

# PREVENTIVE CONTROL OF ANTHRACNOSE BASAL ROT ON A RESEARCH PUTTING GREEN

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## INTRODUCTION

Anthracnose (*Colletotrichum cereale*; previously *C. graminicola*) is emerging as a major pest problem on annual bluegrass putting greens in the Northeastern United States. In many cases, curative control of anthracnose is difficult or near impossible and various fungicides often are used in succession to arrest disease development. The purpose of this study was to assess the ability of various fungicides to provide acceptable control of the disease when applied prior to symptoms becoming present.

## MATERIALS & METHODS

The study was initiated on a newly constructed annual bluegrass putting green at the Plant Science Research and Education Facility located in Storrs, CT. The putting green was constructed from core cultivation plugs collected from various golf courses through Connecticut between 2005 and 2006. Annual bluegrass plugs were spread over native soil. Between 2005 and 2006, the area was subjected to routine topdressing and slowly lowered to a height of 0.140".

Prior to initiation of the study, the area was treated with 0.5 lb N/1000 ft<sup>2</sup> from urea to increase density from winter injury. All treatments were applied on a 14-d interval with initial treatments applied on 5 Jun. All treatments were applied with a CO<sub>2</sub> pressurized (40 psi) sprayer equipped with an air induced flat-fan nozzle, and calibrated to deliver 2.0 gal water per 1000 ft<sup>2</sup>. Plots measured 3'x6' and were arranged as a randomized complete block with 4 replications. All treatments and application dates are listed in the data tables. Data collected included percent plot area affected by anthracnose, anthracnose severity and quality. Data ratings are described in the footnotes of data tables.

## RESULTS

No anthracnose was present when treatments were first applied on 5 Jun and only trace amount were visible until early to mid Jul (Table 1). When plots were rated on 3 Jul, no differences in percent plot area affected by anthracnose was observed among treatments and all plots had ≤4% anthracnose. Based on quality (Table 2), anthracnose severity increased in mid to late-Jul and the untreated control plots had an average of 31% disease by 1 Aug. On this date, plots treated with Daconil Ultrex + Chipco Signature had the least amount of anthracnose (<1%) and good control (≤5%) was afforded within plots treated with Tartan + Chipco Signature, Syngenta Program, Daconil Ultrex + Medallion, Concert, LBG-31 + Dovetail, and Spectro + Alude. Although considered unacceptable (>5%), plots treated with Instrata, DPX-LEM17-50-80, Endorse + Alude, and Disarm C had statistically similar levels of anthracnose as all previously mentioned treatments. On the final rating date (15 Aug, ~ 1 month after last application), acceptable suppression of anthracnose was observed within plots treated with Daconil Ultrex + Chipco Signature, Concert, and Spectro + Alude. Anthracnose was reduced, however, in plots treated with Instrata and LBG-31 + Dovetail when compared to the untreated control. No other treatments provided a reduction in percent plot area affected by anthracnose when compared to the untreated control plots on the final rating date.

## DISCUSSION

Anthracnose was considered severe in this study and most treatments did not provide adequate suppression once disease activity increased in late Jul. No single active ingredient provided acceptable anthracnose control during the study. When applied as a tank-mix or a pre-mix, disease suppression was generally better. Treatments containing chlorothalonil generally improved disease suppression during the study and only treatments containing this active ingredient provided acceptable control on the final rating date. Results of this study reinforce the theory that tank-mixing multiple active ingredients and liberal use of chlorothalonil will generally result in improved suppression of anthracnose.

While previous research has shown that the QoI fungicides are effective against Colletotrichum, results from this study indicate that resistance at the Storrs study site may have developed.

Table 2. Percent Anthracnose of preventive control of anthracnose basal rot on a research putting green

Treatment and rate per 1000 sq ft	Application <sup>z</sup> Timing	Anthracnose <sup>y</sup>				
		20 Jun	3 Jul	1 Aug	15 Aug	15 Aug Severity (0-5)
Daconil Ultrex 3.2 oz + Chipco Signature 4.0 oz...	ACEG	<1 a <sup>x</sup>	<1 a	<1 g	2 j	1.0 l
Tartan 1.5 fl oz + Chipco Signature 4.0 oz .....	ACEG	<1 a	<1 a	4 fg	18 c-h	3.5 efg
Insignia 0.9 oz .....	ACEG	<1 a	<1 a	22 a-d	21 a-e	5.0 a
Trinity 1.0 fl oz + Insignia 0.7 oz .....	ACEG	2 a	2 a	29 ab	27 abc	4.8 ab
Trinity 1.0 fl oz .....	ACEG	<1 a	2 a	27 ab	19 b-g	4.3 bcd
SP2059 1.0 oz .....	ACEG	1 a	3 a	30 ab	31 ab	5.0 a
SP2059 2.0 oz .....	ACEG	<1 a	<1 a	25 abc	25 a-d	5.0 a
Syngenta program <sup>w</sup> .....	ACEG	0 a	0 a	2 g	8 f-j	2.5 hi
Daconil Ultrex 2.4 oz + Medallion 0.25 oz .....	ACEG	<1 a	<1 a	4 fg	7 g-j	1.8 jk
Concert 4.0 fl oz .....	ACEG	2 a	2 a	3 fg	5 hij	2.3 ij
Instrata 4.25 fl oz .....	ACEG	<1 a	<1 a	7 efg	13 d-j	2.5 hi
DPX-LEM17-50-80 0.2 oz .....	ACEG	<1 a	<1 a	23 abc	20 b-g	4.8 ab
DPX-LEM17-50-80 0.3 oz .....	ACEG	<1 a	1 a	17 b-f	20 a-f	3.8 def
DPX-LEM17-50-80 0.4 oz .....	ACEG	<1 a	<1 a	22 a-e	24 a-d	4.0 cde
DPX-LEM17-50-80 0.5 oz .....	ACEG	1 a	2 a	11 c-g	19 b-d	3.8 def
LBG-31 5.5 fl oz + Dovetail 2.0 fl oz .....	ACEG	1 a	2 a	4 fg	9 e-j	2.3 ij
Endorse 4.0 oz + Alude 6.0 fl oz .....	ACEG	<1 a	1 a	10 c-g	17 c-i	3.0 gh
Spectro 3.5 oz + Alude 6.0 fl oz .....	ACEG	<1 a	<1 a	2 g	4 ij	1.3 kl
Disarm 0.27 fl oz .....	ACEG	<1 a	<1 a	29 ab	23 a-d	4.3 bcd
Disarm C 4.32 fl oz .....	ACEG	1 a	3 a	7 d-g	22 a-d	3.3 fg
Disarm 0.27 fl oz + ARY-0438-002 0.44 oz .....	ACEG	2 a	4 a	29 ab	33 a	4.5 abc
ARY-0438-002 0.44 oz .....	ACEG	<1 a	2 a	29 ab	31 ab	5.0 a
Untreated .....	-	<1 a	1 a	32 a	29 abc	5.0 a
Untreated .....	-	<1 a	1 a	30 ab	27 abc	5.0 a

<sup>z</sup> Treatments were applied as follows: A=05 Jun, C = 19 Jun, E= 07 Jul, and G = 18 Jul.

<sup>x</sup> Percent of the plot area with Anthracnose was visually rated on a 0 to 100 percent scale where 0 = no anthracnose was present or 100 = entire plot area affected by anthracnose. Anthracnose severity was rated on a 0 to 5 scale where 0 = no visible anthracnose symptoms present and 5.0 = all annual bluegrass within plot dead.

<sup>y</sup> Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test

<sup>w</sup> Full details of Syngenta program listed in table 3.

Table 2. Turfgrass quality of preventive control of anthracnose basal rot on a research putting green

Treatment and rate per 1000 sq ft	Application <sup>z</sup> Timing	Quality <sup>y</sup>		
		20 Jun	3 Jul	20 Jul
Daconil Ultrex 3.2 oz + Chipco Signature 4.0 oz .....	ACEG	8.0 a <sup>x</sup>	8.3 ab	7.5 ab
Tartan 1.5 fl oz + Chipco Signature 4.0 oz.....	ACEG	8.0 a	8.0 abc	7.3 abc
Insignia 0.9 oz .....	ACEG	7.3 a-d	7.5 a-e	4.3 h-k
Trinity 1.0 fl oz + Insignia 0.7 oz.....	ACEG	6.8 c-f	6.8 de	3.8 ijk
Trinity 1.0 fl oz .....	ACEG	7.0 b-e	6.8 de	4.3 h-k
SP2059 1.0 oz.....	ACEG	7.5 abc	6.8 de	4.3 h-k
SP2059 2.0 oz.....	ACEG	6.8 c-f	7.0 cde	4.8 f-i
Syngenta program <sup>w</sup> .....	ACEG	6.5 def	7.8 a-d	8.0 a
Daconil Ultrex 2.4 oz + Medallion 0.25 oz.....	ACEG	6.3 ef	7.3 b-e	7.5 a
Concert 4.0 fl oz .....	ACEG	6.8 c-f	7.0 cde	7.0 abc
Instrata 4.25 fl oz.....	ACEG	7.8 ab	8.5 a	7.3 abc
DPX-LEM17-50-80 0.2 oz .....	ACEG	6.8 c-f	7.3 b-e	5.0 fgh
DPX-LEM17-50-80 0.3 oz .....	ACEG	7.0 b-e	6.5 e	5.5 efg
DPX-LEM17-50-80 0.4 oz .....	ACEG	7.0 b-e	7.5 a-e	5.8 def
DPX-LEM17-50-80 0.5 oz .....	ACEG	7.0 b-e	7.5 a-e	6.3 cde
LBG-31 5.5 fl oz + Dovetail 2.0 fl oz.....	ACEG	6.0 f	7.0 cde	7.3 abc
Endorse 4.0 oz + Alude 6.0 fl oz .....	ACEG	7.3 a-d	7.3 b-e	6.3 cde
Spectro 3.5 oz + Alude 6.0 fl oz .....	ACEG	7.0 b-e	7.3 b-e	7.0 abc
Disarm 0.27 fl oz.....	ACEG	7.8 ab	6.8 de	5.0 fgh
Disarm C 4.32 fl oz.....	ACEG	7.3 a-d	7.3 b-e	6.8 bcd
Disarm 0.27 fl oz + ARY-0438-002 0.44 oz.....	ACEG	6.5 def	6.5 e	4.0 h-k
ARY-0438-002 0.44 oz.....	ACEG	7.0 b-e	6.8 de	4.5 g-j
Untreated.....	-	7.0 b-e	6.5 e	3.5 jk
Untreated.....	-	7.0 b-e	7.0 cde	3.3 k

<sup>z</sup> Treatments were applied as follows: A=05 Jun, C = 19 Jun, E= 07 Jul, and G = 18 Jul.

<sup>y</sup> Quality was rated visually on 0-9 scale

<sup>x</sup> Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test.

<sup>w</sup> Full details of Syngenta program listed in table 3.

Table 3. Syngenta program consisted of the following treatments sequentially applied on a 14-d interval.

Product	Rate
Primo MAXX + Instrata followed by	0.15 fl. oz. + 4.25 fl. oz.
Primo MAXX + Daconil Ultrex followed by	0.15 fl. oz. + 3.2 oz.
Primo MAXX + Concert + Medallion followed by	0.15 fl. oz. + 4.0 fl. oz. + 0.25 oz.
Primo MAXX + Daconil Ultrex + Heritage followed by	0.15 fl. oz. + 3.2 oz. + 2.0 fl. oz.
Primo MAXX + Concert + Medallion +	0.15 fl. oz. + 4.0 fl. oz. + 0.25 oz. +
Subdue MAXX followed by	0.5 fl. oz.
Primo MAXX + Daconil Ultrex + Heritage	0.15 fl. oz. + 3.2 oz. + 3.0 fl. oz.