

# University of California, Riverside

## 2012 Turf Disease Trial: Management of Anthracnose on Annual Bluegrass

Trial ID: Anthracnose 2012      Protocol ID:  
Location:                      Study Director:  
Project ID:                     Investigator: James H. Baird  
Sponsor Contact:

### General Trial Information

**Study Director:** Jim Baird    **Title:** Turfgrass Specialist  
**Investigator:** Tyler Mock   **Title:** Graduate Student

**Discipline:** F fungicide  
**Trial Status:** F one-year/final  
**Initiation Date:** Jun-20-2012    **Planned Completion Date:** Sep-11-2012

### Trial Location

**City:** Riverside      **Latitude of LL Corner °:** 33.96 N  
**State/Prov.:** CA      **Longitude of LL Corner °:** 117.33 W  
**Postal Code:** 92506    **Altitude of LL Corner, Unit:** 825.56 FT  
**Country:** USA United States

### Objectives:

Anthracnose is a common disease of annual bluegrass turf, especially on intensively maintained greens. Thirty-five fungicide treatments were evaluated for their ability to control anthracnose disease preventatively on an annual bluegrass "tee" at UCR in 2012. Fungicide treatments were initially applied on 20 June 2012 before onset of disease activity.

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#### Conclusions:

- Overall, anthracnose disease pressure was moderate to heavy throughout study period. Mean disease cover in the untreated control reached 53% by the end of August.
- Annual bluegrass phytotoxicity (turf injury and thinning) was never more than 10%, and tended to occur with treatments that included DMI fungicides (a common occurrence in conjunction with summer stress). The most significant injury occurred from Treatment 10 and likely from Trinity (triticonazole) fungicide in that Program. Treatment 36 caused similar but lesser effects, and likely Torque (tebuconazole) fungicide was responsible for the injury. Of the DMI fungicides, treatments containing difenoconazole (e.g., Briskway) appeared to cause the least amount of turf injury.
- Several fungicides or fungicide programs significantly reduced disease severity compared to the untreated control. Those that resulted in 5% or less anthracnose disease cover throughout the entire study included:
  - Treatments 2 and 4 (Bayer Programs)
  - Treatment 9 (BASF Program)
  - Treatment 14 (Briskway and Daconil Action)
  - Treatment 20 (Briskway and Daconil Action)
  - Treatment 26 (A13703G and Appear)
  - Treatment 29 (A13703G and Daconil Action)
  - Treatment 30 (Disarm 480SC)
  - Treatment 31 (Disarm C)
- Comparing two similar treatments containing phosphonate products in combination with Daconil Action, PK Plus provided greater anthracnose control compared to Appear.
- Summer Patch disease activity was observed later during the study. Although disease activity was sparse and inconsistent across all treatments, summer patch disease cover was rated separately and data are provided herein. In addition, a minor outbreak of dollar spot occurred later in the study (data not shown).
- Considering control of all diseases (anthracnose, summer patch, dollar spot) and optimal turf quality, the overall best turf was provided by treatments containing Briskway (difenoconazole and azoxystrobin) and Daconil Action (chlorothalonil and acibenzolar). Other treatments that would be included in the Honorable Mention category also tended to include chlorothalonil, QoI, and DMI fungicides as part of the program.

#### Acknowledgments:

Special thanks to BASF, Syngenta, Valent, DuPont, Bayer, Cleary Chemical, Arysta, and Crop Production Services for providing fungicides and support

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    Sponsor Contact:

### Personnel

**Study Director:** Jim Baird                      **Title:** Turfgrass Specialist  
**Affiliation:** University of California Riverside  
**Address:** 900 University Ave  
**Location:** Riverside, CA  
**Postal Code:** 92521      **E-mail:** james.baird@ucr.edu  
    **Mobile No.:** 951-333-9052  
**Investigator:** Tyler Mock                      **Title:** Graduate Student  
**Affiliation:** University of California Riverside  
**Address:** 2202 Batchelor Hall  
**Location:** Riverside, CA  
**Postal Code:** 92521      **E-mail:** tmock001@ucr.edu

### Crop Description

**Crop 1:** POAAN Poa annua                      Annual bluegrass  
**Variety:** Peterson's Creeping  
**BBCH Scale:** BGRM                      **Planting Date:** Apr-6-2007  
**Planting Method:** SEEDED      seeded

### Pest Description

**Pest 1 Type:** D                      **Code:** COLLSP Colletotrichum sp.  
**Common Name:** Colletotrichum sp.  
**Establishment Method/Description:** Dragging of cores

### Site and Design

**Plot Width, Unit:** 4 FT                      **Site Type:** TURREE turf - research  
**Plot Length, Unit:** 6 FT  
**Plot Area, Unit:** 24 FT2                      **Tillage Type:** NOTILL no-till  
**Replications:** 5                      **Study Design:** RACOB� Randomized Complete Block (RCB)  
    **Untreated Arrangement:** INCLUDED      single control randomized in each block

**Trial Initiation Comments:**

The treatments were initiated on June 20<sup>th</sup> 2012. Anthracnose ratings were not taken until two weeks later because no anthracnose was visible at the time. After initial appearance, ratings were taken every week.

### Maintenance

No.	Date	Maintenance Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Tank Mix
1.	Aug-30-2012	2,4-D Ester	4	SC	1.5	FL OZ/1000 FT2	yes

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**Field Prep./Maintenance:**

**Fertility:**

Monthly applications of 0.5 lbs/1000 ft<sup>2</sup> of nitrogen through April 2012. No nitrogen was applied during study

**Mowing Regime:**

0.25 inches 3 days/wk

**Irrigation Regime:**

Daily according to ET requirements

**Data Collection:**

Percent disease cover and turf phytotoxicity measured visually. Turf Quality measured visually. NDVI measured with hand held NDVI device.

### Soil Description

**Description Name:** Hanford Fine Sandy Loam  
**Soil Name:** HFSL amended with sand topdressing

### Application Description

	A	B	C	D	E	F	G	H	I	J	K	L	M
<b>Application Date:</b>	Jun-20-2012	Jul-4-2012	Jul-11-2012	Jul-18-2012	Aug-1-2012	Aug-15-2012	Aug-22-2012	Aug-29-2012	Sep-11-2012				
<b>Time of Day:</b>	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM			
<b>Application Method:</b>	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY			
<b>Application Timing:</b>	PREVEN	CURATI	CURATI	CURATI	CURATI	CURATI	CURATI	CURATI	CURATI	CURATI			
<b>Application Placement:</b>	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR			
<b>Applied By:</b>	Mock, T.	Mock, T.	Mock, T.	Mock, T.	Mock, T.	Mock, T.	Mock, T.	Mock, T.	Mock, T.	Mock, T.			
<b>Air Temperature, Unit:</b>	57.6 F	60.7 F	69.5 F	63.3 F	66.9 F	72.1 F	68.4 F	75.5 F					
<b>% Relative Humidity:</b>	84	81	61	73	75	42	78	48					
<b>Wind Velocity, Unit:</b>	2.6 MPH	2.6 MPH	1.5 MPH	2.6 MPH	1.8 MPH	2.1 MPH	3.1 MPH	1.9 MPH					
<b>Dew Presence (Y/N):</b>	Y yes	Y yes	Y yes	Y yes	Y yes	Y yes	Y yes	Y yes					
<b>Soil Temperature, Unit:</b>	69.1 F	69.7 F	71.7 F	69.6 F	72 F	73.9 F	74.5 F	73.1 F					

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### Crop Stage At Each Application

	A	B	C	D	E	F	G	H	I	J
<b>Crop 1 Code, BBCH Scale:</b>	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM	POAAN BGRM
	K	L	M							
<b>Crop 1 Code, BBCH Scale:</b>	POAAN BGRM	POAAN BGRM	POAAN BGRM							

### Pest Stage At Each Application

	A	B	C	D	E	F	G	H	I	J	K	L	M
<b>Pest 1 Code, Type, Scale:</b>	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D	COLLSP D

### Application Equipment

	A	B	C	D	E	F	G	H	I	J
<b>Appl. Equipment:</b>	HANDBOOM		HANDBOOM	HANDBOOM	HANDBOOM		HANDBOOM		HANDBOOM	HANDBOOM
<b>Equipment Type:</b>	BACCAI		BACCAI	BACCAI	BACCAI		BACCAI		BACCAI	BACCAI
<b>Operation Pressure, Unit:</b>	36 PSI		36 PSI	36 PSI	36 PSI		36 PSI		36 PSI	36 PSI
<b>Nozzle Type:</b>	TeeJet		TeeJet	TeeJet	TeeJet		TeeJet		TeeJet	TeeJet
<b>Nozzle Size:</b>	8003VS		8003VS	8003VS	8003VS		8003VS		8003VS	8003VS
<b>Nozzle Spacing, Unit:</b>	9 IN		9 IN	9 IN	9 IN		9 IN		9 IN	9 IN
<b>Nozzles/Row:</b>	4		4	4	4		4		4	4
<b>Band Width, Unit:</b>	4 FT		4 FT	4 FT	4 FT		4 FT		4 FT	4 FT
<b>Boom Length, Unit:</b>	36 IN		36 IN	36 IN	36 IN		36 IN		36 IN	36 IN
<b>Boom Height, Unit:</b>	12 IN		12 IN	12 IN	12 IN		12 IN		12 IN	12 IN
<b>Ground Speed, Unit:</b>	1.5 MPH		1.5 MPH	1.5 MPH	1.5 MPH		1.5 MPH		1.5 MPH	1.5 MPH
<b>Spray Volume, Unit:</b>	2 GAL/1000 FT2		2 GAL/1000 FT2	2 GAL/1000 FT2	2 GAL/1000 FT2		2 GAL/1000 FT2		2 GAL/1000 FT2	2 GAL/1000 FT2
<b>Mix Size, Unit:</b>	1 liters		1 liters	1 liters	1 liters		1 liters		1 liters	1 liters
<b>Propellant:</b>	COMCO2		COMCO2	COMCO2	COMCO2		COMCO2		COMCO2	COMCO2
<b>Tank Mix (Y/N):</b>	Y yes		Y yes	Y yes	Y yes		Y yes		Y yes	Y yes

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	K	L	M
<b>Appl. Equipment:</b>	HANDBOOM		HANDBOOM
<b>Equipment Type:</b>	BACCAI		BACCAI
<b>Operation Pressure, Unit:</b>	36 PSI		36 PSI
<b>Nozzle Type:</b>	TeeJet		TeeJet
<b>Nozzle Size:</b>	8003VS		8003VS
<b>Nozzle Spacing, Unit:</b>	9 IN		9 IN
<b>Nozzles/Row:</b>	4		4
<b>Band Width, Unit:</b>	4 FT		4 FT
<b>Boom Length, Unit:</b>	36 IN		36 IN
<b>Boom Height, Unit:</b>	12 IN		12 IN
<b>Ground Speed, Unit:</b>	1.5 MPH		1.5 MPH
<b>Spray Volume, Unit:</b>	2 GAL/1000 FT2		2 GAL/1000 FT2
<b>Mix Size, Unit:</b>	1 liters		1 liters
<b>Propellant:</b>	COMCO2		COMCO2
<b>Tank Mix (Y/N):</b>	Y yes		Y yes

**Trt No Treatment Application Comment**

9 On the 4th treatment date no 26 GT was available so it was left out of the treatment. The other two fungicides involved in that date were put down together without the 26 GT

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Description				% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	
Rating Date				Jul-5-2012	Jul-11-2012	Jul-18-2012	Jul-25-2012	Aug-8-2012	Aug-15-2012	Aug-23-2012	Aug-30-2012
Rating Type				COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER
Rating Unit				%	%	%	%	%	%	%	%
Number of Subsamples				1	1	1	1	1	1	1	1
Days After First/Last Applic.				- 1	- 7	- 7	- 7	- 7	- 14	- 1	- 1
Trt-Eval Interval				15 DA-A	21 DA-A	28 DA-A	35 DA-A	49 DA-A	56 DA-A	64 DA-A	71 DA-A
Plant-Eval Interval				1917 DP-1	1923 DP-1	1930 DP-1	1937 DP-1	1951 DP-1	1958 DP-1	1966 DP-1	1973 DP-1
Trt No.	Treatment Name	Rate	Appl Code	1	2	3	4	5	6	7	8
1	Control			15.6 a	19.0 a	33.0 a	43.0 a	35.0 a	48.0 a	47.0 a	53.0 a
2	Reserve	3.6 fl oz/1000 ft2	A	4.0 cde	7.0 c-f	3.4 ef	3.6 efg	3.0 d-g	5.0 de	5.0 f-k	3.0 efg
	Reserve	3.6 fl oz/1000 ft2	C								
	Daconil Ultrex	3.2 oz/1000 ft2	E								
	Insignia	0.9 fl oz/1000 ft2	E								
	Reserve	3.6 fl oz/1000 ft2	G								
	Daconil Ultrex	3.2 oz/1000 ft2	I								
	Insignia	0.9 fl oz/1000 ft2	I								
	Reserve	3.6 fl oz/1000 ft2	K								
	Reserve	3.6 fl oz/1000 ft2	M								
3	Reserve	3.6 fl oz/1000 ft2	A	2.6 cde	1.0 ef	0.0 f	3.4 efg	2.6 efg	4.0 de	9.0 d-k	5.0 efg
	Reserve	3.6 fl oz/1000 ft2	C								
	Signature	4.0 oz/1000 ft2	E								
	Daconil Ultrex	3.2 oz/1000 ft2	E								
	Daconil Ultrex	3.2 oz/1000 ft2	G								
	Insignia	0.9 fl oz/1000 ft2	G								
	Reserve	3.6 fl oz/1000 ft2	I								
	Signature	2.7 oz/1000 ft2	K								
	Daconil Ultrex	3.2 oz/1000 ft2	K								
	Reserve	3.6 fl oz/1000 ft2	M								
4	Reserve	3.6 fl oz/1000 ft2	A	0.6 e	1.2 ef	1.0 ef	1.0 fg	0.0 g	3.0 de	3.4 g-k	1.0 fg
	Reserve	3.6 fl oz/1000 ft2	C								
	Daconil Ultrex	3.2 oz/1000 ft2	E								
	Insignia	0.9 fl oz/1000 ft2	E								
	Reserve	3.6 fl oz/1000 ft2	G								
	Daconil Ultrex	3.2 oz/1000 ft2	I								
	Insignia	0.9 fl oz/1000 ft2	I								
	Signature	4.0 oz/1000 ft2	K								
	Daconil Ultrex	3.2 oz/1000 ft2	K								
	Reserve	3.6 fl oz/1000 ft2	M								
5	Velista	0.5 oz/1000 ft2	ACEGIKM	14.0 ab	17.6 ab	13.0 cd	17.4 bcd	17.8 bc	35.0 ab	42.0 ab	53.0 a
6	Velista	0.3 oz/1000 ft2	ACEGIKM	7.6 b-e	10.0 a-e	8.4 def	8.8 d-g	4.4 d-g	4.2 de	7.2 e-k	12.0 d-g
	Daconil Ultrex	3.25 oz/1000 ft2	ACEGIKM								

Means followed by same letter do not significantly differ (P=.05, LSD)  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.





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Description				% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose	% Anthracnose
Rating Date				Jul-5-2012	Jul-11-2012	Jul-18-2012	Jul-25-2012	Aug-8-2012	Aug-15-2012	Aug-23-2012	Aug-30-2012
Rating Type				COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER
Rating Unit				%	%	%	%	%	%	%	%
Number of Subsamples				1	1	1	1	1	1	1	1
Days After First/Last Applic.				- 1	- 7	- 7	- 7	- 7	- 14	- 1	- 1
Trt-Eval Interval				15 DA-A	21 DA-A	28 DA-A	35 DA-A	49 DA-A	56 DA-A	64 DA-A	71 DA-A
Plant-Eval Interval				1917 DP-1	1923 DP-1	1930 DP-1	1937 DP-1	1951 DP-1	1958 DP-1	1966 DP-1	1973 DP-1
Trt No.	Treatment Name	Rate	Appl Code	1	2	3	4	5	6	7	8
16	A8574	0.22 fl oz/1000 ft2	ACEGIKM	8.6 a-d	9.6 b-e	12.6 cd	11.2 c-f	10.0 cde	14.6 cde	16.0 c-k	16.0 c-f
17	A8574	0.42 fl oz/1000 ft2	ACEGIKM	5.0 cde	5.6 c-f	5.0 def	10.0 d-g	8.0 d-g	17.0 cde	16.0 c-k	17.0 cde
18	A18281	1.0 fl oz/1000 ft2	ACEGIKM	15.4 a	14.0 abc	10.0 de	12.0 cde	5.0 d-g	5.0 de	5.0 f-k	5.0 efg
19	A19858	0.6 fl oz/1000 ft2	ACEGIKM	4.0 cde	1.6 ef	2.0 ef	7.0 d-g	3.0 d-g	10.0 de	5.0 f-k	4.0 efg
20	Briskway	0.62 fl oz/1000 ft2	ACEGIKM	0.6 e	0.0 f	1.0 ef	0.0 g	0.0 g	0.4 e	2.0 h-k	0.0 g
	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM								
21	Briskway	0.5 fl oz/1000 ft2	ACEGIKM	3.4 cde	6.0 c-f	2.0 ef	5.0 efg	3.0 d-g	8.0 de	10.6 d-k	7.0 efg
	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM								
22	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	2.0 cde	2.2 def	1.0 ef	3.6 efg	5.2 d-g	12.4 de	20.0 c-g	11.0 d-g
	Appear	6.0 fl oz/1000 ft2	ACEGIKM								
23	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	4.2 cde	7.0 c-f	4.0 def	9.0 d-g	5.0 d-g	13.0 de	18.4 c-h	13.0 c-g
	Appear	4.0 fl oz/1000 ft2	ACEGIKM								
24	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	2.4 cde	3.2 def	2.0 ef	3.0 efg	2.0 efg	6.0 de	7.6 e-k	9.6 efg
	Appear	3.0 fl oz/1000 ft2	ACEGIKM								
25	Concert	4.0 fl oz/1000 ft2	AEGIKM	2.4 cde	2.0 ef	2.4 ef	3.0 efg	2.0 efg	3.4 de	6.4 f-k	2.0 efg
	Appear	6.0 fl oz/1000 ft2	ACEGIKM								
26	A13703	0.62 fl oz/1000 ft2	ACEGIKM	0.4 e	0.2 f	0.0 f	0.0 g	0.0 g	0.0 e	0.0 k	0.0 g
	Appear	6.0 fl oz/1000 ft2	ACEGIKM								
27	EXC948	3.6 fl oz/1000 ft2	ACEGIKM	2.0 cde	4.0 def	5.0 def	8.0 d-g	8.2 d-g	12.6 de	20.2 c-f	8.0 efg
	Signature	4.0 oz/1000 ft2	ACEGIKM								
28	Daconil Ultrex	3.2 oz/1000 ft2	ACEGIKM	1.0 de	1.4 ef	1.0 ef	3.4 efg	3.0 d-g	4.6 de	7.0 e-k	4.2 efg
	Signature	4.0 oz/1000 ft2	ACEGIKM								
29	A13703	0.62 fl oz/1000 ft2	ACEGIKM	4.0 cde	4.0 def	1.0 ef	1.0 fg	1.0 fg	4.4 de	4.0 f-k	2.0 efg
	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM								
30	Disarm 480 SC	0.36 fl oz/1000 ft2	ACEGIKM	3.0 cde	3.6 def	1.0 ef	1.0 fg	1.4 efg	5.0 de	5.0 f-k	4.0 efg
31	Disarm C	6.0 fl oz/1000 ft2	ACEGIKM	1.8 cde	1.0 ef	1.0 ef	1.0 fg	1.0 fg	1.0 de	1.0 jk	0.0 g
32	Endorse	4.0 oz/1000 ft2	ACEGIKM	7.2 b-e	8.6 b-f	21.0 bc	20.8 bc	20.0 b	31.0 abc	25.4 bcd	35.0 b







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Description				% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	Turf Quality
Rating Date				Jul-5-2012	Jul-11-2012	Jul-18-2012	Jul-25-2012	Aug-8-2012	Aug-15-2012	Aug-23-2012	Aug-30-2012	Aug-8-2012
Rating Type				PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	QUALIT
Rating Unit				%	%	%	%	%	%	%	%	1-9
Number of Subsamples				1	1	1	1	1	1	1	1	1
Days After First/Last Applic.				- 1	- 7	- 7	- 7	- 7	- 14	- 1	- 1	- 7
Trt-Eval Interval				15 DA-A	21 DA-A	28 DA-A	35 DA-A	49 DA-A	56 DA-A	64 DA-A	71 DA-A	49 DA-A
Plant-Eval Interval				1917 DP-1	1923 DP-1	1930 DP-1	1937 DP-1	1951 DP-1	1958 DP-1	1966 DP-1	1973 DP-1	1951 DP-1
Trt No.	Treatment Name	Rate	Appl Code	9	10	11	12	13	14	15	16	17
16	A8574	0.22 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	1.0 a	0.0 a	0.0 a	2.0 cd	0.0 c	1.0 a	5.60 d-i
17	A8574	0.42 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	1.4 a	0.0 d	1.0 bc	3.0 a	5.50 d-i
18	A18281	1.0 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	1.0 a	0.0 a	2.6 a	5.0 ab	4.0 ab	3.0 a	5.60 d-i
19	A19858	0.6 fl oz/1000 ft2	ACEGIKM	1.0 a	0.0 a	1.0 a	0.0 a	0.0 a	3.0 abc	5.0 a	0.0 a	5.70 c-h
20	Briskway	0.62 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.6 cd	0.0 c	0.0 a	7.10 a
	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM									
21	Briskway	0.5 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	6.60 abc
	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM									
22	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.0 cd	0.0 c	0.0 a	6.30 a-e
	Appear	6.0 fl oz/1000 ft2	ACEGIKM									
23	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	5.90 b-g
	Appear	4.0 fl oz/1000 ft2	ACEGIKM									
24	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	2.0 cd	0.0 c	0.0 a	6.30 a-e
	Appear	3.0 fl oz/1000 ft2	ACEGIKM									
25	Concert	4.0 fl oz/1000 ft2	AEGIKM	2.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	3.0 a	6.00 b-g
	Appear	6.0 fl oz/1000 ft2	ACEGIKM									
26	A13703	0.62 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	6.80 ab
	Appear	6.0 fl oz/1000 ft2	ACEGIKM									
27	EXC948	3.6 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	5.30 f-j
	Signature	4.0 oz/1000 ft2	ACEGIKM									
28	Daconil Ultrex	3.2 oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	6.40 a-d
	Signature	4.0 oz/1000 ft2	ACEGIKM									
29	A13703	0.62 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	1.0 a	0.0 d	0.0 c	0.0 a	6.40 a-d
	Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM									
30	Disarm 480 SC	0.36 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	2.0 a	0.0 a	0.0 a	1.0 cd	0.0 c	0.0 a	6.40 a-d
31	Disarm C	6.0 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	1.0 bc	0.0 a	7.00 a
32	Endorse	4.0 oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	1.0 a	0.0 a	0.0 a	0.0 d	0.0 c	2.0 a	4.70 ijk

## University of California, Riverside

### 2012 Turf Disease Trial: Management of Anthracnose on Annual Bluegrass

Trial ID: Anthracnose 2012      Protocol ID:  
 Location:                              Study Director:  
 Project ID:                             Investigator: James H. Baird  
    Sponsor Contact:

Description	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	% Phytotoxicity	Turf Quality	
Rating Date	Jul-5-2012	Jul-11-2012	Jul-18-2012	Jul-25-2012	Aug-8-2012	Aug-15-2012	Aug-23-2012	Aug-30-2012	Aug-8-2012	Aug-8-2012	
Rating Type	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	PHYCHL	QUALIT	
Rating Unit	%	%	%	%	%	%	%	%	%	1-9	
Number of Subsamples	1	1	1	1	1	1	1	1	1	1	
Days After First/Last Applic.	- 1	- 7	- 7	- 7	- 7	- 14	- 1	- 1	- 1	- 7	
Trt-Eval Interval	15 DA-A	21 DA-A	28 DA-A	35 DA-A	49 DA-A	56 DA-A	64 DA-A	71 DA-A	49 DA-A	49 DA-A	
Plant-Eval Interval	1917 DP-1	1923 DP-1	1930 DP-1	1937 DP-1	1951 DP-1	1958 DP-1	1966 DP-1	1973 DP-1	1951 DP-1		
Trt Treatment	Rate	Appl									
No. Name	Rate Unit	Code	9	10	11	12	13	14	15	16	17
33 Tourney	0.37 oz/1000 ft2	A	2.0 a	2.0 a	0.0 a	0.0 a	0.0 a	0.4 cd	0.0 c	1.0 a	6.20 a-f
Insignia	0.9 fl oz/1000 ft2	C									
Tourney	0.37 oz/1000 ft2	E									
Insignia	0.9 fl oz/1000 ft2	G									
Signature	4.0 oz/1000 ft2	I									
Daconil Ultrex	3.2 oz/1000 ft2	I									
Tourney	0.37 oz/1000 ft2	K									
Signature	4.0 oz/1000 ft2	M									
Daconil Ultrex	3.2 oz/1000 ft2	M									
34 PK Plus	6.0 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	1.0 a	0.0 a	3.0 a	0.0 d	0.0 c	0.0 a	6.40 a-d
Daconil Action	2.5 fl oz/1000 ft2	ACEGIKM									
35 Daconil Action	2.5 fl oz/1000 ft2	ACEGIKM	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	5.60 d-i
36 Torque	0.6 fl oz/1000 ft2	AEIM	0.0 a	0.0 a	0.0 a	0.0 a	2.0 a	2.0 cd	4.0 ab	6.6 a	6.20 a-f
Legend	3.0 fl oz/1000 ft2	AEIM									
Affirm	0.9 oz/1000 ft2	CGK									
Spectro	3.6 oz/1000 ft2	CGK									
LSD (P=.05)			1.41	0.93	1.67	0.47	2.21	2.68	3.29	4.06	0.961
Standard Deviation			1.13	0.75	1.34	0.37	1.77	2.14	2.63	3.24	0.767
CV			810.08	1341.64	320.89	1341.64	387.98	240.76	345.17	369.37	12.97
Replicate F			0.549	1.000	1.360	1.000	1.301	1.070	1.917	1.652	9.903
Replicate Prob(F)			0.7003	0.4098	0.2511	0.4098	0.2727	0.3735	0.1109	0.1646	0.0001
Treatment F			0.937	1.000	1.339	1.000	1.107	2.065	1.762	1.316	4.404
Treatment Prob(F)			0.5739	0.4786	0.1206	0.4786	0.3312	0.0016	0.0113	0.1347	0.0001







# University of California, Riverside

## 2012 Turf Disease Trial: Management of Anthracnose on Annual Bluegrass

Trial ID: Anthracnose 2012      Protocol ID:  
 Location:                              Study Director:  
 Project ID:                             Investigator: James H. Baird  
    Sponsor Contact:

Description	Turf Quality	Turf Quality	Turf Quality	NDVI ratings	NDVI ratings	NDVI ratings	NDVI ratings	Summer Patch	Summer Patch		
Rating Date	Aug-15-2012	Aug-23-2012	Aug-30-2012	Aug-8-2012	Aug-15-2012	Aug-23-2012	Aug-30-2012	Aug-23-2012	Aug-30-2012		
Rating Type	QUALIT	QUALIT	QUALIT	NDVI	NDVI	NDVI	NDVI	COVER	COVER		
Rating Unit	1-9	1-9	1-9	0-1	0-1	0-1	0-1	%	%		
Number of Subsamples	1	1	1	1	1	1	1	1	1		
Days After First/Last Applic.	- 14	- 1	- 1	- 7	- 14	- 1	- 1	- 1	- 1		
Trt-Eval Interval	56 DA-A	64 DA-A	71 DA-A	49 DA-A	56 DA-A	64 DA-A	71 DA-A	64 DA-A	71 DA-A		
Plant-Eval Interval	1958 DP-1	1966 DP-1	1973 DP-1	1951 DP-1	1958 DP-1	1966 DP-1	1973 DP-1	1966 DP-1	1973 DP-1		
Trt Treatment	Rate	Appl	18	19	20	21	22	23	24	25	26
No. Name	Rate Unit	Code									
16 A8574	0.22 fl oz/1000 ft2	ACEGIKM	5.00 def	4.80 f-k	4.30 i-l	0.848 b-h	0.834 a	0.798 a-f	0.808 a-h	0.0 a	2.0 cd
17 A8574	0.42 fl oz/1000 ft2	ACEGIKM	5.40 b-e	5.30 b-i	4.90 g-j	0.834 d-i	0.834 a	0.786 b-h	0.796 b-i	1.0 a	2.0 cd
18 A18281	1.0 fl oz/1000 ft2	ACEGIKM	5.50 b-e	5.50 b-h	5.30 e-h	0.830 f-i	0.850 a	0.824 a-d	0.824 a-e	2.6 a	4.0 a-d
19 A19858	0.6 fl oz/1000 ft2	ACEGIKM	5.30 b-e	5.20 c-j	5.30 e-h	0.828 ghi	0.828 a	0.786 b-h	0.812 a-g	0.0 a	1.0 cd
20 Briskway	0.62 fl oz/1000 ft2	ACEGIKM	6.80 a	6.70 a	7.30 a	0.872 ab	0.870 a	0.844 a	0.842 a	0.0 a	0.0 d
Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM									
21 Briskway	0.5 fl oz/1000 ft2	ACEGIKM	6.20 a-d	5.90 a-e	6.30 bcd	0.866 abc	0.848 a	0.814 a-e	0.818 a-f	0.0 a	0.0 d
Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM									
22 Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	5.60 a-e	4.80 f-k	5.10 e-j	0.858 a-d	0.826 a	0.768 e-h	0.790 c-j	0.0 a	0.0 d
Appear	6.0 fl oz/1000 ft2	ACEGIKM									
23 Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	5.40 b-e	4.60 h-k	5.00 f-j	0.848 b-h	0.838 a	0.794 a-g	0.788 d-j	3.4 a	3.0 a-d
Appear	4.0 fl oz/1000 ft2	ACEGIKM									
24 Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM	5.70 a-e	5.20 c-j	5.10 e-j	0.854 b-f	0.842 a	0.812 a-f	0.806 a-h	2.8 a	4.0 a-d
Appear	3.0 fl oz/1000 ft2	ACEGIKM									
25 Concert	4.0 fl oz/1000 ft2	AEGIKM	6.10 a-e	5.20 c-j	5.10 e-j	0.866 abc	0.864 a	0.828 abc	0.820 a-f	3.0 a	4.6 abc
Appear	6.0 fl oz/1000 ft2	ACEGIKM									
26 A13703	0.62 fl oz/1000 ft2	ACEGIKM	6.50 ab	6.30 ab	7.00 ab	0.858 a-d	0.848 a	0.832 ab	0.832 ab	2.0 a	0.0 d
Appear	6.0 fl oz/1000 ft2	ACEGIKM									
27 EXC948	3.6 fl oz/1000 ft2	ACEGIKM	5.40 b-e	4.70 g-k	5.00 f-j	0.838 d-h	0.800 a	0.780 c-h	0.790 c-j	1.0 a	3.0 a-d
Signature	4.0 oz/1000 ft2	ACEGIKM									
28 Daconil Ultrex	3.2 oz/1000 ft2	ACEGIKM	6.10 a-e	5.20 c-j	5.20 e-i	0.858 a-d	0.854 a	0.822 a-d	0.808 a-h	4.0 a	5.0 abc
Signature	4.0 oz/1000 ft2	ACEGIKM									
29 A13703	0.62 fl oz/1000 ft2	ACEGIKM	5.90 a-e	6.00 a-e	6.50 a-d	0.868 ab	0.854 a	0.826 abc	0.832 ab	0.0 a	0.0 d
Daconil Action	3.5 fl oz/1000 ft2	ACEGIKM									
30 Disarm 480 SC	0.36 fl oz/1000 ft2	ACEGIKM	6.10 a-e	6.10 a-d	6.30 bcd	0.864 abc	0.752 a	0.836 ab	0.834 ab	0.0 a	0.0 d
31 Disarm C	6.0 fl oz/1000 ft2	ACEGIKM	6.30 abc	6.20 abc	6.70 abc	0.880 a	0.868 a	0.832 ab	0.842 a	1.0 a	0.0 d
32 Endorse	4.0 oz/1000 ft2	ACEGIKM	3.90 fg	4.20 jkl	3.90 klm	0.824 hi	0.792 a	0.740 hi	0.752 jk	0.0 a	0.0 d

# University of California, Riverside

## 2012 Turf Disease Trial: Management of Anthracnose on Annual Bluegrass

Trial ID: Anthracnose 2012      Protocol ID:  
 Location:                              Study Director:  
 Project ID:                             Investigator: James H. Baird  
    Sponsor Contact:

Description	Turf Quality Aug-15-2012	Turf Quality Aug-23-2012	Turf Quality Aug-30-2012	NDVI ratings Aug-8-2012	NDVI ratings Aug-15-2012	NDVI ratings Aug-23-2012	NDVI ratings Aug-30-2012	Summer Patch Aug-23-2012	Summer Patch Aug-30-2012		
Rating Date	QUALIT	QUALIT	QUALIT	NDVI	NDVI	NDVI	NDVI	COVER	COVER		
Rating Type	1-9	1-9	1-9	0-1	0-1	0-1	0-1	%	%		
Rating Unit	1	1	1	1	1	1	1	1	1		
Number of Subsamples	- 14	- 1	- 1	- 7	- 14	- 1	- 1	- 1	- 1		
Days After First/Last Applic.	56 DA-A	64 DA-A	71 DA-A	49 DA-A	56 DA-A	64 DA-A	71 DA-A	64 DA-A	71 DA-A		
Trt-Eval Interval	1958 DP-1	1966 DP-1	1973 DP-1	1951 DP-1	1958 DP-1	1966 DP-1	1973 DP-1	1966 DP-1	1973 DP-1		
Plant-Eval Interval											
Trt Treatment	Rate	Appl	18	19	20	21	22	23	24	25	26
No. Name	Rate Unit	Code									
33 Tourney	0.37 oz/1000 ft2	A	6.10 a-e	5.80 a-f	5.20 e-i	0.842 c-h	0.846 a	0.810 a-f	0.820 a-f	1.4 a	3.2 a-d
Insignia	0.9 fl oz/1000 ft2	C									
Tourney	0.37 oz/1000 ft2	E									
Insignia	0.9 fl oz/1000 ft2	G									
Signature	4.0 oz/1000 ft2	I									
Daconil Ultrex	3.2 oz/1000 ft2	I									
Tourney	0.37 oz/1000 ft2	K									
Signature	4.0 oz/1000 ft2	M									
Daconil Ultrex	3.2 oz/1000 ft2	M									
34 PK Plus	6.0 fl oz/1000 ft2	ACEGIKM	5.40 b-e	5.20 c-j	4.90 g-j	0.848 b-h	0.842 a	0.814 a-e	0.810 a-g	6.0 a	7.2 a
Daconil Action	2.5 fl oz/1000 ft2	ACEGIKM									
35 Daconil Action	2.5 fl oz/1000 ft2	ACEGIKM	5.40 b-e	5.00 e-j	5.00 f-j	0.836 d-i	0.848 a	0.810 a-f	0.814 a-g	1.6 a	3.0 a-d
36 Torque	0.6 fl oz/1000 ft2	AEIM	5.50 b-e	5.10 d-j	5.20 e-i	0.856 a-e	0.848 a	0.812 a-f	0.816 a-g	1.6 a	1.0 cd
Legend	3.0 fl oz/1000 ft2	AEIM									
Affirm	0.9 oz/1000 ft2	CGK									
Spectro	3.6 oz/1000 ft2	CGK									
LSD (P=.05)	1.220	1.040	0.947	0.0255	0.0684	0.0503	0.0405	3.73	4.25		
Standard Deviation	0.974	0.831	0.756	0.0204	0.0546	0.0402	0.0324	2.98	3.39		
CV	17.61	15.77	14.24	2.41	6.54	5.02	4.01	206.84	194.95		
Replicate F	9.030	4.543	7.482	15.125	7.659	12.657	14.769	1.760	0.975		
Replicate Prob(F)	0.0001	0.0018	0.0001	0.0001	0.0001	0.0001	0.0001	0.1403	0.4234		
Treatment F	3.297	4.001	8.286	4.596	1.408	2.945	3.010	1.316	1.788		
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001	0.0850	0.0001	0.0001	0.1347	0.0096		

# University of California, Riverside

## 2012 Turf Disease Trial: Management of Anthracnose on Annual Bluegrass

Trial ID: Anthracnose 2012      Protocol ID:  
Location:                      Study Director:  
Project ID:                     Investigator: James H. Baird  
   Sponsor Contact:

Rating Type

PHYCHL = phytotoxicity - chlorosis  
QUALIT = quality  
NDVI = normalized difference vegetation index

Rating Unit

% = percent  
1-9 = 1-9 index/scale  
0-1 = 0-1 index/scale

Plant-Eval Interval

1917 DP-1 = 1 POAAN Apr-6-2007  
1923 DP-1 = 1 POAAN Apr-6-2007  
1930 DP-1 = 1 POAAN Apr-6-2007  
1937 DP-1 = 1 POAAN Apr-6-2007  
1951 DP-1 = 1 POAAN Apr-6-2007  
1958 DP-1 = 1 POAAN Apr-6-2007  
1966 DP-1 = 1 POAAN Apr-6-2007  
1973 DP-1 = 1 POAAN Apr-6-2007

Trial Comments