2011 Turfgrass Pathology Field Research

Texas AgriLife Extension
Department of Plant Pathology & Microbiology
Texas A&M University

December 25, 2011

I am very excited about sharing the results of the Turfgrass Pathology Field Research performed in Texas over the past year with you. The field tests for 2010/2011 included 14 field plot sites established at four golf courses and one sod farm, and Texas A&M University research farms located in College Station and Dallas. More than 3,000 miles were driven during the past year to set up plots, apply treatments and evaluate diseases. Many County Extension Agents, Golf Course Superintendents, Landscape Mangers and Sod Farmers have been associated with our research efforts and provided invaluable supports to complete productive field study for the past year. I believe this report provides research-based and locally-tested information to Texas turfgrass industry.

I am sincerely grateful for the tremendous industry support shown for the Texas A&M Turfgrass Pathology Program by BASF Corporation, Bayer Environmental Science, Cleary Chemical Corporation, Dow AgroSciences, Dupont Crop Protection, Quali-Pro, and Syngenta Professional Products. This field study is also sponsored by Turfgrass Producers of Texas (TPT) and Texas Turfgrass Research, Extension, and Education Endowment (TREEE).

I also would like to acknowledge and give special thanks to the golf course superintendents, golf club owners, and sod producers for participating in our research projects and providing us field research sites. Your volunteer effort made this research possible. Some of the great people that provided tremendous help include Eric Bauer and Tim Huber of the Club at Carlton Woods, George Manuel of Royal Oaks Country Club, George Cincotta of Riverbend Country Club, Nick Johnson of the Woodlands Country Club, Palmer Course, and Lindy Murff of Murff Turf Farms. Without the support of turf industry members like you, the Turfgrass Pathology Research and Extension Program would not be a success. I look forward to your continued support and collaborative relationship.

Sincerely,

Young-Ki Jo
Assistant Professor and Extension Specialist

Department of Plant Pathology and Microbiology
120 Peterson Building, 2132 TAMU
College Station, TX 77843
Phone: 979-862-1758
Email: ykjo@tamu.edu

Table of Contents

Disclaimer

The research results in this document are not intended to be management recommendations. Products, application procedures and other research methods used in this study may not be registered, legal for public use or beneficial for use in some situations. No endorsement of products is implied or intended. This publication was prepared and distributed by the Turfgrass Pathology Laboratory, Department of Plant Pathology and Microbiology, Texas A&M University as a service to the turfgrass industry and management professionals in Texas.

1. Efficacy of fall fungicide application for control of large patch on zoysiagrass in The Woodlands in the 2010-2011 winter

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on zoysiagrass.

Materials and Methods

Fungicide efficacy was evaluated on zoysiagrass cultivar ‘Zeon’ for control of large patch disease between the late fall, 2010 and spring, 2011. The field trial was conducted on the driving range (native soil with a 5-inch sand cap) located at the Club of Carlton Woods, Tom Fazio Championship Course in the Woodlands, TX. Individual plots measured 3 × 6 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gal dilute fungicide spray per 1000 ft^2. The application was performed twice on 5 Oct and 9 Nov 2010. Percent diseased area was measured in the following spring on 29 Mar 2011. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher’s Protected LSD (alpha = 0.05).

Results and Discussion

Spring green-up began and disease symptoms appeared in March on most plots. Statistically, there was significant improvement with certain fungicide combinations (please see Table 1) compared with the non-treated controls. Disease severity ratings significantly less than the control are in **bold**.

Table 1. Fungicide combination used for control of large patch on the zoysiagrass fairway in the fall, 2010

Tmt #	Treatment (Oct 5, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	Treatment (Nov 9, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	29-Mar-2011 Disease severity (%)	
1	Quali-Pro Ipro	4	QP Chlorothalonil DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	**21.25**	C-I
2	Quali-Pro TM	2	NEW QP CHLOR DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	**27.5**	C-G
3	QP Chlorothalonil DF	3.2	QP 642 Fungicide + Foursome	11.75 + 0.4	**16.25**	G-I
4	NEW QP CHLOR DF	3.2	QP 642 Fungicide	11.75	26.25	B-H
5	26 GT	4	26 GT	4	31.25	A-E
6	3336 plus	5	3336 plus	5	**23.75**	C-I
7	Daconil Ultrex	3.2	Daconil Ultrex	3.2	**20**	D-I
8	TRITON FLO	0.75	TRITON FLO	0.75	**23.75**	C-I
9	ProStar 70WP	2.2	TRITON FLO	0.5	**16.25**	GHI
10	TRITON FLO	0.5	TRITON FLO	0.5	**22.5**	C-I
11	TRITON FLO	0.75	TRITON FLO	0.75	**25**	C-H
12	ProStar 70WP	2.2	-	-	**20**	D-I
13	ProStar 70WP	2.2	TRITON FLO	0.75	**23.75**	C-I
14	DISARM 480 SC	0.18	DISARM 480 SC	0.18	31.25	A-E
15	DISARM 480 SC	0.36	DISARM 480 SC	0.36	28.75	B-G
16	Tartan	2	Tartan	2	30	A-F
17	Headway G	4 #/M	Headway G	4 #/M	28.75	B-G
18	Renown	4.5	Renown	4.5	**11.25**	I
19	Heritage wg	2	Heritage wg	2	**13.75**	HI
20	Banner Maxx	4	Banner Maxx	4	33.75	ABC
21	Eagle	2	Eagle	2	28.75	B-G
22	Insignia	0.9	Insignia	0.9	**17.5**	F-I
23	Trinity	2	Trinity	2	**18.75**	E-I
24	Fore	8	Fore	8	**13.75**	HI
25	PCNB	7.5 #/M	PCNB	7.5 #/M	32.5	A-D
26	Ammonium sulfate	16	Ammonium sulfate	16	28.75	B-G
27	Ammonium sulfate	32	Ammonium sulfate	32	28.75	B-G
28	Maxide disease killer	4 #/M	Maxide disease killer	4 #/M	**17.5**	F-I
29	Non-treated control	-	Non-treated control	-	42.5	A
30	Non-treated control	-	Non-treated control	-	38.75	AB

2. Efficacy of fall fungicide application for control of large patch on zoysiagrass in Dallas in the 2010-2011 winter

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Benjamin Wherley, and Ambica Chandra, Texas AgriLife Urban Solution Center, Dallas

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on zoysiagrass.

Materials and Methods

Fungicide efficacy was evaluated on zoysiagrass cultivar 'Cavalier' for control of large patch disease between the late fall, 2010 and spring, 2011. Field trials were conducted on the fairway located at Texas AgriLife Research & Extension Urban Solutions Center in Dallas. Individual plots measured 3 × 6 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gal dilute fungicide spray per 1000 ft^2. The application was performed once on 13 Oct 2010. Percent diseased area was measured in the following spring on 7 Apr 2011. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Spring green-up was delayed and still partially dormant in early April. Large patch pressure was low (in any) and not uniformly distributed in the plots due to record-drought during the winter. Statistically, there was no significant improvement with any fungicide treatments (P = 0.3442).

Table 2. Fungicide treatments used for control of large patch on the zoysiagrass fairway in the fall, 2010

Tmt #	Treatment (Oct 13, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	7 Apr 2011 Disease severity (%)
1	Quali-Pro Ipro	4	22.5
2	Quali-Pro TM	2	15
3	QP Chlorothalonil DF	3.2	21.25
4	NEW QP CHLOR DF	3.2	20
5	26 GT	4	17.5
6	3336 plus	5	25
7	Daconil Ultrex	3.2	43.75
8	TRITON FLO	0.75	35
9	ProStar 70WP	2.2	36.25
10	TRITON FLO	0.5	38.75
11	TRITON FLO	0.75	25
12	ProStar 70WP	2.2	17.5
13	ProStar 70WP	2.2	37.5
14	DISARM 480 SC	0.18	17.5
15	DISARM 480 SC	0.36	17.5
16	Tartan	2	12.5
17	Headway G	4 #/M	27.5
18	Renown	4.5	16.25
19	Heritage wg	2	16.25
20	Banner Maxx	4	30
21	Eagle	2	21.25
22	Insignia	0.9	51.25
23	Trinity	2	33.75
24	Fore	8	40
25	PCNB	7.5 #/M	35
26	Ammonium sulfate	16	18.75
27	Ammonium sulfate	32	17.5
28	Maxide disease killer	4 #/M	11.25
29	Non-treated control	-	20
30	Non-treated control	-	23.75

3. Efficacy of spring application of fungicides for control of large patch on St. Augustinegrass lawn in Houston

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on St. Augustinegrass.

Materials and Methods

Fungicide efficacy was evaluated on St. Augustinegrass lawn showing large patch symptoms in the fall, 2010. Field trials were conducted on a home lawn located in Houston, TX. Individual plots measured 3 by 4 feet. Plots were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO2 pressurized boom sprayer equipped with two Teejet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gallons of dilute fungicide spray per 1000 ft^2. The fungicide application was performed once on 22 Feb, 2011, when the turfgrass was partially on winter dormancy. Turfgrass quality (1-9 scale: 6 = acceptable and 9 = the best quality) was measured on 29 March 2011. Data obtained were subjected to an analysis of variance (ANOVA; alpha = 0.05) and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

The St. Augustinegrass area used in this field study was infested by large patch in the fall, 2010, and went to partial winter dormancy between December and February. Spring green-up began and disease symptoms appeared in March. There was no statistically significant improvement with any fungicides (P = 0.247).

Table 3. Fungicide treatments used for control of large patch on St. Augustinegrass lawn in the spring, 2011

Tmt #	Treatment (Feb 22, 2011)	Rate per 1000 ft^2 (fl oz or oz/M)	29-Mar-2011 Turfgrass quality
1	Tartan	2	6
2	Bayleton flo	1	4.75
3	ProStar 70wp	2.2	5.5
4	Heritage 50wg	2	4.5
5	Non-treated control	-	4.75

4. Efficacy of the fall application of fungicides for control of large patch on St. Augustinegrass sod in Crosby in 2010

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on St. Augustinegrass.

Materials and Methods

Fungicide efficacy was evaluated on St. Augustinegrass cultivar 'Palmetto' sod for control of large patch in the fall, 2009. Field trials were conducted on Murff Turf Farm in Crosby, TX. Individual plots measured 3 by 6 feet. Plots were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO2 pressurized boom sprayer equipped with two Teejet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gallons of dilute fungicide spray per 1000 ft^2. The fungicide application was performed twice on 8 Oct and 15 Nov, 2010. Turf quality (1-9 scales; 6 = acceptable and 9 = best) were measured on 28 Mar, 2011. Data obtained were subjected to an analysis of variance (ANOVA; alpha = 0.05) and mean comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Large patch pressure was low (if any) and not uniformly distributed in the plots, due to record-drought during the winter. Statistically, there was no significant improvement with fungicide treatments (P = 0.3654).

Table 4. Fungicide treatments used for control of large patch on the St. Augustinegrass sod in the fall, 2010

Tmt #	Treatment (Oct 8, 2010)	Rate for 1000 ft^2 (fl oz or oz/M)	Treatment (Nov 15, 2010)	Rate for 1000 ft^2 (fl oz or oz/M)	28-Mar-2011 Turfgrass quality
1	Quali-Pro Ipro	4	QP Chlorothalonil DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	5.75
2	Quali-Pro TM	2	QP Chlorothalonil DF + Propiconazole 14.3	3.2 + 2	5.75
3	QP Chlorothalonil DF	3.2	NEW QP CHLOR DF + Propiconazole 14.3	3.2 + 2	6
4	NEW QP CHLOR DF	3.2	QP 642 Fungicide	11.75	5.5
5	26 GT	4	26 GT	4	6
6	3336 plus	5	3336 plus	5	4.5
7	Daconil Ultrex	3.2	Daconil Ultrex	3.2	5.5
8	TRITON FLO	0.75	TRITON FLO	0.75	5.75
9	ProStar 70WP	2.2	TRITON FLO	0.5	5.75
10	TRITON FLO	0.5	TRITON FLO	0.5	5.5
11	TRITON FLO	0.75	TRITON FLO	0.75	6
12	ProStar 70WP	2.2			5.5
13	ProStar 70WP	2.2	TRITON FLO	0.75	5.25
14	DISARM 480 SC	0.18	DISARM 480 SC	0.18	5.25
15	DISARM 480 SC	0.36	DISARM 480 SC	0.36	5.5
16	Tartan	2	Tartan	2	5.75
17	Headway G	4 #/M	Headway G	4 #/M	5.25
18	Renown	4.5	Renown	4.5	5.25
19	Heritage wg	2	Heritage wg	2	6
20	Banner Maxx	4	Banner Maxx	4	5.75
21	Eagle	2	Eagle	2	5.5
22	Insignia	0.9	Insignia	0.9	5.75
23	Trinity	2	Trinity	2	4.75
24	Fore	8	Fore	8	5.5
25	PCNB	7.5 #/M	PCNB	7.5 #/M	5.25
26	Ammonium sulfate	16	Ammonium sulfate	16	5.25
27	Ammonium sulfate	32	Ammonium sulfate	32	5.25
28	Maxide disease killer	4 #/M	Maxide disease killer	4 #/M	5.25
29	Non-treated control	-	Non-treated control	-	5
30	Non-treated control	-	Non-treated control	-	5.25

5. Efficacy of the fall application of fungicides for control of large patch on St. Augustinegrass in Dallas in 2010

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Benjamin Wherley, and Ambica Chandra, Texas AgriLife Urban Solution Center, Dallas

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on St. Augustinegrass.

Materials and Methods

Fungicide efficacy was evaluated on St. Augustinegrass for control of large patch disease between the late fall, 2010 and spring, 2011. Field trials were conducted on the St. Augustinegrass located at Texas AgriLife Research & Extension Urban Solutions Center in Dallas. Individual plots measured 3 × 6 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gal dilute fungicide spray per 1000 ft^2. The application was performed once on 13 Oct 2010. Percent brown turf area was measured in the following spring on 7 Apr 2011. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Spring green-up was delayed and partially dormant in early April. Large patch pressure was low (if any) and not uniformly distributed in the plots, due to record-drought during the winter. Statistically, there was no significant improvement with fungicide treatments in the following spring (P = 0.4318).

Table 5. Fungicide treatments used for control of large patch on the St. Augustinegrass in the fall, 2010

Tmt #	Treatment (Oct 13, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	7 Apr 2011 Brown turf area (%)
1	Quali-Pro Ipro	4	66.25
2	Quali-Pro TM	2	70
3	QP Chlorothalonil DF	3.2	50
4	NEW QP CHLOR DF	3.2	67.5
5	26 GT	4	70
6	3336 plus	5	66.25
7	Daconil Ultrex	3.2	58.75
8	TRITON FLO	0.75	57.5
9	ProStar 70WP	2.2	58.75
10	TRITON FLO	0.5	77.5
11	TRITON FLO	0.75	60
12	ProStar 70WP	2.2	65
13	ProStar 70WP	2.2	65
14	DISARM 480 SC	0.18	66.25
15	DISARM 480 SC	0.36	62.5
16	Tartan	2	67.5
18	Renown	4.5	60
19	Heritage wg	2	55
20	Banner Maxx	4	68.75
21	Eagle	2	61.25
22	Insignia	0.9	66.25
23	Trinity	2	63.75
24	Fore	8	58.75
25	PCNB	7.5 #/M	47.5
26	Ammonium sulfate	16	76.25
27	Ammonium sulfate	32	65
28	Maxide disease killer	4 #/M	72.5
29	Non-treated control	-	62.5
30	Non-treated control	-	73.75

6. Efficacy of fall fungicide application for control of large patch on bermudagrass in Houston in 2010

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on bermudagrass.

Materials and Methods

Fungicide efficacy was evaluated on bermudagrass cultivar 'Tifway 419' for control of large patch disease between the late fall, 2010 and spring, 2011. The field trial was conducted on the fairway located at Royal Oaks Club in Houston, TX. Individual plots measured 3 × 4 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gal dilute fungicide spray per 1000 ft^2. The application was performed twice on 4 Oct and 15 Nov 2010. Percent diseased area was measured in the following spring on 29 Mar 2011. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Spring green-up began and disease symptoms appeared in March on most plots. However the disease severity was low due record-drought during the winter. Statistically, there was no significant improvement with any fungicide combinations compared with the non-treated controls in the following spring.

Table 6. Fungicide treatments used for control of large patch on the bermudagrass fairway in the fall, 2010

Tmt #	Treatment (Oct 4, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	Treatment (Nov 15, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	29-Mar-2011 Disease severity (%)	
1	Quali-Pro Ipro	4	Quali-Pro Ipro	4	11.875	A-D
2	Quali-Pro TM	2	Quali-Pro TM	2	13.75	A
3	QP Chlorothalonil DF	3.2	QP Chlorothalonil DF	3.2	12.5	BAC
4	NEW QP CHLOR DF	3.2	NEW QP CHLOR DF	3.2	9.375	A-G
5	26 GT	4	26 GT	4	9.375	A-G
6	3336 plus	5	3336 plus	5	8.75	A-G
7	Daconil Ultrex	3.2	Daconil Ultrex	3.2	5.625	C-G
8	TRITON FLO	0.75	TRITON FLO	0.75	5	D-G
9	ProStar 70WP	2.2	TRITON FLO	0.5	5.625	C-G
10	TRITON FLO	0.5	TRITON FLO	0.5	3.125	GF
11	TRITON FLO	0.75	TRITON FLO	0.75	4.625	EGF
12	ProStar 70WP	2.2	-	-	4.375	EGF
13	ProStar 70WP	2.2	TRITON FLO	0.75	2.75	G
14	DISARM 480 SC	0.18	DISARM 480 SC	0.18	6.875	A-G
15	DISARM 480 SC	0.36	DISARM 480 SC	0.36	5	D-G
16	Tartan	2	Tartan	2	10	A-F
17	-	-	Headway G	4 #/M	13.125	BA
18	Renown	4.5	Renown	4.5	4.625	EGF
19	Heritage wg	2	Heritage wg	2	7.125	A-G
20	Banner Maxx	4	Banner Maxx	4	6.875	A-G
21	Eagle	2	Eagle	2	6.25	B-G
22	Insignia	0.9	Insignia	0.9	3.125	GF
23	Trinity	2	Trinity	2	4	GF
24	Fore	8	Fore	8	3.375	GF
25	PCNB	7.5 #/M	PCNB	7.5 #/M	7.5	A-G
26	Ammonium sulfate	16	Ammonium sulfate	16	6.25	B-G
27	Ammonium sulfate	32	Ammonium sulfate	32	3.125	GF
28	Maxide disease killer	4 #/M	Maxide disease killer	4 #/M	5	D-G

29	Non-treated control	-	Non-treated control	-	6.25	B-G
30	Non-treated control	-	Non-treated control	-	6.25	B-G
31	-	-	QP 642 Fungicide	11.75	8.75	A-G
32	-	-	Propiconazole 14.3	2	12.5	BAC
33	-	-	QP Chlorothalonil DF + Propiconazole 14.3	3.2 + 2	13.75	A
34	-	-	QP 642 Fungicide + Foursome	11.75 + 0.4	13.125	BA
35	-	-	NEW QP CHLOR DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	12.5	BAC
36	-	-	QP Chlorothalonil DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	11.25	A-E

Different letters within the same column indicate significant difference

7. Efficacy of fall fungicide application for control of large patch on seashore paspalum in College Station in 2010

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Charles Fontanier and Richard White, Department of Soil and Crop Sciences, Texas A&M University

Objective

To evaluate fungicides for management of large patch disease caused by *Rhizoctonia solani* and spring green-up on seashore paspalum.

Materials and Methods

Fungicide efficacy was evaluated on paspalum for control of large patch disease between the late fall, 2010 and spring, 2011. The field trial was conducted on the fairway located at the Texas A&M University Turfgrass Research Field in College Station, TX. Individual plots measured 3 × 6 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gal dilute fungicide spray per 1000 ft^2. The application was performed twice on 6 Oct and 12 Nov 2010. Percent diseased area was measured in the following spring on 21 Mar 2011. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Spring green-up began and disease symptoms appeared in March on most plots. However the disease severity was low due to record-drought during the winter. Statistically, there was treatment effect in early December, but no significant improvement with any fungicide combinations compared with the non-treated controls in the following spring.

Table 7. Fungicide treatments used for control of large patch on the paspalum fairway in the fall, 2010

Tmt #	Treatment (Oct 6, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	Treatment (Nov 12, 2010)	Rate per 1000 ft^2 (fl oz or oz/M)	2-Dec-2010 Disease severity (%)		21-Mar-2011 Disease severity (%)	
1	Tartan	2	Tartan	2	**17.5**	ED	7.5	DC
2	Tartan	2	TRITON FLO	0.75	**21.25**	EDC	8.75	BDC
3	Tartan	2	TRITON FLO	0.75	**17.5**	ED	10	BAC
4	DISARM 480 SC	0.18	DISARM 480 SC	0.18	**23.75**	BDC	10	BAC
5	DISARM 480 SC	0.36	DISARM 480 SC	0.36	33.75	BAC	10	BAC
6	Heritage wg	2	Heritage wg	2	**21.25**	EDC	8.75	BDC
7	Ammonium sulfate	32	Ammonium sulfate	32	35	BA	6.25	D
8	Maxide disease killer	4 #/M	Maxide disease killer	4 #/M	**23.75**	BDC	12.5	A
9	Non-treated control	-	Non-treated control	-	37.5	A	11.25	BA
10	Non-treated control	-	Non-treated control	-	37.5	A	8.75	BDC
11	-	-	QP 642 Fungicide	11.75	**16.25**	ED	11.25	BA
12	-	-	NEW QP CHLOR DF + Propiconazole 14.3	3.2 + 2	**10.5**	ED	12.5	A
13	-	-	QP Chlorothalonil DF + Propiconazole 14.3	3.2 + 2	**17.5**	ED	11.25	BA
14	-	-	QP 642 Fungicide + Foursome	11.75 + 0.4	**11.25**	ED	8.75	BDC
15	-	-	NEW QP CHLOR DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	**10.5**	ED	10	BAC
16	-	-	QP Chlorothalonil DF + Propiconazole 14.3 + Foursome	3.2 + 2 + 0.4	**9.25**	E	10	BAC

Different letters within the same column indicate significant difference

8. Efficacy of spring nematicide application for control of sting nematode on bermudagrass in Houston in 2011

Young-Ki Jo, and J.L Starr, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate nematicides for management of nematode problems on the bermudagrass putting green.

Materials and Methods

Nematicide efficacy was evaluated on bermudagrass cultivar 'Tifway 419' for control of nematode disease in the spring, 2011. The field trial was conducted on the putting green (5-inch sand cap) located at Royal Oaks Country Club in Houston, TX. This putting green had been determined to be highly infested with sting nematode before the field experiment began. Individual plots measured 3 × 8 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All nematicides were agitated by hand and applied at the equivalent of 2 gal dilute nematicide spray per 1000 ft^2, with the exception of three treatments (Treatment # 1-3) that were applied in the dry granular form. The application of Treatments 1-7 was performed on 28 Mar, and 14 days later the application of Treatments 4-10 were performed on 11 Apr 2011. After treatment, addition water (~1 inch) was sprayed until the turf was saturated.

Turf quality (1-9 scale: 6 = acceptable and 9 = best) and number of plant parasitic nematodes were measured. Composite soil and root samples were collected from each test plot using a standard 2.5 cm diameter soil probe. Ten individual cores were collected from each plot and mixed to form a composite sample. Nematodes will be extracted from the samples using a modified Baermann funnel system, identified to genus, and counted using an inverted compound microscope. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Turf quality and color was improved by Nortica WP5 treatments (Treatment # 8-10). However the dry granular application Nortica WP5 treatments (Treatment # 1-3) caused phytotoxicity that burned turf within 7 days after treatment. Statistically, there was no treatment that significantly decreased the number of sting nematodes.

Table 8. Efficacy of nematicide treatments tested on the bermudagrass putting green

#	Treatment	App rate	note	Turf quality			No. nematode	
				11-Apr	2-May		11-Apr	2-May
1	Nortica WP5	50 #/A	Granular application	5.8	5.0	c	60.0	179.5
2	Nortica WP5	70 #/A	Granular application	5.3	5.3	bc	104.7	361.0
3	Nortica WP5	90 #/A	Granular application	5.3	5.0	c	60.0	223.0
4	Actinovate-AG	6 oz/A	Sprayer at 2 gal/1000 ft2	5.5	5.0	c	89.0	204.0
5	Actinovate-S	6 oz/A	Sprayer at 2 gal/1000 ft2	5.5	5.5	abc	86.5	119.0
6	NanoAg		Sprayer at 2 gal/1000 ft2	5.8	5.5	abc	107.0	249.0
7	Control	-	-	6.0	6.0	abc	113.0	229.0
8	Nortica WP5	50 #/A	Sprayer at 2 gal/1000 ft2	6.0	6.5	a		347.0
9	Nortica WP5	70 #/A	Sprayer at 2 gal/1000 ft2	6.3	6.5	a		366.0
10	Nortica WP5	90 #/A	Sprayer at 2 gal/1000 ft2	6.5	6.3	ab		463.5
	Fisher's Protected LSD (α = 0.05)			NS	LSD =	1.038	NS	NS

NS = not significant; Different letters within the same column indicate significant difference

9. Efficacy of summer nematicide application for control of root knot nematode on bermudagrass in Sugar Land in 2011

Young-Ki Jo, and J.L Starr, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate nematicides for management of nematode problems on the bermudagrass putting green.

Materials and Methods

Nematicide efficacy was evaluated on bermudagrass cultivar 'Miniverde' for control of nematode disease in the summer, 2011. The field trial was conducted on the putting green (5-inch sand cap) located at Riverbend Country Club in Sugar Land, TX. This putting green had been determined to be highly infested with root knot nematodes before the field experiment began. Individual plots measured 4 × 8 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All nematicides were agitated by hand and applied at the equivalent of 2 gal dilute nematicide spray per 1000 ft^2. The application of treatments was performed on 12 Jul. After treatment, addition water (~1 inch) was sprayed until the turf was saturated.

Turf quality (1-9 scale: 6 = acceptable and 9 = best) and number of plant parasitic nematodes were measured. Composite soil and root samples will be collected from each test plot using a standard 2.5 cm diameter soil probe. Ten individual cores will be collected from each plot and mixed to form a composite sample. Nematodes will be extracted from the samples using a modified Baermann funnel system, identified to genus, and counted using an inverted compound microscope. Data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Statistically, there was no treatment that significantly decreased the number of root knot nematodes or improved turf quality.

Table 9. Efficacy of nematicide treatments tested on the bermudagrass putting green

#	Treatment	App rate	Note	Turf quality		No. nematode		
				12-Jul	19-Jul	12-Jul	27-Jul	9-Aug
1	Nortica WP5	70 #/A	Sprayer at 2 gal/1000 ft2	5.5	5.3	48.5	143.0	46.0
2	NanoAg		Sprayer at 2 gal/1000 ft2	5.5	5.5	65.0	76.0	111.0
3	Control			5.5	5.8	51.0	22.0	45.0

10. Efficacy of fall nematicide application for control of root knot nematode on bermudagrass in Sugar Land in 2011

Young-Ki Jo, and J.L Starr, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate nematicides for management of nematode problems on the bermudagrass putting green.

Materials and Methods

Nematicide efficacy was evaluated on bermudagrass cultivar 'Miniverde' for control of nematode disease in the summer, 2011. The field trial was conducted on the putting green (5-inch sand cap) located at Riverbend Country Club in Sugar Land, TX. This putting green had been determined to be highly infested with root knot nematodes before the field experiment began. Individual plots measured 6 × 6 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All nematicides were agitated by hand and applied at the equivalent of 2 gal dilute nematicide spray per 1000 ft^2. Granular products (Treatment # 3-5) were applied with hands and brush in. After treatment, addition water (~1 inch) was sprayed until the turf was saturated. The application of treatments was performed on 1 Nov and 23 Nov.

Turf quality (1-9 scale: 6 = acceptable and 9 = best) and number of plant parasitic nematodes were measured. Composite soil and root samples will be collected from each test plot using a standard 2.5 cm diameter soil probe. Ten individual cores will be collected from each plot and mixed to form a composite sample. Nematodes will be extracted from the samples using a modified Baermann funnel system, identified to genus, and counted using an inverted compound microscope.

At the end of the experiment, thatch and soil was collected from each plot with the soil probe. The sample was burned into ash in a muffle furnace for 3 hours. The organic matter content of the sample was analyzed by determining the ash weight. Loss on ignition (LOI) content is calculated at %LOI = (dry weight – ash weight)/dry weight x 100. All data obtained were subjected to analysis of variance and means comparisons were performed using Fisher's Protected LSD (alpha = 0.05).

Results and Discussion

Statistically, there was detected no treatment effect that significantly decreased the number of root knot nematodes, due to high variability among replicates. However, most treatments showed the improvement on turf quality on 7 Dec at the level of P = 0.898.

Table 10. Efficacy of nematicide treatments tested on the bermudagrass putting green in Sugar Land

#	Treatment	App rate	note	Turf quality			No. nematode		%LOI
				15-Nov	7-Dec		15-Nov	7-Dec	7-Dec
1	Nortica WP5	70 #/A	Sprayer at 2 gal/1000 ft2	6.0	6.3	a	120.7	125.3	18.7
2	Nano Ag		Sprayer at 2 gal/1000 ft2	5.7	5.3	abc	14.0	345.3	14.4
3	MCW-2	60 #/A	Granular application	4.7	5.0	bc	207.3	378.0	16.1
4	MCW-2	120 #/A	Granular application	4.3	5.0	bc	139.3	174.7	15.0
5	MCW-2	240 #/A	Granular application	4.7	5.7	ab	86.5	31.3	17.6
6	Control			3.3	4.3	c	107.0	46.0	13.5
	Fisher's Protected LSD (α = 0.05)				LSD =	1.038			
	P-value			NS		0.0898	NS	NS	NS

NS = not significant; Different letters within the same column indicate significant difference
LOI = Loss on ignition content, % organic matter

11. Efficacy of fall nematicide application for control of root knot nematode on bermudagrass in College Station in 2011

Young-Ki Jo, and J.L Starr, Department of Plant Pathology & Microbiology, Texas A&M University
Charles Fontanier and Richard White, Department of Soil and Crop Sciences, Texas A&M University

Objective

To evaluate nematicides for management of nematode problems on the bermudagrass putting green.

Materials and Methods

Fungicide efficacy was evaluated on bermudagrass cultivar ‘Tif Eagle’ for control of nematode disease in the fall, 2011 before winter dormancy. The field trial was conducted on the putting green (5-inch capping sand) located at Texas A&M Turf Research Field, College Station, TX. This putting green had been determined to be highly infested with root knot nematodes before the field experiment began. Individual plots measured 4 × 6 feet and were arranged in a randomized complete block design with three replications. The application of treatments was performed on 21 Nov.

Individual treatments were applied at a pressure of 40 psi using a CO2-pressurized boom sprayer equipped with two TeeJet 8002 nozzles. All fungicides were agitated by hand and applied at the equivalent of 2 gal dilute fungicide spray per 1000 ft2. Granular products (Treatment # 3-5) were applied with hands and brush in. After treatment, addition water (~1 inch) was sprayed until the turf was saturated.

Composite soil and root samples will be collected from each test plot using a standard 2.5 cm diameter soil probe. Ten individual cores will be collected from each plot and mixed to form a composite sample. Nematodes will be extracted from the samples using a modified Baermann funnel system, identified to genus, and counted using an inverted compound microscope. All data obtained were subjected to analysis of variance and means comparisons were performed using Fisher’s Protected LSD (alpha = 0.05).

Results and Discussion

Most treatments (Treatment # 1-4) significantly decreased the number of root knot nematode population at the level of P = 0.08. Turf quality of the field was generally below acceptable levels because of biotic and abiotic stresses during the summer season. No apparent difference on turf quality among treatments was observed.

Table 11. Efficacy of nematicide treatments tested on the bermudagrass putting green in College Station

#	Treatment	App rate	note	No. nematode 8-Dec	
1	Nortica WP5	70 #/A	Sprayer at 2 gal/1000 ft2	145.3	b
2	Nano Ag		Sprayer at 2 gal/1000 ft2	97.3	b
3	MCW-2	60 #/A	Granular application	93.3	b
4	MCW-2	120 #/A	Granular application	120.0	b
5	MCW-2	240 #/A	Granular application	214.7	ab
6	Control			369.3	a
Fisher's Protected LSD (α = 0.05)				202.37	
P-value				0.08	

Different letters within the same column indicate significant difference

12. Efficacy of fall fungicide application for control of leaf spot on bermudagrass in the Woodlands in 2011

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of leaf spot problems caused by *Bipolaris* spp. on the bermudagrass putting green.

Materials and Methods

The field trials were conducted at the Woodland Country Club, Palmer Course, the Woodlands, TX. Field plots were established on bermudagrass fairway, maintained at 1/4-inch mowing height. Individual plots measured 3 by 4 feet. The field plots were arranged in a randomized complete block design with four replicates.

A total of 15 fungicide treatments along with 3 non-treated controls were applied. Individual treatments were applied at a pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two Teejet 8002 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 2 gallons of dilute fungicide spray per 1,000 ft^2. Fungicide applications were performed on September 20.

Percent diseased area and turfgrass quality of each plot were recorded weekly during the field evaluation. Turf quality (1-9 scale: 6 = acceptable and 9 = best) were measured. Data obtained were subjected to an analysis of variance to determine significant differences between treatments using the SAS software program.

Results and Discussion

Statistically, there was no treatment effect that significantly improved turf quality. The turf quality was naturally improved as the weather became cool (below 100 F of the high temperature) and had more rain falls since September.

Table 12. Efficacy of fungicide treatments tested on the bermudagrass fairway in the Woodlands. Turfgrass quality is presented.

#	Treatment	App rate (fl oz or oz/M)	17-Oct	25-Oct	1-Nov	23-Nov
1	QP 642	11.75	4.8	4.8	5.5	6.0
	Foursome	0.4				
2	QP IPRO 2 SE	4	5.0	5.0	5.5	5.8
	Foursome	0.4				
3	Propiconazole 14.3	2	5.0	5.0	5.5	5.8
	Foursome	0.4				
4	QP IPRO 2 SE	4	4.8	5.5	5.3	5.8
	Propiconazole 14.3	2				
	Foursome	0.4				
5	QP Tebuconazole	0.6	5.3	5.3	5.5	6.0
	Foursome	0.4				
6	QP IPRO 2 SE	4	5.3	5.5	5.3	6.0
	QP Tebuconazole	0.6				
	Foursome	0.4				
7	Daconil ULTREX	3.2	4.8	5.0	5.0	5.8
8	Interface	3	5.0	5.3	6.0	6.3
9	Interface	4	5.3	5.5	5.8	6.3
10	Chipco 26019	4	5.0	4.8	5.5	6.3
11	Iprodione PRO 2SE	4	5.5	5.3	5.3	6.3
12	Banner Maxx	2	4.5	4.5	5.8	5.8
13	Eagle 20 EW	1.2	5.3	5.8	5.5	6.3
14	3336 plus	5	5.5	5.3	5.5	6.3
15	Heritage TL	2	5.0	4.5	5.3	6.0
16	Control		5.8	5.8	5.8	6.0
17	Control		6.0	5.3	5.5	6.3
18	Control		5.8	5.5	5.8	6.0
P-value			NS	NS	NS	NS

13. Efficacy of spring fungicide application for control of black spot on zoysiagrass in the Woodlands, TX in 2011

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of black spot disease caused by *Cochliobolus* species on zoysiagrass.

Materials and Methods

The field trials were conducted at the Club of Carlton Woods, Tom Fazio Championship Course, Woodlands, TX. Field plots were established on zoysiagrass (cultivar Zeon) fairway (a chipping practice hole), maintained at 1/4-inch mowing height. Individual plots measured 3 by 3 feet. The field plots were arranged in a randomized complete block design with four replicates.

A total of 24 treatments including 15 different fungicide treatments, 4 fertilizer treatments and 2 plant growth regulators along with 3 non-treated controls were applied. Individual treatments were applied at a pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two Teejet 8002 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 2 gallons of dilute fungicide spray per 1,000 ft^2. Fungicide applications were performed on May 31.

Percent diseased area and turfgrass quality of each plot were recorded weekly during the field evaluation. Turf quality (1-9 scale: 6 = acceptable and 9 = best) and number of black spot (2-inch diameter) were measured. Data obtained were subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean percent disease for each treatment is presented in the tables below.

Results and Discussion

Symptoms of black spot disease included distinctive black round spot on zoysiagrass fairways. As the disease progressed, individual spots were merged to bigger and irregular patches. Most fungicide treatments showed reduced disease severity (see Table 13) and turfgrass quality improvement (see Table 14) within 2 weeks after application. A single application of any good fungicide in May could hold down the disease throughout the summer. Fertilizer and plant growth regulator treatments were not effective in reducing the disease.

Table 13. Black spot severity on the zoysiagrass fairway

#	Treatment	App rate (fl oz or oz/M)	5/31/2011 (beginning)	6-Jun		12-Jul		27-Jul		23-Aug		20-Sep	
1	QP 642	11.75	7.0	0.5	hi	0.8	e	0.0	f	0.0	e	0.0	e
	Foursome	0.4											
2	QP IPRO 2 SE	4	3.3	0.5	hi	1.3	e	2.5	f	0.5	de	0.0	e
	Foursome	0.4											
3	Propiconazole 14.3	2	6.5	0.8	ghi	1.5	e	2.3	f	1.0	cde	0.0	e
	Foursome	0.4											
4	QP IPRO 2 SE	4	3.5	0.0	i	0.0	e	0.5	f	0.3	de	0.0	e
	Propiconazole 14.3	2											
	Foursome	0.4											
5	QP Tebuconazole	0.6	7.5	1.3	ghi	4.0	de	3.5	e	1.8	cde	1.3	de
	Foursome	0.4											
6	QP IPRO 2 SE	4	6.8	0.3	hi	0.0	e	0.0	f	0.0	e	0.0	e
	QP Tebuconazole	0.6											
	Foursome	0.4											
7	Daconil ULTREX	3.2	5.5	0.0	i	2.8	e	3.0	f	0.3	de	1.0	de
8	Interface	3	5.0	0.5	hi	0.5	e	0.5	f	0.0	e	0.0	e
9	Interface	4	5.5	0.3	hi	0.5	e	0.5	f	0.3	de	1.3	de
10	Chipco 26019	4	7.3	1.5	ghi	0.8	e	0.3	f	0.0	e	0.0	e
11	Iprodione PRO 2SE	4	7.0	0.5	hi	2.3	e	2.8	f	0.0	e	0.8	e
12	Banner Maxx	2	5.3	0.8	ghi	2.3	e	1.3	f	0.0	e	0.5	e
13	Eagle 20 EW	1.2	5.5	2.3	fghi	7.8	bcde	5.8	def	0.3	de	0.0	e
14	3336 plus	5	8.0	5.0	efgh	7.0	ced	6.3	def	0.5	de	5.3	bcd
15	Heritage TL	2	4.8	1.8	fghi	0.3	e	1.5	f	1.3	cde	2.5	cde
16	Ammonium sulfate	16	9.5	12.3	cd	17.3	a	9.5	cde	0.8	cde	1.5	de
17	Ammonium sulfate	32	6.5	5.5	efg	14.3	abc	14.3	abc	1.5	cde	4.3	bcde
18	Primo Maxx	0.25	7.0	13.8	bc	15.8	ab	18.0	ab	2.8	bcd	11.0	a
19	Primo Maxx	0.5	4.0	8.8	de	11.0	abcd	15.0	abc	5.8	a	8.0	ab
20	TurfRx fairway (PKBCuFeMnZn)	1.5	5.3	9.0	cde	14.8	abc	12.0	bcd	0.8	cde	0.5	e
21	TurfRx penecal (surfactant+Ca)	1.5	5.0	6.5	ef	11.8	abcd	10.8	cd	2.0	bcde	6.5	bc
22	Non-treated control		7.8	18.8	a	17.8	a	17.5	ab	0.5	de	7.0	ab
23	Non-treated control		8.3	13.3	bcd	16.5	a	17.8	ab	3.3	abc	6.3	bc
24	Non-treated control		7.3	17.5	ab	17.5	a	18.8	a	4.5	ab	7.3	ab
Fisher's Protected LSD (α = 0.05)			NS	LSD = 4.82		LSD = 8.22		LSD = 6.34		LSD = 2.51		LSD = 4.44	

NS = not significant; Different letters within the same column indicate significant difference

Table 14. Turf quality on the zoysiagrass fairway

#	Treatment	App rate (fl oz or oz/M)	6-Jun		12-Jul		27-Jul		20-Sep	
1	QP 642	11.75	6.75	abcd	5.5	abc	5.75	a	6	a
	Foursome	0.4								
2	QP IPRO 2 SE	4	7.75	a	6	a	6	a	6	a
	Foursome	0.4								
3	Propiconazole 14.3	2	7	abc	4.5	b-f	5.75	a	6	a
	Foursome	0.4								
4	QP IPRO 2 SE	4	7.5	ab	6	a	5.75	a	6	a
	Propiconazole 14.3	2								
	Foursome	0.4								
5	QP Tebuconazole	0.6	6.75	abcd	4.5	b-f	5	abcd	5.75	ab
	Foursome	0.4								
6	QP IPRO 2 SE	4	7	abc	5.75	ab	5.75	a	5.75	ab
	QP Tebuconazole	0.6								
	Foursome	0.4								
7	Daconil ULTREX	3.2	6.75	abcd	4.25	cdef	5.25	abc	5.75	ab
8	Interface	3	7.25	abc	5.25	abcd	5.75	abc	5.75	ab
9	Interface	4	7	abc	4.5	b-f	5.5	ab	5.25	bc
10	Chipco 26019	4	6.75	abcd	5	a-e	6	a	6	a
11	Iprodione PRO 2SE	4	6.75	abcd	4.25	cdef	5.5	ab	5.75	ab
12	Banner Maxx	2	6.5	bcde	5	a-e	5.5	ab	5.5	abc
13	Eagle 20 EW	1.115	6.25	dce	4.5	b-f	5.25	abc	5.75	ab
14	3336 plus	5	5.75	def	4.75	a-f	4.25	ced	5.75	ab
15	Heritage TL	2	6.5	bcde	5	a-e	5.75	a	5.75	ab
16	Ammonium sulfate	16	4.75	fgh	4.25	cdef	4.25	cde	5.5	abc
17	Ammonium sulfate	32	5.75	def	4.5	b-f	4	de	5.25	bc
18	Primo Maxx	0.25	4.75	fgh	4	def	3.5	e	5	c
19	Primo Maxx	0.5	5.5	efg	4	def	3.75	e	5	c
20	TurfRx fairway (PKBCuFeMnZn)	1.5	5.75	def	5	a-e	4.5	bcde	5.75	ab
21	TurfRx penecal (surfactant+Ca)	1.5	5.5	efg	4.75	a-f	4.5	bcde	5.75	ab
22	Non-treated control		4.5	gh	3.75	ef	3.5	e	5.25	bc
23	Non-treated control		4.25	h	5	a-e	3.5	e	5.25	bc
24	Non-treated control		4.5	gh	3.5	f	3.75	e	5	c
Fisher's Protected LSD (α = 0.05)			LSD = 1.10		LSD = 1.44		LSD = 1.10		LSD = 0.58	

Different letters within the same column indicate significant difference

14. Efficacy of summer fungicide application for control of black spot on zoysiagrass in the Woodlands, TX in 2011

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of black spot disease caused by *Cochliobolus* species on zoysiagrass.

Materials and Methods

The field trials were conducted at the Club of Carlton Woods, Tom Fazio Championship Course, Woodlands, TX. Field plots were established on zoysiagrass (cultivar Zeon) fairway #8 hole, maintained at 1/4-inch mowing height. Individual plots measured 3 by 3 feet. The field plots were arranged in a randomized complete block design with four replicates.

No fungicide was used before this field trial. In late August, black spot started ramping up in the #8 fairway. A total of 24 treatments including 15 different fungicide treatments, 3 fertilizer treatments and 2 plant growth regulators along with 4 non-treated controls were applied. Individual treatments were applied at a pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two Teejet 8002 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 2 gallons of dilute fungicide spray per 1,000 ft^2. Fungicide applications were performed on August 30.

Percent diseased area and turfgrass quality of each plot were recorded weekly during the field evaluation. Turf quality (1-9 scale: 6 = acceptable and 9 = best) and number of black spot (2-inch diameter) were measured. Data obtained were subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean percent disease for each treatment is presented in the tables below.

Results and Discussion

Most fungicide treatments showed reduced disease severity and turfgrass quality improvement within 2 weeks after application. Fertilizer and plant growth regulator treatments did not show less effect on reducing the disease. Disease severity ratings significantly less than the control are in **bold**.

Table 15. Efficacy of fungicide treatments tested on the zoysiagrass fairway

#	Treatment	App rate (fl oz or oz/M)	30-Aug (beginning)	No of black spot 6-Sep		No of black spot 20-Sep		Turf quality 20-Sep	
1	QP 642	11.75	5.8	1.0	de	**0.0**	d	**6.8**	a
	Foursome	0.4							
2	QP IPRO 2 SE	4	1.8	0.0	e	**0.0**	d	**6.3**	abc
	Foursome	0.4							
3	Propiconazole 14.3	2	1.3	0.3	de	**0.0**	d	**6.5**	ab
	Foursome	0.4							
4	QP IPRO 2 SE	4	2.5	1.8	cde	**0.0**	d	**6.5**	ab
	Propiconazole 14.3	2							
	Foursome	0.4							
5	QP Tebuconazole	0.6	2.8	2.5	bcde	**0.5**	cd	**6.3**	abc
	Foursome	0.4							
6	QP IPRO 2 SE	4	3.8	1.8	cde	**0.0**	d	**6.3**	abc
	QP Tebuconazole	0.6							
	Foursome	0.4							
7	Daconil ULTREX	3.2	6.5	3.8	a-e	**0.0**	d	5.5	def
8	Interface	3	7.0	4.5	abcd	**1.8**	cd	**6.0**	bcd
9	Interface	4	3.3	0.5	de	0.0	d	**6.0**	bcd
10	Chipco 26019	4	8.8	6.3	ab	5.5	bcd	**5.8**	cde
11	Iprodione PRO 2SE	4	1.0	0.8	de	**0.0**	d	**6.0**	bcd
12	Banner Maxx	2	4.5	2.3	bcde	**0.5**	cd	**6.0**	bcd
13	Eagle 20 EW	1.115	6.3	6.0	abc	**0.5**	cd	**6.0**	bcd
14	3336 plus	5	3.0	0.8	de	**1.0**	cd	**5.8**	cde
15	Heritage TL	2	3.3	0.8	de	**0.0**	d	**6.5**	ab
16	Ammonium sulfate	16	5.0	2.0	bcde	4.0	bcd	**6.3**	abc
17	Non-treated control		6.3	3.0	a-e	8.8	b	5.3	efg
18	Primo Maxx	0.25	2.0	1.0	de	5.8	bcd	5.3	efg
19	Primo Maxx	0.5	4.8	3.3	a-e	8.3	b	4.5	h
20	TurfRx fairway (PKBCuFeMnZn)	1.5	4.0	3.5	a-e	6.5	bc	5.5	def
21	TurfRx penecal (surfactant+Ca)	1.5	2.5	2.0	bcde	4.0	bcd	**5.8**	cde
22	Non-treated control		2.0	1.3	de	5.0	bcd	5.5	def
23	Non-treated control		8.3	7.0	a	17.0	a	4.8	gh
24	Non-treated control		6.8	2.8	a-e	8.8	b	5.0	fgh
Fisher's Protected LSD (α = 0.05)			NS	LSD = 4.45		LSD = 6.03		LSD = 0.72	

NS = not significant; Different letters within the same column indicate significant difference

15. Efficacy of spring fungicide application for control of fairy ring on the bermudagrass putting green in Sugar Land, TX in 2011

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Anthony Camerino, Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for management of fairy ring disease on bermudagrass putting green.

Materials and Methods

The field trials were conducted at Riverbend Country Club, Sugar Land, TX. Field plots were established on the bermudagrass cultivar 'Miniverde' practice putting green, maintained at 0.1-0.125 inch mowing height. Individual plots measured 3 by 6 feet. The field plots were arranged in a randomized complete block design with four replicates.

In past year, this practice putting green was heavily infested with fairy ring. The putting greens till showed residual symptoms, but there was significant recovered from the previous year. A total of 5 different fungicide treatments along with 2 non-treated controls were applied. Individual treatments were applied at a pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two Teejet 8002 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 2 gallons of dilute fungicide spray per 1,000 ft^2.

Turfgrass quality (1-9 scale: 6 = acceptable and 9 = best) of each plot were recorded biweekly during the field evaluation. Data obtained were subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean turf quality for each treatment is presented in the tables below.

Results and Discussion

No fungicide treatments showed significant reduction of disease severity or improvement of turfgrass quality. Granular application of Nortica by an accident caused severe phytotoxicity on turf.

Table 16. Fungicide efficacy (turf quality) in control of fairy ring on bermudagrass putting green

Tmt #	Treatment	App rate (fl oz or oz/M)	22-Feb (beginning)	28-Mar	11-Apr	8-Jun	12-Jul	Appl date
1	Tartan	2	4.3	6.3	6.0	6.3	5.8	ABD
2	Bayleton flo	1	4.5	6.3	5.5	6.0	6.0	ABD
3	ProStar 70WP	2.2	4.3	6.5	6.5	5.5	6.0	ABD
4	Heritage 50wg	2	4.3	7.3	6.0	6.5	5.3	ABD
5	Nortica	70 lb/A	4.8	6.5	5.3	5.3	5.3	B
6	Nortica	70 lb/A	4.5	6.8	5.8	6.3	6.5	CD
7	Non-treated control		4.0	6.8	5.8	5.8	6.0	
Fisher's Protected LSD (P = 0.05)			NS	NS	NS	NS	NS	

NS = Not significant
A = February 22
B = March 28. Nortica was applied as a granular form by hand and immediately watered down
C = April 11. Nortica was applied as a liquid form using a CO2 sprayer
D = June 8

16. Evaluation of fungicide programs on ultra-dwarf bermudagrass during a growing season in College Station, TX in 2011

Young-Ki Jo, Department of Plant Pathology & Microbiology, Texas A&M University
Charles Fontanier and Richard White, Department of Soil and Crop Sciences, Texas A&M University

Objective

To evaluate fungicide programs for turf quality and control of potential diseases on the ultra-dwarf bermudagrass putting green in a growing season.

Materials and Methods

The field trial was conducted at Turf Research Farm at Texas A&M University in College Station. Plots were established on ultra-dwarf 'Tif-Eagle' bermudagrass putting green, maintained at 1/8-inch mowing height. The plots were irrigated at every other day at 1.2 inches per week since mid-June, which is 15% cut from the normal irrigation program. Individual plots measured 3 by 4 feet, and were arranged in a randomized complete block design with four replicates.

Thirteen different fungicide programs along with 2 non-treated controls were performed. Individual treatments were applied at a pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two Teejet 8002 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 2 gallons of dilute fungicide spray per 1,000 ft^2. The first applications of the treatments were begun on April 27 and will be continued until the end of November.

Turfgrass quality (1-9 scale: 6 = acceptable and 9 = best) of each plot was recorded biweekly throughout experiment. Data obtained was subjected to an analysis of variance to determine significant differences between treatments using the SAS software program.

Results and Discussion

The mean turfgrass quality for each treatment is presented in Table 18. Turfgrass was severely stressed from continued heat and drought during the summer, and turf quality dramatically decreased in late August and early September. Turf quality was decreased by DMI fungicides within 2 weeks after treatment. However, the program programs (Treatment # 6, 8, 9, 11, 12, 13, and 14) including DMI fungicides in the spring and early summer provided better turf quality in the fall after the hot and dry summer. This effect is speculated that DMI fungicides might inhibit the plant growth and cause the positive effect on stress tolerance during hot and dry weather conditions; and these fungicides might effectively reduce the take-all root rot fungus (*Gaeumannomyces* spp.) which has been found commonly in this field area.

Table 17. Fungicide programs tested in this study

#	App date	Spray #	Treatment	Rate Unit (fl oz or oz/M)
1	Untreated control			
2	5/20/2011	Spray #1	Interface	4
	6/10/2011	Spray #2	Chipco Signature Interface	4 4
	7/1/2011	Spray #3	Chipco Signature Prostar 70 wg	4 2.2
	7/22/2011	Spray #4	Chipco Signature Compass	4 0.25
	8/12/2011	Spray #5	Interface	4
	9/2/2011	Spray #6	Chipco Signature Prostar 70 wg	4 2.2
	9/23/2011	Spray #7	Interface	4
	10/14/2011	Spray #8	Chipco Signature Daconil ultrex	4 3.2
	11/4/2011	Spray #9	Interface	4
	11/23/2011	Spray #10	Chipco Signature Interface	4 4
3	4/27/2011	Spray #1	Interface	4
	5/20/2011	Spray #2	Interface Fore 80 WP	4 8

	6/10/2011	Spray #3	Chipco 26GT	4
	7/1/2011	Spray #4	Insignia	0.9
	7/22/2011	Spray #5	Chipco Signature	4
			Fore 80 WP	8
	8/12/2011	Spray #6	Chipco Signature	4
			Fore 80 WP	8
	9/2/2011	Spray #7	Fore 80 WP	8
	9/23/2011	Spray #8	Interface	4
4	5/27/2011	Spray #1	Chipco Signature	4
			Interface	3
	6/10/2011	Spray #2	Interface	4
	6/24/2011	Spray #3	Insignia	0.9
	7/8/2011	Spray #4	Chipco Signature	4
			Interface	3
	7/22/2011	Spray #5	Interface	4
	8/5/2011	Spray #6	Chipco Signature	4
			Interface	3
	8/19/2011	Spray #7	Interface	4
	9/2/2011	Spray #8	Interface	4
5	4/27/2011	Spray #1	Chipco Signature	4
			Interface	4
	5/20/2011	Spray #2	Chipco Signature	4
			Interface	4
	6/10/2011	Spray #3	Chipco Signature	4
			Interface	4
	9/2/2011	Spray #4	Chipco Signature	4
			Interface	4
	9/23/2011	Spray #5	Chipco Signature	4
			Interface	4
	10/14/2011	Spray #6	Chipco Signature	4
			Interface	4
6	4/27/2011	Spray 1	Banner MAXX	2
	5/20/2011	Spray 2	Banner MAXX	2
	6/10/2011	Spray 3	Banner MAXX	2
	7/1/2011	Spray 4	Banner MAXX	2

	4/27/2011	Spray 1	Bayleton flo	1
	5/20/2011	Spray 2	Bayleton flo	1
	6/10/2011	Spray 3	Bayleton flo	1
7	7/1/2011	Spray 4	Bayleton flo	1
	4/27/2011	Spray 1	Eagle	1.2
	5/20/2011	Spray 2	Eagle	1.2
	6/10/2011	Spray 3	Eagle	1.2
8	7/1/2011	Spray 4	Eagle	1.2
	4/27/2011	Spray 1	Trinity	2
9	5/20/2011	Spray 2	Trinity	2
10	Untreated control			
	5/27/2011	Spray 1	QP Tebuconazole	0.6
	6/24/2011	Spray 2	QP Tebuconazole	0.6
11	7/22/2011	Spray 3	QP Tebuconazole	0.6
	5/27/2011		QP Tebuconazole	0.6
	5/27/2011	Spray 1	Foursome	0.4
	6/24/2011		QP Tebuconazole	0.6
	6/24/2011	Spray 2	Foursome	0.4
	7/22/2011		QP Tebuconazole	0.6
12	7/22/2011	Spray 3	Foursome	0.4
	5/27/2011	Spray 1	Propiconazole 14.3	2
	6/24/2011	Spray 2	Propiconazole 14.3	2
13	7/22/2011	Spray 3	Propiconazole 14.3	2
	5/27/2011		Propiconazole 14.3	2
	5/27/2011	Spray 1	Foursome	0.4
	6/24/2011		Propiconazole 14.3	2
	6/24/2011	Spray 2	Foursome	0.4
	7/22/2011		Propiconazole 14.3	2
14	7/22/2011	Spray 3	Foursome	0.4

Table 18. Turf quality of the bermudagrass putting green

Tmt #	20-May	27-May	10-Jun	24-Jun	1-Jul	8-Jul	22-Jul	5-Aug	12-Aug	19-Aug	5-Sep	23-Sep
1	5.8	6.0 ab	5.8 abc	5.5 bc	5.3 abc	5.5 abc	5.3 bcd	5.0 cde	5.5 abc	5.3 bcd	3.0 f	2.3 fg
2	4.8	6.3 a	5.5 abcd	6.8 a	6.3 abc	6.3 a	5.5 bc	5.3 bcd	5.3 bcd	5.8 ab	4.5 ab	2.0 g
3	5.8	6.3 a	5.0 b-f	4.8 cd	4.8 bc	4.8 cd	4.3 e	5.0 cde	5.0 bcde	5.0 bcd	4.3 bc	2.0 g
4	4.8	5.3 bc	6.5 a	7.0 a	6.3 abc	5.8 ab	6.5 a	6.3 a	5.8 ab	5.8 ab	4.5 ab	2.3 fg
5	5.5	6.5 a	6.0 ab	6.8 a	5.8 ab	5.3 bcd	5.0 bcde	4.3 ef	4.5 def	4.5 de	3.3 ef	2.8 defg
6	4.8	4.8 c	4.5 defg	5.0 bc	5.3 abc	5.3 bcd	5.3 bcd	6.0 ab	6.3 a	6.3 ab	5.0 ab	4.5 a
7	4.5	4.5 c	4.0 fg	4.0 d	4.8 bc	3.8 ef	4.5 de	5.3 bcd	5.3 bcd	5.3 bcd	4.3 bc	3.5 bcd
8	5.0	5.0 c	4.3 efg	5.5 bc	5.0 abc	4.8 cd	4.8 cde	5.3 bcd	5.5 abc	5.8 ab	4.5 ab	3.8 abc
9	4.5	3.3 d	2.0 h	3.0 e	3.0 d	3.0 f	3.0 f	2.8 g	3.5 g	3.3 f	2.3 g	2.5 efg
10	5.3	5.0 c	5.3 bcde	5.5 bc	5.3 abc	5.5 abc	5.5 bc	4.8 de	4.8 cdef	4.8 cde	3.5 def	2.5 efg
11		5.0 c	4.8 c-g	5.3 bc	4.5 bc	4.5 de	4.5 de	3.8 f	4.0 fg	4.0 ef	3.0 f	3.0 defg
12		5.0 c	6.0 ab	5.8 b	5.5 abc	5.8 ab	5.3 bcd	5.8 abc	4.8 cdef	4.8 cde	3.8 cde	2.8 defg
13		5.0 c	3.8 g	5.8 b	4.3 cd	4.5 de	5.3 bcd	4.3 ef	4.3 efg	4.8 cde	4.0 bcd	3.3 bcde
14		5.3 bc	5.5 abcd	5.5 bc	5.8 ab	5.8 ab	5.8 ab	6.0 ab	5.8 ab	5.5 abc	4.3 bc	4.0 ab
LSD	NS	0.96	1.18	0.92	1.42	0.80	0.97	0.76	0.82	0.95	0.74	0.95

NS = not significant
LSD = Least significant difference value at α = 0.05. Different letters within the same column indicate significant difference

Continued Table 18. Turf quality of the bermudagrass putting green

Tmt #	14-Oct		24-Oct		4-Nov		22-Nov		8-Dec	
1	3.0	cd	2.8	de	3.3	def	4.0	ef	4.0	c
2	2.0	d	2.0	e	2.3	f	4.5	de	4.8	bc
3	2.0	d	2.0	e	2.8	ef	3.5	f	4.0	c
4	2.3	d	2.0	e	3.0	ef	4.5	de	5.3	abc
5	3.0	cd	3.3	cd	4.0	cde	5.3	bcd	5.0	abc
6	5.5	a	5.0	a	6.3	a	6.3	a	6.3	a
7	3.3	bcd	3.3	cd	4.5	bcd	4.5	de	5.0	abc
8	4.5	ab	4.0	abc	5.0	abc	5.3	bcd	5.8	ab
9	4.5	ab	4.5	ab	5.0	abc	5.8	abc	5.5	ab
10	2.8	d	2.8	de	4.0	cde	4.5	de	5.0	abc
11	4.5	ab	4.0	abc	5.8	ab	6.0	ab	6.0	ab
12	4.3	abc	4.0	abc	5.3	abc	5.5	abc	5.3	abc
13	4.3	abc	3.8	bcd	5.5	ab	5.5	abc	5.3	abc
14	4.3	abc	4.0	abc	5.0	abc	5.0	cd	5.0	abc
LSD	2.02		2.02		1.26		2.02		1.27	

NS = not significant
LSD = Least significant difference value at $\alpha = 0.05$. Different letters within the same column indicate significant difference