PREVENTIVE CONTROL OF DOLLAR SPOT, RED LEAF SPOT, AND BROWN PATCH ON A CREEPING BENTGRASS RESEARCH PUTTING GREEN WITH VARIOUS BAYER FUNGICIDES

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INTRODUCTION

Dollar spot (caused by the pathogen *Sclerotinia homoeocarpa*) is a common disease of golf course fairways throughout Pennsylvania and the entire United States. Although there are several cultural management practices that can assist in reducing disease severity, the use of protective chemicals usually is necessary to control the disease during periods favorable for growth of the pathogen. Research into the ability of a single early-season fungicide application to reduce the levels of initial inoculum has shown promise. The objective of this study was to assess the ability of various commercially available and an experimental fungicide to suppress the disease following an early season and sequential traditionally-timed applications.

MATERIALS & METHODS

This one-year field study was initiated at the Valentine Turfgrass Research Center located in University Park, PA. Soil was a loamy sand capped with a 4" layer of USGA sand with a pH of 7.2 and 1.8% organic matter. Turfgrass used for the fungicide evaluation was a 3-year old stand of 'Penn A-4' creeping bentgrass. The area was maintained as a golf course putting green and mowed five times per week to a height of 0.110 inch. All fungicide treatments were applied with a CO_2 pressurized (40 psi) sprayer equipped with an air-induction flat fan nozzle (TeeJet, AI9508EVS) calibrated to deliver 2.0 gal of water 1000 ft^{-2}. Treatments were initiated on 23 May and re-applied according to the application schedule. All treatments and application dates are listed in the data tables.

Plots measured 3 ft x 6 ft and were arranged in a randomized complete block design with four replications. Dollar spot severity was assessed by counting the number of infection centers within each plot. Red leaf spot severity (caused by the pathogen *D. erthrospila*) was assessed by estimating the disease severity on a 0 to 100% scale where 0 = no disease present and 100 = entire plot area affected by disease. Brown patch (caused by the pathogen *Rhizoctonia solani*) severity was assessed by estimating the disease severity on a 0 to 100% scale where 0 = no disease present and 100 = entire plot area affected by disease. Turfgrass quality and/or color were also visually rated on a 1 to 9 scale where 1 = entire plot brown or dead and 9 = optimum greenness and/or density. All data were subjected to analysis of variance and means were separated at $P \leq 0.05$ according to Tukey's Protected least significant difference test.

Figure 1. Disease pressure on a Penn A-4 creeping bentgrass green at the Valentine Turfgrass Research Center, 2016.

RESULTS & DISCUSSION

Dollar spot (DS) was observed at the site on 10 Jun. Unfortunately, DS pressure did not increase at this site and disease severity was low (Table 1).

Brown patch (BP) was observed at the site on 20 Jul. Disease pressure increased through Jul and disease pressure peaked on 10 Aug. On 10 Aug, plots treated with rotation 1 (treatment 1) and rotation 2 (treatment 2) provided a significant reduction in disease (0% BP) when compared to the non-treated

control (41% BP) (Table 2). On the same rating date, plots treated with an early season application of Tartan Stressgard had some disease suppression (20% BP) but were not significantly different from the aforementioned treatments or plots treated with an early season application of Mirage (44% BP) or the non-treated control plots (41% BP) (Table 2).

Red leaf spot (RLS) was observed at the study site on 29 Jun. Disease pressure was low and limited information is presented (Table 3).

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Table 1. Dollar spot on a creeping bentgrass/annual bluegrass green following the application of Bayer products, 2016.

			Dollar Spot[z]			
	Treatment and rate per 1000 ft^2	Application	10 Jun	29 Jun	20 Jul	10 Aug
1	Tartan Stressgard 1.5 fl oz	A	0.3 a[x]	0.0 a	0.0 a	0.0 a
	Mirage 1.5 fl oz	B				
	Fiata Stressgard 5 fl oz	C				
	Exteris Stressgard 4 fl oz	CJ				
	Mirage 1 fl oz	D				
	Daconil Ultrex 3.2 oz	E				
	Fiata Stressgard 5 fl oz	E				
	Interface 3 fl oz	F				
2	Tartan Stressgard 1.5 fl oz	A	0.3 a	0.0 a	0.0 a	0.3 a
	Mirage 1.5 fl oz	BDF				
	Fiata Stressgard 5 fl oz	BCDEF				
	Exteris Stressgard 4 fl oz	C				
	26GT 2 fl oz	F				
3	Tartan Stressgard 1.5 fl oz	A	0.0 a	0.0 a	2.5 a	0.8 a
4	Mirage 1.5 fl oz	B	0.0 a	0.0 a	0.0 a	2.3 a
5	Nontreated	-	0.3 a	0.3 a	0.3 a	2.0 a

[z] Dollar spot severity was assessed by counting the number of infection centers per plot.

[y] Treatments were applied on the following dates: A = 25 Apr, B = 23 May, C = 6 Jun, D = 20 Jun, E = 5 Jul, F= 19 Jul.

[x] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Tukey's least significant difference test.

Table 2. Brown patch on a creeping bentgrass/annual bluegrass green following the application of Bayer products, 2016.

	Treatment and rate per 1000 ft^2	Application	Brown 20	Brown 10
1	Tartan Stressgard 1.5 fl oz	A	0.0	0.0
	Mirage 1.5 fl oz	B		
	Fiata Stressgard 5 fl oz	C		
	Exteris Stressgard 4 fl oz	CJ		
	Mirage 1 fl oz	D		
	Daconil Ultrex 3.2 oz	E		
	Fiata Stressgard 5 fl oz	E		
	Interface 3 fl oz	F		
2	Tartan Stressgard 1.5 fl oz	A	0.0	0.0
	Mirage 1.5 fl oz	BDF		
	Fiata Stressgard 5 fl oz	BCDEF		
	Exteris Stressgard 4 fl oz	C		
	26GT 2 fl oz	F		
3	Tartan Stressgard 1.5 fl oz	A	3.8	
4	Mirage 1.5 fl oz	B	0.0	43.
5	Nontreated.....	-	3.8	41.

[z] Brown patch (BP) was visually assessed on a 0 to 100% scale where 0 = no disease present and 100 = entire plot area affected by BP.

[y] Treatments were applied on the following dates: A = 25 Apr, B = 23 May, C = 6 Jun, D = 20 Jun, E = 5 Jul, F= 19 Jun.

[x] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Tukey's least significant difference test.

Table 3. Red leaf spot on a creeping bentgrass/annual bluegrass green following the application of Bayer products, 2016.

			Red leaf spot[z]
	Treatment and rate per 1000 ft^2	Application code[y]	29 Jun
1	Tartan Stressgard 1.5 fl oz	A	0.0 a[x]
	Mirage 1.5 fl oz	B	
	Fiata Stressgard 5 fl oz	C	
	Exteris Stressgard 4 fl oz	CJ	
	Mirage 1 fl oz	D	
	Daconil Ultrex 3.2 oz	E	
	Fiata Stressgard 5 fl oz	E	
	Interface 3 fl oz	F	
2	Tartan Stressgard 1.5 fl oz	A	0.0 a
	Mirage 1.5 fl oz	BDF	
	Fiata Stressgard 5 fl oz	BCDEF	
	Exteris Stressgard 4 fl oz	C	
	26GT 2 fl oz	F	
3	Tartan Stressgard 1.5 fl oz	A	1.3 a
4	Mirage 1.5 fl oz	B	0.0 a
5	Nontreated	-	0.8 a

[z] Red leaf spot (RLS) was visually assessed on a 0 to 100% scale where 0 = no disease present and 100 = entire plot area affected by RLS.

[y] Treatments were applied on the following dates: A = 25 Apr, B = 23 May, C = 6 Jun, D = 20 Jun, E = 5 Jul, F= 19 Jul.

[x] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Tukey's least significant difference test.

Table 4. Quality on a creeping bentgrass/annual bluegrass green following the application of Bayer products, 2016.

			Quality[z]			
	Treatment and rate per 1000 ft^2	Application	10 Jun	29 Jun	20 Jul	10 Aug
1	Tartan Stressgard 1.5 fl oz	A	8.0 a[x]	8.0 a	8.0 a	8.0 a
	Mirage 1.5 fl oz	B				
	Fiata Stressgard 5 fl oz	C				
	Exteris Stressgard 4 fl oz	CJ				
	Mirage 1 fl oz	D				
	Daconil Ultrex 3.2 oz	E				
	Fiata Stressgard 5 fl oz	E				
	Interface 3 fl oz	F				
2	Tartan Stressgard 1.5 fl oz	A	8.0 a	8.0 a	8.0 a	8.0 a
	Mirage 1.5 fl oz	BDF				
	Fiata Stressgard 5 fl oz	BCDEF				
	Exteris Stressgard 4 fl oz	C				
	26GT 2 fl oz	F				
3	Tartan Stressgard 1.5 fl oz	A	8.0 a	8.0 a	8.0 a	7.3 ab
4	Mirage 1.5 fl oz	B	8.0 a	8.0 a	8.0 a	6.8 b
5	Nontreated	-	8.0 a	8.0 a	8.0 a	6.8 b

[z] Quality was visually assessed on a 1 to 9 scale where 1 = entire plot brown and 9 = optimum uniformity and density.

[y] Treatments were applied on the following dates: A = 25 Apr, B = 23 May, C = 6 Jun, D = 20 Jun, E =5 Jul, F= 19 Jul.

[x] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Tukey's least significant difference test.

Table 5. Color on a creeping bentgrass/annual bluegrass green following the application of Bayer products, 2016.

Treatment and rate per 1000 ft^2	Application	Color[z]			
		10 Jun	29 Jun	20 Jul	10 Aug
1 Tartan Stressgard 1.5 fl oz	A	8.0 a[x]	8.0 a	8.0 a	8.0 a
Mirage 1.5 fl oz	B				
Fiata Stressgard 5 fl oz	C				
Exteris Stressgard 4 fl oz	CJ				
Mirage 1 fl oz	D				
Dacinil Ultrex 3.2 oz	E				
Fiata Stressgard 5 fl oz	E				
Interface 3 fl oz	F				
2 Tartan Stressgard 1.5 fl oz	A	8.0 a	8.0 a	8.0 a	8.0 a
Mirage 1.5 fl oz	BDF				
Fiata Stressgard 5 fl oz	BCDEF				
Exteris Stressgard 4 fl oz	C				
26GT 2 fl oz	F				
3 Tartan Stressgard 1.5 fl oz	A	7.5 a	7.5 a	7.8 a	7.0 b
4 Mirage 1.5 fl oz	B	7.8 a	8.0 a	8.0 a	6.5 b
5 Nontreated	-	7.5 a	7.8 a	7.5 a	6.5 b

[z] Color was visually assessed on a 1 to 9 scale where 1 = entire plot brown and 9 = optimum greenness.

[y] Treatments were applied on the following dates: A = 25 Apr, B = 23 May, C = 6 Jun, D = 20 Jun, E = 5 Jul, F= 19 Jul.

[x] Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ according to the Tukey's least significant difference test.