Fungicide Evaluation on a Fungicide Sensitive Dollar Spot Population in a Creeping Bentgrass and Annual Bluegrass Putting Green

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Objective

To evaluate fungicides for control of dollar spot (caused by *Sclerotinia homoeocarpa*) on a putting green consisting of creeping bentgrass and annual bluegrass with no prior fungicide resistance.

Materials and Methods

This evaluation was conducted at the Joseph Troll Turf Research Center in South Deerfield, MA. The plot consists of creeping bentgrass (*Agrostis stolonifera* 'L-93'*)* and annual bluegrass (*Poa annua*) maintained under putting green conditions. Mowing was performed five times per week (0.156-inch cutting height) with a Toro Flex 21 greens mower and clippings collected. 17-0-17 fertilizer was applied at a rate of 0.5 lb nitrogen (N)/1,000 ft² on May 25th. Core aeration and topdressing was performed in May and October utilizing 0.5-inch hollow tines spaced 2" x 2" at a depth of 3 inches. Siduron was applied May 11 and June 23 to control crabgrass at a rate of 4.4 oz ai/1,000 ft^2. Dursban was applied at a rate of 1.5 oz/1,000 ft² on June 17th to control annual bluegrass weevil. The site was irrigated as needed to prevent drought stress. Individual plots measured 3x6 ft, and were arranged in a randomized complete block design with three replications.

Fungicides (see Table 1) were applied based on label or suggested rates. Individual treatments were applied at a nozzle pressure of 40 psi using a CO_2 pressurized boom sprayer equipped with two XR TeeJet 8004VS nozzles. Treatments were initiated on June 4th, 2010 prior to the onset of favorable disease conditions and all treatments following were applied at intervals indicated in the Table. All fungicides were agitated by hand and applied in the equivalent of 2 gallons of water per 1,000 ft². Dollar spot severity was rated by counting disease infection centers each week. A secondary disease rating of copper spot (*Gloeocercospora sorghi*) was made when symptoms were present on August 5th by counting individual infection centers. Turf quality ratings were made when differences among treatments became noticeable on September 10th, 16th and October 2nd. Data was subject to an analysis of variance and means were separated with Tukey's Honest Significant Difference test. The mean percent diseased area for each rating date exhibiting significant differences are listed in Table 1 and 2.

Results and Discussion

Environmental Condition Summary

Environmental conditions were not favorable for dollar spot infection until the week of September 16th when the number of infections on the control plots averaged 22.5 and continually increased until the end of the trial on October 2nd. Temperature averaged 62°F during that time period with a total 4.52 in. of precipitation (0.29 in./day). Between June 4 and September 16, average temperatures were warm (69°F) and daily precipitation averaged only 0.08 in./day making for a mostly warm and dry summer with low dollar spot disease pressure.

Dollar Spot Control

Most fungicides provided complete control of dollar spot throughout the trial, mostly due to low disease pressure. All treatments except for the experimental unidentified product applied at the lower rate of 0.5 oz/1,000 ft^2 rated on August 10, performed significantly better than the control on the rating dates listed in Table 1.

Secondary Disease Control

Copper spot (caused by *Gloeocercospora sorghi*) was observed and confirmed by a diagnostician on August 5 when ratings were made by counting the number of infection centers per plot. Most fungicide treatments provided almost complete control of copper spot, except for the experimental product DPX-LEM17-50 which had no effect on the pathogen at any rate or application interval. Treatment DPX-LEM17-50 applied on a 21-day interval at a rate of 0.5 oz/1,000 ft^2 averaged twice the number of copper spot infections than the untreated plots. One experimental unidentified product, Tourney, and Rotation[w] did not perform significantly better than the untreated plots for copper spot control.

Turf Quality

Due to the many applications (eight 14-day interval applications) made in this trial spanning June-October some products began showing an effect on turf quality, therefore ratings were made on September 10, 16 and October 2. The untreated control did not exhibit acceptable turf quality with a rating of 4.75, 5.29, and 3.77 on the three rating dates respectively. On the two rating dates in September, DPX-LEM17-50 at a rate of 0.5 oz/1,000 ft^2 had significantly lower or similar turf quality ratings to the untreated plots and exhibited the worst turf quality of all treatments. Overall, very few treatments provided acceptable turf quality ratings above 6 for all three rating dates except for: both rotation programs, all treatments including Torque, and one unidentified product at the low rate of 0.5 oz/1,000 ft^2.

Table 1. Fungicide application for dollar spot control on creeping bentgrass and annual bluegrass putting green, South Deerfield, MA, 2010.

Treatment and oz/1,000 ft^2	**Interval (days)**	11-Jun	2-Jul	8-Jul	23-Jul	29-Jul	5-Aug	19-Aug	26-Aug	10-Sep	16-Sep	24-Sep	2-Oct	**AUDPC**[z]
Untreated	---	3.23 A[y]	2.81 A	7.06 A	16.94 A	15.92 A	11.17 A	9.67 A	7.25 A	30.40 A	22.50 A	35.35 A	45.42 A	1658.25 A
Disarm M, 0.25	14	0.56 B	0.15 B	0.73 B	1.60 B	0.92 B	0.83 B	0.33 B	0.58 B	2.73 B	1.50 B	2.69 B	3.42 B	154.08 B
Disarm M, 1	14	0.56 B	0.15 B	0.73 B	1.27 B	1.25 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	152.92 B
Rotation[x]	14	0.56 B	0.15 B	0.40 B	1.27 B	0.92 B	0.83 B	0.67 B	0.92 B	2.73 B	1.50 B	3.35 B	3.42 B	149.42 B
Rotation[w]	14	0.23 B	0.15 B	0.73 B	1.27 B	1.58 B	1.17 B	0.33 B	0.92 B	2.73 B	1.50 B	3.35 B	3.42 B	162.58 B
Torque, 0.6 Spectro, 3	21 14 after Torque	0.90 B	0.15 B	0.73 B	1.27 B	1.25 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	3.35 B	3.75 B	167.42 B
Torque, 0.6 Spectro, 4	28 21 after Torque	0.23 B	0.15 B	1.06 B	1.60 B	0.92 B	0.83 B	0.33 B	0.92 B	2.40 B	1.50 B	2.69 B	3.42 B	143.92 B
Torque, 0.6 Spectro, 3	28 21 after Torque	0.23 B	0.15 B	0.73 B	1.27 B	1.25 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	150.42 B
Torque, 0.6 Spectro, 3 Primo Maxx, 0.1	28 7 after Torque 14 after Spectro	0.56 B	0.15 B	0.40 B	1.27 B	0.92 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	161.25 B
DPX-LEM17-50, 0.3	14	0.23 B	0.15 B	0.40 B	1.60 B	0.92 B	0.83 B	0.33 B	0.58 B	2.73 B	2.17 B	2.69 B	3.42 B	158.58 B
DPX-LEM17-50, 0.5	14	0.23 B	0.15 B	0.40 B	1.27 B	1.25 B	1.17 B	1.00 B	0.58 B	2.73 B	1.83 B	3.02 B	3.42 B	151.92 B
DPX-LEM17-50, 0.5	21	0.23 B	0.15 B	0.40 B	1.94 B	0.92 B	1.17 B	0.33 B	0.58 B	2.40 B	1.50 B	3.69 B	3.42 B	152.92 B
0.5	14	0.23 B	0.15 B	0.73 B	1.27 B	0.92 B	2.17 AB	0.67 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	156.25 B
1	14	0.56 B	0.15 B	0.73 B	1.60 B	1.25 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	172.25 B
0.96	14	0.23 B	0.15 B	0.40 B	1.27 B	0.92 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	142.75 B
Tourney, 0.37	14	0.23 B	0.15 B	0.40 B	1.27 B	0.92 B	0.83 B	0.33 B	0.58 B	2.40 B	1.50 B	2.69 B	3.42 B	144.08 B

[z] Area Under Disease Progress Curve (AUDPC).

[y] Values are least significant means of three replications. Means followed by the same letter are not significantly different according to Tukey's HSD test.

[x] Each application contained Chipco Signature (4 oz/1,000 ft^2) tank mixed with the following products in order of rotation for a total eight applications: Triton Flo (0.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Triton Flo (0.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Interface (3 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Interface (3 oz/1,000 ft^2), Tartan (1.5 oz/1,000 ft^2).

[w] Each application contained Chipco Signature (4 oz/1,000 ft^2) tank mixed with the following products in order of rotation for a total eight applications: Interface (3 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Triton Flo (0.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Tartan (1.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Interface (3 oz/1,000 ft^2), Tartan (1.5 oz/1,000 ft^2).

Table 2. Secondary diseases and turf quality on creeping bentgrass and annual bluegrass putting green, South Deerfield, MA, 2010.

Treatment and oz/1,000 ft^2	Interval (days)	Copper Spot[z] 5-Aug	Turf Quality[y] 10-Sep	16-Sep	2-Oct
Untreated	---	11.73 AB	4.75 BCD	5.29 BC	3.77 B
Disarm M, 0.25	14	0.73 B	5.75 ABC	6.63 AB	7.10 A
Disarm M, 1	14	0.00 B	5.08 ABCD	6.96 A	6.10 AB
Rotation[x]	14	0.00 B	6.75 A	7.29 A	7.77 A
Rotation[w]	14	1.06 AB	6.42 AB	7.29 A	7.77 A
Torque, 0.6 Spectro, 3	21 14 after Torque	0.00 B	6.42 AB	6.63 AB	6.10 AB
Torque, 0.6 Spectro, 4	28 21 after Torque	0.73 B	6.75 A	6.63 AB	6.10 AB
Torque, 0.6 Spectro, 3	28 21 after Torque	0.40 B	6.75 A	6.63 AB	7.10 A
Torque, 0.6 Spectro, 3 Primo Maxx, 0.1	28 7 after Torque 14 after Spectro	0.00 B	6.75 A	6.96 A	7.44 A
DPX-LEM17-50, 0.3	14	9.06 AB	5.08 ABCD	4.29 C	5.10 AB
DPX-LEM17-50, 0.5	14	18.73 AB	3.75 D	4.29 C	5.44 AB
DPX-LEM17-50, 0.5	21	24.06 A	4.08 CD	4.63 C	5.44 AB
, 0.5	14	4.06 AB	6.42 AB	7.63 A	7.10 A
, 1	14	4.06 AB	5.42 ABCD	6.29 AB	6.10 AB
, 0.96	14	0.00 B	5.08 ABCD	5.29 BC	6.10 AB
Tourney, 0.37	14	1.06 AB	5.75 ABC	7.29 A	5.44 AB

[z] Values are least significant means of three replications. Means followed by the same letter are not significantly different according to Tukey's HSD test.

[y] Values are least significant means of three replications. Means followed by the same letter are not significantly different according to Tukey's HSD test.

[x] Each application contained Chipco Signature (4 oz/1,000 ft^2) tank mixed with the following products in order of rotation for a total eight applications: Triton Flo (0.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Triton Flo (0.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Interface (3 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Interface (3 oz/1,000 ft^2), Tartan (1.5 oz/1,000 ft^2).

[w] Each application contained Chipco Signature (4 oz/1,000 ft^2) tank mixed with the following products in order of rotation for a total eight applications: Interface (3 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Triton Flo (0.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Tartan (1.5 oz/1,000 ft^2), Daconil Ultrex (3.2 oz/1,000 ft^2), Interface (3 oz/1,000 ft^2), Tartan (1.5 oz/1,000 ft^2).