COMPARISON OF VARIOUS CHLOROTHALONIL PRODUCTS FOR THE SUPPRESSION OF DOLLAR SPOT ON A RESEARCH PUTTING GREEN, 2010

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INTRODUCTION

Dollar spot (*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. Of the chemicals used to suppress dollar spot, chlorothalonil is one of the most common and one of the most effective due to its broad spectrum activity. Various chlorothalonil products and formulations are available. The objectives of this study were to: 1) evaluate the ability of various chlorothalonil products to provide curative and extended dollar spot suppression; and 2) elucidate any differences in control afforded by the different products.

MATERIALS & METHODS

This study was initiated at the Valentine Turfgrass Research Center located in University Park, PA. Soil was a sandy loam with a pH 7.4 and an OM of 1.77%. Turfgrass used for the fungicide evaluation was a mixed stand of predominantly creeping bentgrass (*Agrostis stolonifera*) with approximately 10 to 15% annual bluegrass (*Poa annua*). The area was maintained as a bentgrass green and mowed six times per week to a height of 0.125 in. All fungicide treatments were applied with a CO_2 pressurized (40 psi) sprayer equipped with an air-induction flat fan nozzle (AI9508E), and calibrated to deliver 2.0 gal water per 1000 ft^2. Due to the high presence of dollar spot within the study early in the season, the area was treated with 1.8 oz and 3.2 oz of Daconil Ultrex on 24 May and 9 Jun, respectively. Between 3 and 15 dollar spot infection centers were present within the study area around the time treatments were initiated, but no differences in disease severity was present. Treatments were applied on 25 June and reapplied four times approximately every 14 days. 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 with four replications. Dollar spot severity was assessed by counting the number of infection centers within each plot or by estimating the disease severity on a 0 to 100% scale where 0 = no disease present and 100 = entire plot area affected by dollar spot. On 27 Aug, percent dollar spot was rated by counting the number of dollar spot infection centers per at each intersection of a rating grid (253 total intersection). Turfgrass quality was also visually rated on a 1 to 9 scale where 1 = entire plot brown or dead and 9 = optimum greenness and density. All data were subjected to analysis of variance and means were separated at $P \leq 0.05$ according to Fisher's Protected Least Significant Difference Test.

RESULTS & DISCUSSION

Disease pressure was severe early in the season and two applications of chlorothalonil (Daconil Ultrex) were applied to the study area prior to the initiation of treatments. Despite these applications, active disease symptoms were present when treatments were first applied on 25 Jun. Three days after the first application (28 Jun), dollar spot ranged from 5 to 15 infection centers (IC) per plot and no differences were observed among any treatments (Table 1). By 16 Jul (8 days after the second application), dollar spot was again becoming severe in the untreated control plots (73 to 91 IC), but was equally suppressed by all chlorothalonil products. All treatments continued to provide equal suppression of dollar spot throughout the study. Dollar spot began to increase within the chlorothalonil treated plots between 7 and 21 days following the last application on 6 Aug.

Based on the results of this study, no differences in disease suppression was observed among any of the chlorothalonil products. While all products provided curative disease suppression, most plots continued to see low disease pressure when chlorothalonil was applied on a 14-d interval. Although no differences among products or rates were observed, disease pressure within plots tended to be numerically lower when chlorothalonil was applied at the higher rates. While these data demonstrate the ability of chlorothalonil to provide excellent curative disease control, future studies should look towards a programmatic approach which utilizes chlorothalonil in combination with a systemic fungicide that may provide extended and complete suppression.

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Table 1. Dollar spot severity on a creeping bentgrass putting green following the application of various commercially available chlorothalonil products at two rates, 2010.

	Dollar Spot [z]			
Treatment and rate per 1000 sq ft [y]	8 Jun	28 Jun	16 Jul	27 Aug
	No. spots			%
QP NEW Chloro DF 1.84 oz	30 a [x]	7 a	18 b	10 c
QP NEW Chloro DF 3.2 oz	40 a	11 a	11 b	7 cd
QP Chlorothalonil DF 1.84 oz	26 a	5 a	5 b	6 cd
QP Chlorothalonil DF 3.2 oz	52 a	15 a	8 b	3 cd
QP Chlorothalonil 720 2.02 fl oz	40 a	15 a	17 b	8 cd
QP Chlorothalonil 720 3.53 fl oz	50 a	14 a	4 b	2 cd
Echo Ultimate 1.84 oz	43 a	14 a	15 b	8 cd
Echo Ultimate 3.2 oz	27 a	3 a	0 b	1 d
Daconil Ultrex 1.84 oz	26 a	6 a	11 b	6 cd
Daconil Ultrex 3.2 oz	27 a	5 a	0 b	2 cd
Untreated	37 a	10 a	73 a	40 a
Untreated	40 a	14 a	91 a	30 b

[z] Dollar spot was rated by counting the number of infection centers per plot (No. spots) or by counting the number of dollar spot infection centers per at each intersection of a rating grid (253 total intersection).

[y] Treatments were applied on 25 Jun; 8 and 23 Jul; and 6 Aug.

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

Table 2. Dollar spot severity on a creeping bentgrass putting green following the application of various commercially available chlorothalonil products at two rates, 2010.

	Percent dollar spot [z]				
Treatment and rate per 1000 sq ft [y]	16 Jul	28 Jul	13 Aug	28 Aug	8 Sep
QP NEW Chloro DF 1.84 oz	<1 b	1 b	3 b	7 b	5 b
QP NEW Chloro DF 3.2 oz	<1 b	<1 b	2 b	4 b	4 b
QP Chlorothalonil DF 1.84 oz	<1 b	<1 b	1 b	5 b	3 b
QP Chlorothalonil DF 3.2 oz	<1 b	<1 b	<1 b	3 b	2 b
QP Chlorothalonil 720 2.02 fl oz	<1 b	2 b	2 b	6 b	5 b
QP Chlorothalonil 720 3.53 fl oz	0 b	<1 b	< 1 b	2 b	2 b
Echo Ultimate 1.84 oz	<1 b	<1 b	3 b	6 b	6 b
Echo Ultimate 3.2 oz	0 b	0 b	< 1 b	1 b	< 1 b
Daconil Ultrex 1.84 oz	<1 b	<1 b	2 b	4 b	5 b
Daconil Ultrex 3.2 oz	0 b	<1 b	0 b	< 1 b	< 1 b
Untreated	2 a	7 a	15 a	34 a	35 a
Untreated	2 a	7 a	14 a	32 a	36 a

[z] Dollar spot was rated by visually assessing the percent disease on a 0 to 100 scale where 0 = no disease symptoms present and 100 = entire plot area affected by dollar spot.

[y] Treatments were applied on 25 Jun; 8 and 23 Jul; and 6 Aug.

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

Table 3. Overall quality of a creeping bentgrass putting green following the application of various commercially available chlorothalonil products at two rates, 2010.

	Quality (1-9) [z]				
Treatment and rate per 1000 sq ft [y]	8 Jun	28 Jun	16 Jul	28 Jul	13 Aug
QP NEW Chloro DF 1.84 oz	8.0 a	7.5 a	7.8 bcd	7.8 abc	7.0 ab
QP NEW Chloro DF 3.2 oz	8.0 a	7.0 a	8.3 abc	8.3 ab	8.0 a
QP Chlorothalonil DF 1.84 oz	8.0 a	7.5 a	8.3 abc	8.0 ab	7.8 a
QP Chlorothalonil DF 3.2 oz	8.0 a	7.5 a	8.5 ab	8.5 a	8.0 a
QP Chlorothalonil 720 2.02 fl oz	8.0 a	7.5 a	7.5 cd	7.5 bcd	7.0 ab
QP Chlorothalonil 720 3.53 fl oz	8.0 a	7.0 a	8.3 abc	8.5 a	7.5 a
Echo Ultimate 1.84 oz	8.0 a	7.0 a	8.5 ab	8.0 ab	7.5 a
Echo Ultimate 3.2 oz	8.0 a	7.3 a	8.3 abc	8.3 ab	7.3 a
Daconil Ultrex 1.84 oz	8.0 a	7.5 a	7.5 cd	8.0 ab	7.3 a
Daconil Ultrex 3.2 oz	8.0 a	7.3 a	8.8 a	8.0 ab	7.8 a
Untreated	8.0 a	7.3 a	7.3 d	7.0 cd	5.5 c
Untreated	8.0 a	7.0 a	7.0 d	6.8 d	6.0 bc

[z] Creeping bentgrass quality was rated on a 1 to 9 scale where 1 = entire plot area brown or dead; 7 = minimum acceptable quality for a golf course putting green; and 9 = optimum greenness and density.

[y] Treatments were applied on 25 Jun; 8 and 23 Jul; and 6 Aug.

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