

Stop #3: Evaluation of Fungicides for Control of Anthracnose and Summer Patch Diseases on Annual Bluegrass Putting Greens

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Objectives:

This study was conducted to evaluate ability of twenty-three different fungicide treatments to control foliar and basal rot anthracnose (*Colletotrichum cereale*) and summer patch (*Magnaporthe poae*) diseases preventatively on an annual bluegrass (*Poa annua*) maintained as a golf course putting green.

Materials and Methods:

The study was conducted on mature annual bluegrass (*Poa annua*) turf on a Hanford fine sandy loam amended with sand. Turf was mowed three days/wk at 0.125 inches and received 0.125 lbs N/1000ft² every 14 days and monthly sand topdressing.

Fungicide treatments were applied every 14 days beginning on June 9, 2017 (before disease symptoms were present) and ending on September 12 for a total of 8 applications. Treatments were applied using a CO₂-powered backpack sprayer with TeeJet 8004VS nozzles calibrated to deliver 2 gallons/1000 ft².

Plots were evaluated for turf quality, injury caused by treatments, and anthracnose and summer patch disease pressure on a weekly basis starting July 18. Volumetric water content, soil temperature, NDVI ratings and digital image analysis (DIA) were taken on biweekly basis starting from June 13.

Experimental design was a randomized block with 4 replications. Plot size was 4 x 6 ft with 2-ft alleys.

Results:

Temperatures and humidity were unusually high and persistent throughout the study this year. Treatments containing Primo Maxx and or most DMI fungicides caused significant turf injury at the onset of applications (Table 2). Primo Maxx injury turned into darker green, higher quality turf between the second and third applications; whereas injury from DMI fungicides tended to persist longer but generally subsided as the study progressed (data not shown).

Historically, anthracnose disease pressure is severe on this research putting green with sporadic occurrence of summer patch disease. This year, summer patch was more prevalent due to extreme weather conditions; however, there were no significant differences among treatments (data not shown). That said, summer patch symptoms appeared slightly more prevalent in the untreated control as well as the

following treatments: Affirm; NUP-15014; Rotator; Syngenta Program #5; UCR 001, 002, and 004; and Torque (data not shown).

Significant anthracnose pressure and treatment differences started around August 1 (data not shown). By the end of August, the best treatments in terms of lowest disease cover and highest turf quality included: rotation of Heritage Action + Primo Maxx with Daconil Action + Primo Maxx (Syngenta Program #1); rotation of Briskway + Primo Maxx with Daconil Action + Primo Maxx (Syngenta Program #4); rotation among several fungicides including Mirage, Signature Xtra Stressgard, Insignia and Daconil Ultrex (Bayer Program #2); rotation among several fungicides including Mirage, Signature WDG, Medallion, Insignia and Daconil Ultrex (Bayer Program #5); rotation of Insignia + Daconil Ultrex with Daconil Ultrex; and Headway (Table 2).

Acknowledgments:

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Table 1. Treatment tested in the anthracnose and summer patch fungicide trial in Riverside, CA. 2017.

No.	Treatments	Application code (timing)	Rate (oz/1000 ft ²)	
1	Untreated Control	-	-	
2	Bayer Program No. 1	Mirage	A	1.5
		Signature Xtra Stressgard	B	4
		Daconil Ultrex		3.2
		Mirage	C	1
		Insignia		0.7
		Signature Xtra Stressgard	D	4
		Daconil Ultrex		3.2
		Insignia	E	0.7
		Mirage		1
		Signature Xtra Stressgard	F	4
		Daconil Ultrex		3.2
		Signature Xtra Stressgard	G	4
		Mirage		1
		Signature Xtra Stressgard	H	4
Daconil Ultrex	3.2			
3	Bayer Program No. 2	Mirage	A	1.5
		Primo Maxx		0.1
		Signature Xtra Stressgard	B	4
		Daconil Ultrex		3.2
		Primo Maxx		0.1
		Mirage	C	1
		Insignia		0.7
		Signature Xtra Stressgard	D	4
		Daconil Ultrex		3.2
		Insignia	E	0.7
		Mirage		1
		Signature Xtra Stressgard	F	4
		Daconil Ultrex		3.2
		Signature Xtra Stressgard	G	4
Mirage	1			
Signature Xtra Stressgard	H	4		
Daconil Ultrex		3.2		
4	Bayer Program No. 3 (continued on next page)	Mirage	A	1.5
		Primo Maxx		0.1
		Signature Xtra Stressgard	B	4
		Daconil Ultrex		3.2
		Primo Maxx		0.1
		Medallion	C	2
		Insignia		0.7

4	Bayer Program No. 3 (continued from the previous page)	Signature Xtra Stressgard	D	4
		Daconil Ultrex		3.2
		Insignia	E	0.7
		Medallion		2
		Signature Xtra Stressgard	F	4
		Daconil Ultrex		3.2
		Signature Xtra Stressgard	G	4
		Mirage		1
		Signature Xtra Stressgard	H	4
		Daconil Ultrex		3.2
5	Bayer Program No. 4	Mirage	A	1.5
		Primo Maxx		0.1
		Signature WDG	B	4
		Daconil Ultrex		3.2
		Primo Maxx		0.1
		Mirage	C	1
		Insignia		0.7
		Signature WDG	D	4
		Daconil Ultrex		3.2
		Insignia	E	0.7
		Mirage		1
		Signature WDG	F	4
		Daconil Ultrex		3.2
		Signature WDG	G	4
		Mirage		1
		Signature WDG	H	4
		Daconil Ultrex		3.2
		6	Bayer Program No. 5	Mirage
Primo Maxx	0.1			
Signature WDG	B			4
Daconil Ultrex				3.2
Primo Maxx				0.1
Medallion	C			2
Insignia				0.7
Signature WDG	D			4
Daconil Ultrex				3.2
Insignia	E			0.7
Medallion				2
Signature WDG	F			4
Daconil Ultrex				3.2
Signature WDG	G			4
Mirage				1
Signature WDG	H			4
Daconil Ultrex				3.2
7	Affirm			ABCDEFGH
8	NUP-15014	ABCDEFGH	1.3	

9	Rotator		ABCDEFGH	0.5
10	Syngenta Program No. 1	Heritage Action	ACEG	0.4
		Primo Maxx		0.1
		Daconil Action	BDFH	3.5
		Primo Maxx		0.1
11	Syngenta Program No. 2	A22063A	ACEG	0.5
		Heritage Action		0.4
		Primo Maxx		0.1
		Daconil Action	BDFH	3.5
		A22063A		0.5
		Primo Maxx		0.1
12	Syngenta Program No. 3	Velista	ACEG	0.5
		Primo Maxx		0.1
		Daconil Action	BDFH	3.5
		Primo Maxx		0.1
13	Syngenta Program No. 4	Briskway	ACEG	0.7
		Primo Maxx		0.1
		Daconil Action	BDFH	3.5
		Primo Maxx		0.1
14	Syngenta Program No. 5	A14658	ABCDEFGH	6
		Daconil Action		3.5
15	Syngenta Program No. 6	Signature Xtra Stressgard	ABCDEFGH	4
		Daconil Action		3.5
16	Insignia	ACEG	0.7	
	Daconil Ultrex		3.2	
	Daconil Ultrex	BDFH	3.2	
17	UCR 001		ABCDEFGH	--
18	UCR 002		ABCDEFGH	--
19	Torque		ABCDEFGH	1.1
20	UCR 004		ABCDEFGH	--
21	Headway		ABCDEFGH	3
22	UCR 006		CDEFGH	--
23	UCR 007		CDEFGH	--

Application codes / timing:

A – 06/09/2017
B – 06/20/2017
C – 07/04/2017
D – 07/18/2017
E – 08/01/2017
F – 08/15/2017
G – 08/29/2017
H – 09/12/2017

Anthracnose/Summer Patch Fungicide Trial Plot Plan

113	112	111	110	109	108	107	106	105	104	103	102	101
Trt 13	Trt 12	Trt 11	Trt 10	Trt 9	Trt 8	Trt 7	Trt 6	Trt 5	Trt 4	Trt 3	Trt 2	Trt 1

213	212	211	210	209	208	207	206	205	204	203	202	201
Trt 14	Trt 15	Trt 16	Trt 17	Trt 18	Trt 19	Trt 20	Trt 21	Trt 13	Trt 1	Trt 8	Trt 10	Trt 6

313	312	311	310	309	308	307	306	305	304	303	302	301
Trt 14	Trt 4	Trt 21	Trt 7	Trt 18	Trt 16	Trt 11	Trt 19	Trt 5	Trt 12	Trt 2	Trt 20	Trt 3

413	412	411	410	409	408	407	406	405	404	403	402	401
Trt 15	Trt 9	Trt 17	Trt 13	Trt 16	Trt 8	Trt 11	Trt 7	Trt 20	Trt 18	Trt 10	Trt 14	Trt 21

→
N

513	512	511	510	509	508	507	506	505	504	503	502	501
Trt 12	Trt 19	Trt 3	Trt 15	Trt 6	Trt 4	Trt 17	Trt 5	Trt 2	Trt 1	Trt 9	Trt 21	Trt 11

613	612	611	610	609	608	607	606	605	604	603	602	601
Trt 7	Trt 16	Trt 10	Trt 1	Trt 3	Trt 14	Trt 18	Trt 12	Trt 9	Trt 6	Trt 15	Trt 17	Trt 8

713	712	711	710
Trt 19	Trt 5	Trt 13	Trt 22

704	703	702	701
Trt 23	Trt 20	Trt 2	Trt 4

813	812	811
Trt 23	Trt 22	Trt 23

803	802	801
Trt 22	Trt 23	Trt 22

Table 2. Injury [0-100%] caused by fungicides on annual bluegrass turf and effect of treatments on turf quality [1-9, 9 = best] and anthracnose cover [0-100%]. Riverside, CA. 2017.

No.	Treatment	Injury		Turf quality		Anthracnose	
		06/27/2017		08/29/2017		08/29/2017	
1	Untreated Control	0	G	3.2	DE	56	ABCD
2	Bayer Program No. 1	1	G	5.2	ABCD	29	CDEF
3	Bayer Program No. 2	39	BC	5.8	ABC	15	EF
4	Bayer Program No. 3	25	CDE	5.2	ABCD	24	EF
5	Bayer Program No. 4	55	A	5.5	ABC	24	EF
6	Bayer Program No. 5	45	AB	5.5	ABC	10	EF
7	Affirm	0	G	3.2	DE	60	ABC
8	NUP-15014	16	EF	4.5	ABCD	25	DEF
9	Rotator	0	G	4.0	CDE	24	EF
10	Syngenta Program No. 1	20	DE	6.2	AB	4	F
11	Syngenta Program No. 2	12	EFG	5.8	ABC	16	EF
12	Syngenta Program No. 3	25	CDE	5.0	ABCD	20	EF
13	Syngenta Program No. 4	32	BCD	6.5	A	15	EF
14	Syngenta Program No. 5	0	G	4.0	CDE	31	CDEF
15	Syngenta Program No. 6	0	G	4.0	CDE	21	EF
16	Insignia Daconil Ultrex	0	G	5.8	ABC	16	EF
17	UCR 001	0	G	4.8	ABCD	36	BCDE
18	UCR 002	0	G	4.0	CDE	35	CDEF
19	Torque	11	EFG	4.5	ABCD	18	EF
20	UCR 004	0	G	4.2	BCD	35	CDEF
21	Headway	2	FG	5.5	ABC	6	EF
22	UCR 006	0	G	2.0	E	68	AB
23	UCR 007	0	G	2.0	E	71	A

Means followed by the same letter in a column are not significantly different (P=0.05).