

STOP #1: Effects of Fungicide Programs on Creeping Bentgrass Quality and Recovery from Aeration and Drought Stress

Jim Baird, Marco Schiavon, Giulio Cremonese, and Tyler Mock
Department of Botany and Plant Sciences,
University of California, Riverside, CA 92521

Background:

Certain fungicides can have secondary benefits on plant health in addition to providing disease control. Previous field and greenhouse research conducted by UCR has demonstrated that fungicide plant health benefits in response to water deficit stress are minimal when disease pressure is negligible or absent.

Objectives:

Evaluate fungicide program effects on the rate of recovery following core aeration and the onset of drought stress and recovery following irrigation.

Study Conditions:

Soil:	Sand
Species:	'Pure Distinction' Creeping Bentgrass
Height:	0.125 inches; 5 times/wk
Spray Information:	CO ₂ -powered backpack sprayer TeeJet 8003VS nozzles; 9-inch spacing; 2 gal/M
Design:	Randomized block (by drainage patterns/history of drought stress symptoms); 9 replications
Plot size:	4 ft x 6 ft; 2-ft alleys
Important Dates:	17 April 2015 (1 st fungicide application) 1 May 2015 (2 nd) 18 May 2015 (3 rd) 29 May 2015 (4 th) 4 June 2015 (1/2-inch tine core aeration + sand) 14 June 2015 (5 th) 27 June 2015 (6 th) 29 June to 6 July 2015 (water withheld) 10 July 2015 (7 th) 28 July 2015 (8 th) 5 August 2015 (solid tine aeration + sand) 13 August 2015 (9 th) 21 August 2015 (10 th) 3 September 2015 (11 th) 10 September 2015 (1/2-inch tine core aeration + sand) 18 September 2015 (12 th)

Treatments:

1. Syngenta Basic

Date	Product	Rate (oz/M)
April 17	Headway	3.0
May 1	Heritage	0.4
	Qualibra	6.0
May 18	Daconil Weather Stik	3.6
	Signature	4.0
	Primo Maxx	0.125
May 29	Heritage	0.4
	Qualibra	6.0
June 4	Core Aeration	
June 14	Daconil Weather Stik	3.6
	Signature	4.0
	Primo Maxx	0.125
June 27	Heritage	0.4
	Qualibra	6.0
June 29 to July 6	Dry Down	
July 10	Daconil Weather Stik	3.6
	Signature	4.0
	Primo Maxx	0.125
July 28	Daconil Weather Stik	3.6
	Signature	4.0
	Heritage	0.4
	Primo Maxx	0.125
	Qualibra	6.0
August 5	Solid Tine Aeration	
August 13	Daconil Weather Stik	3.6
	Signature	4.0
	Primo Maxx	0.125
August 21	Daconil Weather Stik	3.6
	Signature	4.0
	Primo Maxx	0.125
September 3	Heritage	0.4
	Qualibra	6.0
September 10	Core Aeration	
September 18	Daconil Weather Stik	3.6
	Signature	4.0
	Primo Maxx	0.125

2. Syngenta Premium

Date	Product	Rate (oz/M)
April 17	Headway	3.0
	Secure	0.5
May 1	Heritage Action	0.4
	Qualibra	6.0
May 18	Daconil Action	3.5
	Appear	6.0
	Primo Maxx	0.125
May 29	Heritage Action	0.4
	Qualibra	6.0
June 4	Core Aeration	
June 14	Daconil Action	3.5
	Appear	6.0
	Velista	0.5
	Primo Maxx	0.125
June 27	Heritage Action	0.4
	Qualibra	6.0
June 29 to July 6	Dry Down	
July 10	Daconil Action	3.5
	Appear	6.0
	Velista	0.5
	Primo Maxx	0.125
July 28	Daconil Action	3.5
	Appear	6.0
	Briskway	0.72
	Primo Maxx	0.125
	Qualibra	6.0
August 5	Solid Tine Aeration	
August 13	Daconil Action	3.5
	Appear	6.0
	Velista	0.5
	Primo Maxx	0.125
August 21	Daconil Action	3.5
	Appear	6.0
	Velista	0.5
	Primo Maxx	0.125
September 3	Heritage Action	0.4
	Qualibra	6.0
September 10	Core Aeration	
September 18	Briskway	0.72
	Appear	6.0
	Primo Maxx	0.125

3. Control (minimal fungicide inputs)

Date	Product	Rate (oz/M)
April 17	Daconil Weather Stik	3.6
	Heritage	0.4
May 1		
May 18		
May 29	Daconil Weather Stik	3.6
June 4	Core Aeration	
June 14		
June 27	Heritage	0.4
June 29 to July 6	Dry Down	
July 10		
July 28	Heritage	0.4
August 5	Solid Tine Aeration	
August 13		
August 21	Daconil Weather Stik	3.6
September 3		
September 10	Core Aeration	
September 18	Heritage	0.4

4. Bayer

Date	Product	Rate (oz/M)
April 17	Tartan	2.0
May 1	Signature Xtra Stressgard	4.0
	Daconil Action	3.2
	Revolution	6.0
May 18	Tartan	2.0
May 29	Signature Xtra Stressgard	4.0
	Daconil Action	3.2
	Revolution	6.0
June 4	Core Aeration	
June 14	Signature Xtra Stressgard	4.0
	Daconil Action	3.2
June 27	Signature Xtra Stressgard	4.0
	Interface	4.0
	Revolution	6.0
June 29 to July 6	Dry Down	
July 10	Signature Xtra Stressgard	4.0
	Daconil Action	3.2
July 28	Signature Xtra Stressgard	4.0
	Honor	1.1
	Revolution	6.0
August 5	Solid Tine Aeration	
August 13	Signature Xtra Stressgard	4.0
	26GT	4.0
August 21	Signature Xtra Stressgard	4.0
	Honor	1.1
September 3	Signature Xtra Stressgard	4.0
	Interface	4.0
	Revolution	6.0
September 10	Core Aeration	
September 18	Interface	4.0

5. BASF

Date	Product	Rate (oz/M)
April 17	Encartis	0.3
May 1	Tourney Revolution	0.37 6.0
May 18	Signature Daconil Ultrex 26GT	2.0 3.2 4.0
May 29	Lexicon Intrinsic Revolution	0.34 6.0
June 4	Core Aeration	
June 14	Lexicon Intrinsic Daconil Ultrex	0.34 3.2
June 27	Lexicon Intrinsic Revolution	0.34 6.0
June 29 to July 6	Dry Down	
July 10	Signature Daconil Ultrex 26GT	2.0 3.2 4.0
July 28	Lexicon Intrinsic Revolution	0.34 6.0
August 5	Solid Tine Aeration	
August 13	Segway Tourney Daconil Ultrex	0.9 0.37 3.2
August 21	Lexicon Intrinsic	0.34
September 3	Signature Daconil Ultrex Tourney Revolution	4.0 3.2 0.37 6.0
September 10	Core Aeration	
September 18	Encartis	4.0

6. Control (no fungicides)

Date	Product	Rate (oz/M)
April 17		
May 1	Revolution	6.0
May 18	Primo Maxx	0.125
May 29	Revolution	6.0
June 4	Core Aeration	
June 14	Primo Maxx	0.125
June 27	Revolution	6.0
June 29 to July 6	Dry Down	
July 10	Primo Maxx	0.125
July 28	Primo Maxx Transition HC Revolution	0.125 3.0 6.0
August 5	Solid Tine Aeration	
August 13	Primo Maxx Transition HC	0.125 1.5
August 21	Primo Maxx Transition HC	0.125 1.5
September 3	Transition HC Revolution	3.0 6.0
September 10	Core Aeration	
September 18	Transition HC	1.5

Plot Plan (Field 12E-22):

North ↑

5	3	2	1	4
1	4	4	6	3
6	2	5	3	5
3	6	1	2	4
4	1	2	6	3
6	5	X	2	1
4	3	1	5	1
4	5	6	3	6
2	3	4	2	5
2	2	4	6	3
1	5	6	5	1

Results:

No.	Program	Green Cover (%) 29 June 2015	Green Cover (%) 6 July 2015	Green Cover (%) 14 August 2015
1	Syngenta Basic	98.3378 c	78.5517 d	79.5797 bc
2	Syngenta Premium	98.9906 b	86.7061 bcd	88.0794 ab
3	Control (Minimum inputs)	98.9633 b	93.2629 ab	75.2049 c
4	Bayer	99.7190 a	96.7210 a	87.2112 ab
5	BASF	99.0356 b	82.2748 cd	54.5170 d
6	Control (No fungicides)	98.1066 c	90.3167 abc	96.9729 a

Green cover analyzed using digital image analysis.

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

Preliminary Results:

- ✓ Despite 9 replications and attempts to block accordingly, there was considerable variation in soil conditions ranging from severe drought stress/LDS (SE corner) to no turf stress (NW corner). Data shown include all 9 replications/treatment. Preliminary data analysis with outlier plots removed did not appear to resolve this dilemma.
- ✓ No significant treatment differences were found for turf quality or soil moisture (TDR) throughout the study.
- ✓ Differences in % Green Cover were detected between June 24 and July 6, and on August 7 and 14 only.
- ✓ Differences in NDVI occurred from 29 June to 2 July 2015 only (data not shown).
- ✓ It appeared that the Bayer program helped to expedite turf recovery following the first core aeration. However, this and most of the other programs were not different from the controls following subsequent dry down and aeration events. Bayer contained the darkest green pigment among the fungicide treatments, which usually resulted in higher visual turf quality ratings and may have been responsible for increased green cover ratings using digital image analysis. To test this theory, Transition HC pigment was incorporated into the no fungicide control treatment (#6) beginning July 28. The green was aerated using solid tines and topdressed on August 5 to help recovery from turf loss during the dry down in early July. Subsequent Green Cover measurements showed the highest value for treatment #6. On the other hand, when NDVI was significant, lowest values were recorded for treatment #4 (the darkest green pigment).
- ✓ Thus far, these data support previous findings at UCR that fungicides have little or no positive impact on turf health in an environment where there is low disease pressure. However, in a separate ongoing fungicide trial in northern California, the secondary benefits of fungicides on turf health are clearly evident among visible anthracnose and rapid blight disease pressure.
- ✓ Core aeration was repeated 10 September 2015 and recovery measurements are being collected until October.