 and treatment 21, respectively.

At Big Foot CC where the disease pressure was heavy, most fungicide treatments significantly reduced dollar spot severity as compared with the non-treated control, but the half rates of single fungicides could not hold the disease (Table 2). DMI fungicides were variable on controlling the disease. Rubigan AS (treatment 14) did not keep the disease below 20 DSIC's per plot. High rate Banner MAXX (treatment 5), Eagle (treatment 15), and high rate Bayleton (treatment 17) worked the best among the DMI's tested. Among the contact fungicides, high rate Daconil Ultrex (treatment 12) consistently had the best control as at OJ Noer. Here again, the combination treatments were consistently effective. All of the full rate combinations, and the half rate of Banner MAXX/Chipco 26GT (treatment 20) and Banner MAXX/Curalan EG (treatment 22) had excellent control.

The trial conducted at Milwaukee CC was hampered by the rapid progression of the disease before our study. At the time of the first spraying the percent disease ranged from 25 to 85% over all plots (Table 2). Due to the very high initial disease pressure at Milwaukee CC, the treatments were evaluated using the percent disease instead of a spot count. The results were similar to those at OJ Noer and Big Foot CC. The tank-mixed fungicides continued to have excellent control and half-rate mixes performed just as well as full rate mixes. One thing of note at Milwaukee CC is that disease pressure seemed dramatically less in the second rating (Aug 26) than the first rating (July 28). On the non-treated control plots, the disease rating was initially 71.8% on July 28 and became reduced to 15.0% on August 26.

The half rates of single fungicides worked well at the moderate disease pressure but broke down under the heavy disease pressure. In all of our field locations, the low rate tank mixtures continued to hold up as

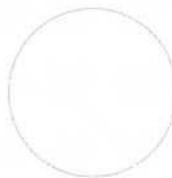
well as the high rate combinations. What are the best fungicides of reducing dollar spot severity in our study? Among the treatments tested, treatments 2, 4, 9, 12, 16, 17, 19, 20, 21, 22, 23, and 25 consistently had excellent control of dollar spot in all three locations. Preventative fungicide applications are always preferable for dollar spot management, but dollar spot outbreaks are unavoidable because of changing environmental conditions and the persistent nature of this pathogen. Because of this, a curative fungicide approach is an important thing to keep in mind. These field evaluations of various fungicides commercially available in Wisconsin will provide valuable guidance to local turfgrass managers for dollar spot management. We would like to thank two superintendents, Pat Sisk and Jim Knulty, for their participation, not only for maintaining the plots, but also rating the disease severity. Their cooperative efforts were essential in carrying out this study. ♣



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