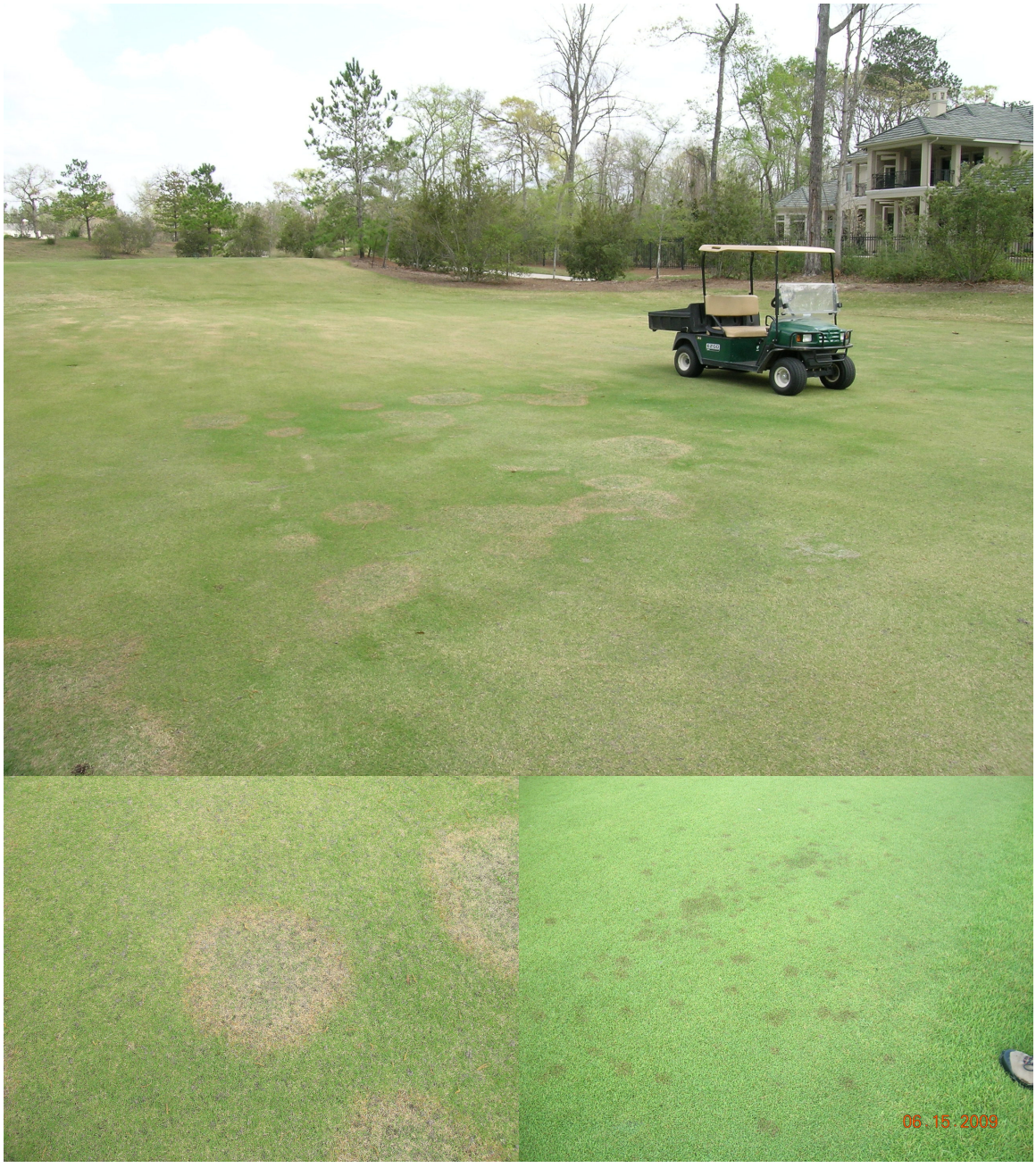
AgriLIFE EXTENSION
Texas A&M System

2009 Turfgrass Disease Clinic and Field Day



October 27, 2009
Texas AgriLife Extension Service

Welcome to the 2009 Turfgrass Disease Clinic and Field Day. At this event, Turfgrass Disease Specialists with Texas AgriLife Extension and Texas A&M University share the results of the fungicide evaluations and turfgrass disease research that has been performed in Southeast Texas over the past year. At this annual event we will share the results of a growing turfgrass disease management research program with the turfgrass and pest management professionals.

The field tests for 2008/2009 included eight field plot sites established at three golf courses and two sod farms in Southeast Texas. More than 2,000 miles were driven during the past year to set up plots, apply treatments and evaluate diseases. Working with County Extension Agents, Golf Course Superintendents and Sod Farmers has been an invaluable experience in which I have gained a greater understanding about the industry and turfgrass disease problems in Texas. I believe this event is a positive step toward building a successful Turfgrass Pathology Research and Extension Program in the state of Texas.

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, Dupont Crop Protection, Syngenta Professional Products, Quali-Pro, Dow AgroSciences, and AgraQuest. 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 help include Mr. Bud Graves and Rusty Graves of VGT Sod, Mr. Abel Gonzales of Twinwood, Mr. Clay Hillegeist of Bear Creek Golf World, and Mr. Eric Bauer and Billy Weeks of the Club at Carlton Woods, and Mr. Charles Joachim of Champions Golf Club. Without the support of 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,

Dr. Young-Ki Jo
Assistant Professor and Extension Specialist
Department of Plant Pathology and Microbiology
120 Peterson Building, 2132 TAMU
College Station, TX 77843

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.

Fungicide evaluation for spring green-up of bermudagrass at Bear Creek Golf World, Houston in 2009

Young-Ki Jo[1], Xian Mao[1] and Anthony Camerino[2]
[1]Department of Plant Pathology & Microbiology, Texas A&M University
[2]Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for spring green-up of bermudagrass.

Materials and Methods

The field trial was conducted at Bear Creek Golf World in Houston. Plots were established on the fairway of the Presidents Course #8 Hole, maintained at 0.5-inch mowing height. Individual plots measured 3 by 4 feet, and were arranged in a randomized complete block design with four replicates.

A total of 23 different fungicide treatments along with a non-treated control were applied based at labeled or suggested rates. 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. Spring applications of the treatments were performed on February 18 and March 18, 2009.

Turfgrass quality of each plot was recorded weekly during the experiment. Data obtained were subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean turfgrass quality for each treatment is presented in the table below.

Results and Discussion

Statistically significant reduction of turf quality was observed on the plots treated with fungicides containing the active ingredient of propiconazole (e.g., Quali-Pro Propiconazole, Headway and Banner MAXX). This is likely to be due to phytotoxicity and slowed green-up by the chemical.

Table 1. Turfgrass quality of the bermudagrass fairway plots established on Presidents Course #8 Hole at Bear Creek Golf World, Houston. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Feb.25	Mar.4	Mar.12	Mar.23
1	Quali-Pro Ipro 2SE	4	5.0	5.0	5.0	5.3
2	Quali-Pro TM 4.5	2	5.0	5.0	5.0	5.3
3	Quali-Pro Chlorothalonil 720 SFT	3.5	5.0	5.0	5.3	5.0
4	Quali-Pro TM/C	4	5.0	5.0	5.3	5.3
5	Quali-Pro Propiconazole 14.3	4	4.0**	5.0	5.3	4.8
6	26GT	4	5.0	5.0	5.0	5.0
7	3336 PLUS	5	5.0	5.0	5.0	5.3
8	3336 PLUS Daconil Ultrex	5 2.5	5.0	5.0	5.0	5.3
9	Banner MAXX	4	4.5**	4.5**	4.8	5.0
10	Chipco Triton 70WDG	0.3	5.0	5.0	5.0	5.3
11	Tartan	2	5.0	6.0	5.8	5.8
12	ProStar 70WP	2.2	5.0	5.0	5.3	5.5
13	ProStar 70WP	3	5.0	5.0	5.0	5.3
14	Headway	3	4.8	5.0	5.3	5.0
15	Headway	1.5	4.5**	5.3	4.8	5.3
16	Eagle	2				4.8
17	Heritage	2	5.0	5.0	5.3	5.3
18	Daconil Ultrex	2.5	5.0	5.0	5.0	5.5
19	Insignia	0.9	5.0	5.3	5.0	5.5
20	Trinity	2	5.0	5.3	5.3	5.5
21	LEM17	0.3	5.0	5.3	5.3	5.5
22	LEM17	0.5	4.8	5.3	5.3	5.8
23	Rhapsody	5	5.0	5.3	5.3	5.3
24	Non-treated control		5.0	5.0	5.3	5.5
	*LSD (P=0.05)		0.3	0.4	NS	NS

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly lower turfgrass quality than the non-treated control.

Fungicide evaluation for control of inky spot disease on zoysiagrass at the Club at Carlton Woods, Woodlands in 2009

Young-Ki Jo[1], Xian Mao[1] and Anthony Camerino[2]
[1]Department of Plant Pathology & Microbiology, Texas A&M University
[2]Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for control of a foliar disease, tentatively named "inky spot," caused by *Exserohilum* species on zoysiagrass.

Materials and Methods

The field trials were conducted at the Club of Carlton Woods, Tom Fazio Championship Course, Woodlands. Two field sites (Field 1 and Field 2) were established on zoysiagrass (cultivar Zeon) fairway #8 hole, maintained at 1/4-inch mowing height. Individual plots measured 3 by 4 feet for Field 1 and 3 by 3 feet for Field 2. Both field plots were arranged in a randomized complete block design with four replicates.

A total of 23 different fungicide treatments along with a non-treated control were applied for Field 1, and 27 fungicide treatments with a non-treated control and a fertilizer control for Field 2. 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 June16 at Field 1 and July 7 at Field 2. The Field 2 contained several additional fungicide treatments that were particularly effective in Field 1, but the fungicides were applied at a half rate of Field 1.

Percent diseased area and turfgrass quality of each plot were recorded weekly 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 percent disease and mean turfgrass quality for each treatment are presented in the tables below.

Results and Discussion

Symptoms of inky spot disease included distinctive black spots (~ 2 inches in diameter) on zoysiagrass fairways. As the disease progressed, individual spots were merged to bigger and irregular patches. We believe this disease may be caused by a previously-undocumented fungal pathogen, *Exserohilum* species, on turfgrass.

Most fungicide treatments showed reduced disease severity and turfgrass quality improvement within 2 weeks after application. Particularly, fungicides containing propiconazole (Quali-Pro Propiconazole, Banner MAXX and Headway), iprodione (Quali-Pro Ipro and 26GT), strobilurin (Heritage and Insignia) consistently showed best performance.

Table 1. Inky spot disease severity (number of infection centers, 2-inch diameter) on the zoysiagrass fairway plots established at Tom Fazio Championship Course, Field 1.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Jun.16	Jun.23	Jun.30	Jul.7	Jul.21
1	Quali-Pro Ipro 2SE	4	13.3	2.8**	0.0**	0.3**	1.3**
2	Quali-Pro TM 4.5	2	7.8	1.3**	1.3**	5.5**	3.8**
3	Quali-Pro Chlorothalonil 720 SFT	3.5	18.0	8.8**	5.8**	19.8	8.3
4	Quali-Pro TM/C	4	13.0	5.0**	4.3**	14.5	9.5
5	Quali-Pro Propiconazole 14.3	4	20.3	5.0**	0.3**	0.3**	0.0**
6	26GT	4	13.0	2.0**	0.0**	0.3**	0.0**
7	3336 PLUS	5	13.8	6.5**	6.6**	14.3	4.5**
8	3336 PLUS Daconil Ultrex	5 2.5	9.5	1.8**	0.1**	6.5**	1.3**
9	Banner MAXX	4	11.8	2.0**	0.1**	0.0**	0.0**
10	Chipco Triton 70WDG	0.3	10.5	3.3**	0.1**	2.5**	2.8**
11	Tartan	2	10.8	5.0**	1.5**	2.5**	1.3**
12	ProStar 70WP	2.2	20.3	8.3**	12.0	15.3	2.0**
13	ProStar 70WP	3	8.0	3.8**	1.5**	6.0**	1.8**
14	Headway	3	15.5	3.0**	0.0**	0.0**	1.3**
15	Headway	1.5	14.0	4.0**	0.8**	8.8	9.8
16	Eagle	2	29.5	7.0**	0.8**	2.8**	5.8
17	Heritage	2	14.0	4.0**	1.5**	2.0**	0.0**
18	Daconil Ultrex	2.5	16.5	6.5**	2.8**	9.8	7.5
19	Insignia	0.9	10.5	3.8**	0.1**	0.0**	0.0**
20	Trinity	2	18.0	3.5**	5.5**	10.8	9.8
21	LEM17	0.3	6.8	2.9**	0.5**	0.0**	0.0**
22	LEM17	0.5	16.8	3.0**	0.0**	0.0**	0.0**
23	Rhapsody	5	11.5	5.8**	11.8	14.5	4.8**
24	Non-treated control		19.5	23.0	20.5	22.8	15.3
	*LSD (P=0.05)		NS	9.8	10.5	14.5	10.3

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly less disease than the non-treated control.

Table 2. Turfgrass quality of the zoysiagrass fairway plots established at at Tom Fazio Championship Course, Field 1. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Jun.23	Jun.30	Jul.7	Jul.21
1	Quali-Pro Ipro 2SE	4	6.0**	6.8**	6.8**	6.3**
2	Quali-Pro TM 4.5	2	6.3**	5.8**	5.0	5.3
3	Quali-Pro Chlorothalonil 720 SFT	3.5	5.5	5.3	4.5	4.8
4	Quali-Pro TM/C	4	5.5	5.5**	4.5	4.8
5	Quali-Pro Propiconazole 14.3	4	5.5	6.3**	6.0**	6.3**
6	26GT	4	6.3**	6.5**	6.8**	6.3**
7	3336 PLUS	5	5.8**	5.0	4.3	5.0
8	3336 PLUS Daconil Ultrex	5 2.5	6.0**	6.0**	5.5**	5.0
9	Banner MAXX	4	5.8**	5.8**	6.8**	6.5**
10	Chipco Triton 70WDG	0.3	6.0**	6.5**	6.0**	5.3
11	Tartan	2	6.5**	6.5**	6.0**	5.8**
12	ProStar 70WP	2.2	5.0	4.8	4.5	5.5**
13	ProStar 70WP	3	5.8**	5.8**	5.3**	5.8**
14	Headway	3	6.0**	6.3**	6.8**	6.0**
15	Headway	1.5	5.3	6.0**	5.8**	5.3
16	Eagle	2	5.0	6.0**	5.3**	5.5**
17	Heritage	2	5.5	5.8**	6.8**	6.3**
18	Daconil Ultrex	2.5	5.3	5.5**	5.0	4.5
19	Insignia	0.9	6.0**	6.0**	6.5**	6.5**
20	Trinity	2	5.8**	5.8**	5.5**	5.5**
21	LEM17	0.3	6.0**	6.3**	7.3**	6.3**
22	LEM17	0.5	6.3**	6.8**	7.3**	6.8**
23	Rhapsody	5	5.3	4.8	4.8	4.8
24	Non-treated control		4.5	4.0	3.5	3.8
	*LSD (P=0.05)		1.1	1.3	1.7	1.5

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly better turfgrass quality than the non-treated control.

Table 3. Inky spot disease severity (number of infection centers, 2-inch diameter) on the zoysiagrass fairway plots established at Tom Fazio Championship Course, Field 2.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Jul.7	Jul.14	Jul.21	Jul.26
1	Quali-Pro Ipro 2SE	4	14.3	10.3	0.5**	1.3
2	Quali-Pro Ipro 2SE	2	14.8	10.0	5.0**	6.8
3	Quali-Pro TM 4.5	2	4.3	4.6	4.3**	9.0
4	Quali-Pro Chlorothalonil 720 SFT	3.5	14.8	9.3	4.8**	11.8
5	Quali-Pro TM/C	4	8.8	5.8	3.5**	8.8
6	Quali-Pro Propiconazole 14.3	4	13.3	12.0	1.0**	0.3
7	26GT	4	10.8	6.8	1.8**	0.3
8	26GT	2	9.0	4.5	0.3**	0.3
9	3336 PLUS	5	11.0	6.8	2.5**	4.0
10	3336 PLUS Daconil Ultrex	5 2.5	5.3	1.4	0.8**	11.5
11	Banner MAXX	4	10.0	9.8	1.0**	0.3
12	Chipco Triton 70WDG	0.3	12.0	7.3	3.3**	6.5
13	Tartan	2	11.8	7.8	0.5**	0.8
14	ProStar 70WP	2.2	11.0	7.3	4.0**	5.5
15	ProStar 70WP	3	7.5	4.3	1.3**	1.3
16	Headway	3	10.8	7.8	1.8**	0.3
17	Headway	1.5	7.5	2.9	0.8**	2.8
18	Eagle	2	17.8	13.0	0.5**	1.5
19	Heritage	2	8.5	6.3	1.5**	0.3
20	Heritage	1	8.8	4.5	1.0**	0.8
21	Daconil Ultrex	2.5	13.3	8.8	7.8	14.3
22	Insignia	0.9	9.5	7.3	1.5**	1.0
23	Insignia	0.5	7.3	2.3	1.0**	2.3
24	Trinity	2	21.0	15.0	2.3**	11.5
25	Ammonium sulfate	16	12.8	14.3	5.3**	11.3
26	LEM17	0.3	11.3	5.3	2.3**	0.5
27	LEM17	0.5	5.5	0.8	0.0**	0.3
28	Rhapsody	5	14.3	12.5	6.0	10.3
29	Non-treated control		19.8	17.3	10.5	8.0
	*LSD (P=0.05)		NS	NS	4.6	8.3

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly less disease than the non-treated control.

Table 4. Turfgrass quality of the zoysiagrass fairway plots established at at Tom Fazio Championship Course, Field 2. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Jul.14	Jul.21
1	Quali-Pro Ipro 2SE	4	5.0**	5.5**
2	Quali-Pro Ipro 2SE	2	4.3	5.0
3	Quali-Pro TM 4.5	2	5.8**	5.3
4	Quali-Pro Chlorothalonil 720 SFT	3.5	5.0**	4.8
5	Quali-Pro TM/C	4	4.5	5.3
6	Quali-Pro Propiconazole 14.3	4	4.3	5.8**
7	26GT	4	5.0**	5.5**
8	26GT	2	5.0**	5.8**
9	3336 PLUS	5	4.8	5.3
10	3336 PLUS Daconil Ultrex	5 2.5	5.3**	4.8
11	Banner MAXX	4	5.0**	5.5**
12	Chipco Triton 70WDG	0.3	5.0**	5.0
13	Tartan	2	5.8**	5.8**
14	ProStar 70WP	2.2	5.3**	5.3
15	ProStar 70WP	3	5.0**	5.8**
16	Headway	3	4.8	5.3
17	Headway	1.5	5.3**	5.3
18	Eagle	2	4.8	5.0
19	Heritage	2	5.0**	5.5**
20	Heritage	1	5.0**	5.5**
21	Daconil Ultrex	2.5	3.5	4.5
22	Insignia	0.9	4.8	5.8**
23	Insignia	0.5	5.8**	5.8**
24	Trinity	2	4.3	5.8**
25	Ammonium sulfate	16	3.5	4.8
26	LEM17	0.3	4.8	5.8**
27	LEM17	0.5	5.5**	6.0**
28	Rhapsody	5	4.3	4.8
29	Non-treated control		3.8	4.5
	*LSD (P=0.05)		1.1	0.9

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly better turfgrass quality than the non-treated control.

Evaluation of fall fungicide applications for control of large patch disease on zoysiagrass at the Club at Carlton Woods in 2008/2009

Young-Ki Jo[1], Xian Mao[1] and Anthony Camerino[2]
Department of Plant Pathology & Microbiology, Texas A&M University
[2]Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides of protective effect for large patch disease caused by *Rhizoctonia solani* on zoysiagrass.

Materials and Methods

The field trial was conducted at the Club of Carlton Woods, Tom Fazio Championship Course, Woodlands. Plots were established on zoysiagrass cultivar 'Zeon' driving range, maintained at 1/4-inch mowing height. Individual plots measured 3 by 4 feet, and were arranged in a randomized complete block design with four replicates.

A total of 22 different fungicide treatments along with a non-treated control were applied based at labeled or suggested rates. 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. Two applications of the treatments were performed on November 4 and December 9, 2008 before complete winter dormancy of turfgrass.

Percent diseased area and turfgrass quality of each plot were recorded in the following spring. Data obtained was subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean disease severity and turf quality for each treatment are presented in the tables below.

Results and Discussion

Spring green-up began and large patch disease symptoms appeared in March on most plots. Statistically, there was a significant difference in the disease severity and turfgrass quality in many treatments. Particularly, Banner MAXX, Tartan, ProStar and Daconil Ultrax yielded best protection, consistently showing less symptoms and better turfgrass quality than the non-treated control plot.

Table 1. Large patch disease severity (% infected area) on zoysiagrass plots established at Tom Fazio Championship Course, Woodlands.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Mar.18	Mar.24	Mar.31	Apr.7
1	Quali-Pro Ipro 2SE	4	18.5**	58.8	53.8	16.3**
2	Quali-Pro TM 4.5	2	21.3	68.5	63.8	27.5
3	Quali-Pro Chlorothalonil 720 SFT	3.5	10.0**	58.8	45.0**	12.5**
4	Quali-Pro TM/C	4	19.3**	60.0	27.5**	15.0**
5	Quali-Pro Propiconazole 14.3	4	6.0**	46.5**	50.0**	11.8**
6	26GT	4	18.8**	42.5**	42.5**	21.8**
7	3336 PLUS	5	15.0**	64.8	43.8**	19.3**
8	3336 PLUS Daconil Ultrax	5 2.5	22.5	45.0**	40.0**	14.3**
9	Banner MAXX	4	12.0**	45.0**	40.0**	16.8**
10	Chipco Triton 70WDG	0.3	12.3**	58.8	40.0**	15.0**
11	Tartan	2	11.8**	31.3**	40.0**	12.5**
12	ProStar 70WP	2.2	15.5**	33.8**	46.3**	20.0**
13	ProStar 70WP	3	11.3**	44.8**	46.3**	15.0**
14	Headway	3	41.3	76.3	90.0	43.8
15	Headway	1.5	10.5**	55.0	53.8	20.0**
16	Heritage TL	2	30.0	65.0	61.3	26.3
17	Daconil Ultrax	2.5	2.3**	40.0**	26.3**	10.5**
18	Insignia	0.9	11.3**	47.3**	55.0	13.8**
19	Trinity	2	27.5	65.0	70.0	28.8
20	LEM17	0.3	15.0**	55.0	45.0**	26.3
21	LEM17	0.5	22.5	51.3	58.8	36.3
22	3336 PLUS Protect DF	4 8	32.5	77.3	58.8	22.5**
23	CX-09	2.5	20.0**	43.8**	55.0	21.3**
24	Rhapsody	5	33.8	53.8	77.5	32.5
25	Non-treated control		50.0	78.8	85.0	46.3
	*LSD (P=0.05)		28.8	30.9	32.0	22.2

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly less disease than the non-treated control.

Table 2. Turfgrass quality of the zoysiagrass plots established at Tom Fazio Championship Course, Woodlands. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Mar.18	Mar.24	Mar.31	Apr.7
1	Quali-Pro Ipro 2SE	4	4.5	3.8	3.8**	5.0
2	Quali-Pro TM 4.5	2	4.0	3.3	2.8	4.8
3	Quali-Pro Chlorothalonil 720 SFT	3.5	5.3	3.3	4.0**	5.3
4	Quali-Pro TM/C	4	5.0	3.0	4.3**	5.0
5	Quali-Pro Propiconazole 14.3	4	5.3	4.3	3.5	4.8
6	26GT	4	5.5	3.8	3.5	4.8
7	3336 PLUS	5	5.5	3.5	3.8**	5.0
8	3336 PLUS Daconil Ultrax	5 2.5	5.5	4.0	4.3**	5.3
9	Banner MAXX	4	5.5	3.5	4.3**	5.0
10	Chipco Triton 70WDG	0.3	5.5	4.0	4.3**	4.8
11	Tartan	2	5.5	3.0	4.3**	5.5
12	ProStar 70WP	2.2	5.3	4.0	4.0**	4.8
13	ProStar 70WP	3	5.0	3.8	4.0**	4.8
14	Headway	3	3.3	3.0	1.5	3.8
15	Headway	1.5	5.0	4.0	3.5	5.3
16	Heritage TL	2	4.3	3.5	3.3	4.5
17	Daconil Ultrax	2.5	6.3	3.8	4.8**	6.0
18	Insignia	0.9	5.3	4.0	3.5	4.8
19	Trinity	2	4.8	3.5	3.0	4.3
20	LEM17	0.3	5.0	3.8	3.8**	5.0
21	LEM17	0.5	4.8	3.5	3.3	4.8
22	3336 PLUS Protect DF	4 8	4.8	3.3	3.0	4.8
23	CX-09	2.5	5.0	3.5	3.8**	4.8
24	Rhapsody	5	4.3	3.3	2.5	4.3
25	Non-treated control		3.8	2.5	1.8	3.8
	*LSD (P=0.05)		NS	NS	1.8	NS

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly better turfgrass quality than the non-treated control.

Evaluation of spring fungicide applications for control of large patch disease on zoysiagrass at the Club at Carlton Woods in 2009

Young-Ki Jo[1], Xian Mao[1] and Anthony Camerino[2]
Department of Plant Pathology & Microbiology, Texas A&M University
[2]Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides of curative effect for large patch disease caused by *Rhizoctonia solani* on zoysiagrass.

Materials and Methods

The field trial was conducted at the Club of Carlton Woods, Tom Fazio Championship Course, Woodlands. Plots were established on zoysiagrass cultivar 'Zeon' driving range, maintained at 1/4-inch mowing height. Individual plots measured 3 by 4 feet, and were arranged in a randomized complete block design with four replicates.

A total of 22 different fungicide treatments along with a non-treated control were applied based at labeled or suggested rates. 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 application was performed on March 24 when 45% of the plot area had already been infected and showed large patch symptoms. Additional application was conducted on April 21.

Percent diseased area and turfgrass quality of each plot were recorded weekly during this field trial. Data obtained was subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean disease severity and turf quality for each treatment are presented in the tables below.

Results and Discussion

Spring green-up began in March. Large patch symptoms appeared on most plots before fungicide treatment, and average 45% of the plot area was infected. Statistically, there was no significant improvement by fungicides for turfgrass recovery. Turfgrass naturally recovered by May.

Table 1. Large patch disease severity (% infected area) on zoysiagrass plots established at Tom Fazio Championship Course, Woodlands.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Before treatment Mar.24	Mar.31	Apr.21	Apr.27
1	Quali-Pro Ipro 2SE	4	35.0	45.0	25.0	31.3
2	Quali-Pro TM 4.5	2	32.5	60.0	28.8	25.0
3	Quali-Pro Chlorothalonil 720 SFT	3.5	41.3	48.5	21.3	25.0
4	Quali-Pro TM/C	4	43.8	70.0	33.8	48.8
5	Quali-Pro Propiconazole 14.3	4	37.5	59.8	35.0	50.0
6	26GT	4	51.3	75.0	45.0	46.3
7	3336 PLUS	5	20.3	36.3	23.8	16.8
8	3336 PLUS Daconil Ultrax	5 2.5	51.3	61.0	43.8	41.3
9	Banner MAXX	4	26.3	73.8	30.0	42.5
10	Chipco Triton 70WDG	0.3	47.5	58.8	42.5	42.5
11	Tartan	2	58.8	80.8	45.0	55.0
12	ProStar 70WP	2.2	64.8	78.5	50.0	61.3
13	ProStar 70WP	3	53.8	72.3	41.3	46.3
14	Headway	3	38.8	62.5	37.5	41.3
15	Headway	1.5	30.0	47.5	26.3	36.3
16	Heritage TL	2	33.8			38.8
17	Daconil Ultrax	2.5	56.3	69.8	33.8	56.3
18	Insignia	0.9	43.8	73.5	41.3	33.8
19	Trinity	2	57.5	68.8	52.5	55.0
20	LEM17	0.3	48.8	56.3	37.5	37.5
21	LEM17	0.5	38.8	68.8	38.8	41.3
22	Rhapsody	5	60.0	69.5	53.8	61.3
23	Non-treated control		73.5	95.8	65.0	71.3
	*LSD (P=0.05)		NS	NS	NS	NS

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

Table 2. Turfgrass quality of the zoysiagrass plots established at Tom Fazio Championship Course, Woodlands. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Before treatment Mar.24	Mar.31	Apr.27	May.6
1	Quali-Pro Ipro 2SE	4	3.5	3.8	3.8	4.5
2	Quali-Pro TM 4.5	2	4.3	4.5	4.3	4.8
3	Quali-Pro Chlorothalonil 720 SFT	3.5	4.3	4.3	4.8	5.0
4	Quali-Pro TM/C	4	3.8	3.0	3.8	4.3
5	Quali-Pro Propiconazole 14.3	4	3.5	3.5	2.8	4.0
6	26GT	4	3.5	3.5	3.0	4.3
7	3336 PLUS	5	4.3	4.8	4.5	4.8
8	3336 PLUS Ultrex	5 2.5	3.0	3.8	4.0	3.8
9	Banner MAXX	4	3.5	2.8	3.3	4.0
10	Chipco Triton 70WDG	0.3	3.5	4.3	3.5	3.8
11	Tartan	2	3.0	2.5	3.5	4.0
12	ProStar 70WP	2.2	2.8	2.5	3.3	4.0
13	ProStar 70WP	3	3.3	3.8	3.5	4.0
14	Headway	3	3.3	3.3	3.3	4.0
15	Headway	1.5	4.3	3.0	3.8	4.3
16	Heritage TL	2	4.0		3.8	3.8
17	Daconil Ultrax	2.5	3.5	3.8	3.8	4.0
18	Insignia	0.9	3.0	2.8	3.8	4.3
19	Trinity	2	2.8	2.5	3.5	4.5
20	LEM17	0.3	3.3	3.3	4.0	4.0
21	LEM17	0.5	3.3	2.8	4.0	4.5
22	Rhapsody	5	2.8	2.3	3.5	3.5
23	Non-treated control		2.5	1.8	3.0	3.5
	*LSD (P=0.05)		NS	NS	NS	NS

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

Fungicide evaluation for spring green-up on bermudagrass at Champions Golf Club, Houston in 2009

Young-Ki Jo[1], Xian Mao[1] and Anthony Camerino[2]
[1]Department of Plant Pathology & Microbiology, Texas A&M University
[2]Texas AgriLife Extension Service, Harris County Office

Objective

To evaluate fungicides for spring green-up and potential diseases on ultra-dwarf bermudagrass.

Materials and Methods

The field trial was conducted at Champions Golf Club, Houston. Plots were established on ultra-dwarf bermudagrass cultivar 'Champion' putting green, maintained at 1/8-inch mowing height. Individual plots measured 3 by 4 feet, and were arranged in a randomized complete block design with four replicates.

A total of 23 different fungicide treatments along with a non-treated control were applied based at labeled or suggested rates. 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 applications of the treatments were performed on March 13 and April 21.

Turfgrass quality of each plot was recorded weekly throughout experiment. Data obtained was subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean turfgrass quality for each treatment is presented in the table below.

Results and Discussion

Statistically, there was not a significant improvement of turfgrass quality with fungicides compared with the non-treated control. However, the quality was significantly reduced by demethylase inhibitor fungicides including Headway, Quali-Pro Propiconazole, Banner MAXX, Chipco Triton and Trinity. The reduced turfgrass quality was caused by phytotoxicity from application of these chemicals.

Table 1. Turfgrass quality of the bermudagrass plots established on the putting green at the Champions Golf Club. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Mar. 24	Mar. 31	Apr. 7	Apr. 21	May. 6	May. 27
1	Quali-Pro Ipro 2SE	4	6.0	6.0	6.0	5.8	5.0	6.7
2	Quali-Pro TM 4.5	2	6.0	5.8	6.0	5.8	4.8	6.0
3	Quali-Pro Chlorothalonil 720 SFT	3.5	6.0	6.0	6.0	6.0	5.2	6.5
4	Quali-Pro TM/C	4	5.8	5.7	6.0	5.8	4.8	6.0
5	Quali-Pro Propiconazole 14.3	4	5.5	4.3**	5.3**	3.2**	3.0**	3.8**
6	26GT	4	6.0	6.0	6.0	6.5	6.0	6.3
7	3336 PLUS	5	6.0	6.0	6.0	6.5	5.0	6.0
8	3336 PLUS Daconil Ultrex	5 2.5	5.5	5.8	6.0	5.5	5.2	6.5
9	Banner MAXX	4	4.2**	4.0**	5.0**	3.0**	3.0**	3.8**
10	Chipco Triton 70WDG	0.3	5.5	5.8	6.0	3.8**	3.0**	3.3**
11	Tartan	1	7.0	6.0	6.0	5.2	4.0	6.0
12	ProStar 70WP	2.2	5.3**	5.7	6.0	6.0	5.2	6.0
13	ProStar 70WP	3	5.7	5.3**	6.0	6.0	5.5	6.0
14	Headway	3	4.7**	4.8**	5.3**	3.2**	3.8	5.2**
15	Headway	1.5	5.3**	5.3**	6.0	4.7**	4.5	5.3**
16	Eagle	2					5.0	5.0
17	Heritage TL	2	5.7	5.0**	5.7	4.6**	4.3	6.0
18	Daconil Ultrex	2.5	6.0	5.5**	6.0	4.8	5.2	6.5
19	Insignia	0.9	5.8	6.0	6.0	5.7	5.8	6.0
20	Trinity	2	6.0	5.3**	6.0	4.0**	3.3**	3.2**
21	LEM17	0.3	6.0	6.0	6.0	6.3	5.0	6.0
22	LEM17	0.5	6.0	6.0	6.0	6.2	5.2	6.2
23	Rhapsody	5	6.0	6.0	6.0	4.8	4.7	6.0
24	Non-treated control		6.0	6.3	6.0	6.3	5.0	6.0
	*LSD (P=0.05)		0.6	0.7	0.3	1.5	1.2	0.5

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly lower turfgrass quality than the non-treated control.

Fungicide evaluation for control of large patch disease on St. Augustinegrass sod at Twinwood Farm, Brookshire in 2008/2009

Young-Ki Jo and Xian Mao
Department of Plant Pathology & Microbiology, Texas A&M University

Objective

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

Materials and Methods

The field trial was conducted at Twinwood Farms in Brookshire. Plots were established on St. Augustinegrass cultivar 'Raleigh' maintained at 3-inch mowing height. Individual plots measured 3 by 6 feet, and were arranged in a randomized complete block design with four replicates.

A total of 24 different fungicide treatments along with water and fertilizer controls were applied based at labeled or suggested rates. 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 application of the treatments was performed on December 8, 2008.

Turfgrass quality of each plot was recorded on March 19, 2009. 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 table below.

Results and Discussion

There was no noticeable large patch disease symptoms observed due to dry weather in the spring, 2009. Statistically, there was no significant difference in turf quality among treatments. However, slight phytotoxicity and slow spring green-up were observed on the plots treated with products containing the active ingredient of propiconazole (e.g., Quali-Pro Propiconazole and Banner MAXX).

Table 1. Turfgrass quality of the St. Augustinegrass plots established at Twinwood Farms, Brookshire. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Mar.19
1	Quali-Pro Ipro 2SE	4	5.3
2	Quali-Pro TM 4.5	2	6.0
3	Quali-Pro Chlorothalonil 720 SFT	3.5	5.8
4	Quali-Pro TM/C	4	6.0
5	Quali-Pro Propiconazole 14.3	4	4.3
6	26GT	4	5.0
7	3336 PLUS	5	5.3
8	3336 PLUS Daconil Ultrex	5 2.5	5.8
9	Banner MAXX	4	4.5
10	Chipco Triton 70WDG	0.3	6.0
11	Tartan	2	5.3
12	ProStar 70WP	2.2	5.3
13	ProStar 70WP	3	5.5
14	Headway	3	5.8
15	Headway	1.5	5.3
16	Heritage	2	5.5
17	Daconil Ultrex	2.5	5.8
18	Insignia	0.9	4.8
19	Trinity	2	5.8
20	LEM17	0.3	5.5
21	LEM17	0.5	5.0
22	3336 PLUS Protect DF	4 8	6.0
23	CX-09	2.5	4.5
24	Rhapsody	5	6.0
25	Non-treated control		5.3
	*LSD (P=0.05)		NS

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

Fungicide evaluation for control of large patch disease on St. Augustinegrass sod at VGT Sod Farm, Wharton in 2008/2009

Young-Ki Jo and Xian Mao
Department of Plant Pathology & Microbiology, Texas A&M University

Objective

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

Materials and Methods

The field trial was conducted at the VGT Sod Farm in Wharton. Plots were established on St. Augustinegrass cultivar 'Raleigh' maintained at 4-inch mowing height. Individual plots measured 3 by 6 feet, and were arranged in a randomized complete block design with four replicates.

A total of 24 different fungicide treatments along with water and fertilizer controls were applied based at labeled or suggested rates. 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 water per 1,000 ft^2. The application of the treatments was performed on December 8, 2008.

Percent diseased area and turfgrass quality of each plot were recorded in the following spring. Data obtained were subjected to an analysis of variance to determine significant differences between treatments using the SAS software program. The mean turfgrass quality for each treatment is presented in the table below.

Results and Discussion

There was no noticeable large patch disease symptoms developed due to dry weather in the spring, 2009. Spring green-up began in March. Statistically, there was no significant improvement by most fungicide treatment. However, phytotoxicity was observed in the plot treated with Quali-Pro Propiconazole, showing delayed green-up, discoloration, and reduced turf quality as compared to the non-treated control plot.

Table 1. Turfgrass quality of St. Augustinegrass plots established at VGT Sod Farm, Wharton. Quality scale on a 1 to 9, where 9 = highest quality, and 6 = acceptable.

Treatment No.	Treatment	Appl. Rate (fl oz or oz/M)	Mar.19	Mar.27	Apr.20
1	Quali-Pro Ipro 2SE	4	5.5	5.0	6.8
2	Quali-Pro TM 4.5	2	5.5	4.8	5.3
3	Quali-Pro Chlorothalonil 720 SFT	3.5	4.8	5.3	6.0
4	Quali-Pro TM/C	4	4.0**	3.8	4.5
5	Quali-Pro Propiconazole 14.3	4	4.0**	3.0**	4.3
6	Chipco 26GT	4	4.3**	4.5	4.0
7	3336 PLUS	5	4.8	3.8	4.5
8	3336 PLUS Daconil Ultrex	5 2.5	5.3	4.8	5.5
9	Banner MAXX	4	4.5	4.0	5.0
10	Chipco Triton 70WDG	0.3	4.5	4.0	4.8
11	Tartan	2	5.3	4.3	5.3
12	ProStar 70WP	2.2	5.5	4.8	5.8
13	ProStar 70WP	3	4.8	4.3	4.5
14	Headway	3	6.3	4.8	5.5
15	Headway	1.5	5.0	4.0	5.3
16	Heritage	2	5.3	4.5	4.8
17	Daconil Ultrex	2.5	5.5	4.3	5.3
18	Insignia	0.9	4.8	3.8	4.5
19	Trinity	2	5.3	4.0	4.8
20	LEM17	0.3	5.5	3.8	4.8
21	LEM17	0.5	5.8	4.0	4.8
22	3336 PLUS Protect DF	4 8	5.8	4.3	5.3
23	CX-09	2.5	4.5	3.8	4.5
24	Rhapsody	5	5.0	4.0	4.5
25	Non-treated control		5.5	4.3	4.5
	*LSD (P=0.05)		1.1	1.0	NS

*The differences greater than or equal to the LSD value are significant. NS = statistically no significant difference between treatments.

**Significantly lower turfgrass quality than the non-treated control.

Fungicides registered for use on golf courses and sod production

Common Name	Trade Name	Mode of Action
Anilene		
Boscalid	Emerald 70EG (WDG)	Acropetal Penetrant
Aromatic Hydrocarbon		
Chloroneb	Terraneb SP, Teremec SP	Contact
Etridiazol (ethazole)	Terrazole, Koban	Contact
PCNB	Turfcide 400, Turfcide 10G, PCNB 12.5G, Revere 10G Revere 4000, FF II, Terrachlor 400, Terrachlor 75WP	Contact
Benzimidazole		
Thiophanate-methyl	Fungo 50, Fungo Flo, 3336 WP, 3336 Flo, Caviler 2G Caviler 4.5F, Caviler 50WSB, 3336 Plus	Acropetal Penetrant
Carbamate		
Maneb	Maneb Plus Zinc F4, Maneb 75DF, Pentathlon 4F, Pentathlon 75DG	Contact
Thiram	Spotrete, Thiram	Contact
Mancozeb	Fore, Fore Flo, Dithane T/O, Dithane WF, Pentathalon	Contact
Propamocarb-hydrochloride	Banol	Contact
Carboximide		
Flutolanil	ProStar 70WP	Acropetal Penetrant
Demethylation Inhibitor		
Fenarimol	Rubigan A.S.	Acropetal Penetrant
Myclobutanil	Eagle, Golden Eagle	Acropetal Penetrant
Propiconazole	Banner, Banner MAXX, Spectator, Propiconazole Pro	Acropetal Penetrant
Triadimefon*	Bayleton 25, Bayleton 50, Accost 1G	Acropetal Penetrant
Dicarboximide		
Iprodione*	Chipco 26GT, Chipco 26019, Iprodione Pro, ProTurf Fungicide X	Local Penetrant
Vinclozolin*	Curalan, Curalan DF, Touché, Touché Flowable, Vorlan	Local Penetrant
Nitrile		
Chlorothalonil*	Daconil WeatherStik, Daconil Ultrex, Daconil 2787 Daconil Zn, Manicure 6 Flowable, Manicure Ultrex, Concorde, Thalonil 4L, Thalonil 90DF, Echo 720, Echo 75	Contact
Phenylamide		
Mefenoxam	Subdue, Subdue MAXX, Ridomil	Acropetal Penetrant
Phenylpyrrole		
Fludioxonil	Medallion	Contact
Phosphonate		
Fosetyl-aluminum	Aliette, Aliette T&O, Chipco Signature, Prodigy, Autograph	Systemic
Phosphite (salts)	Magellan, Fosphite, Resyst, Alude, Reliant	Systemic
Polyoxin		
Polyoxin D Zinc	Endorse	Local Penetrant
Strobilurin (=QoI)		
Azoxystrobin	Heritage	Acropetal Penetrant
Fluoxastrobin	Disarm	Localized Penetrant
Pyraclostrobin	Insignia	Localized Penetrant
Trifloxystrobin	Compass	Localized Penetrant
This list is not all-inclusive	*The use for residential turf is prohibited	

Pre-mix products with more than one fungicide

Active ingredients	Product name
azoxystrobin + propiconazole	Headway
chlorothalonil + propiconazole	Echo Propiconazole Turf Fungicide
chlorothalonil + thiophanate-methyl	ConSyst, Spectro, Broadside, Peregrine
chlorothalonil + fludioxonil + propiconazole	Instrata
mancozeb + copper hydroxide	Junction
mancozeb + myclobutanil	MANhandle
thiophanate-methyl + chloroneb	Proturf Fungicide IX
thiophanate-methyl + flutalonil	Systar
thiophanate-methyl + iprodione	26/36 Fungicide, Proturf Fluid Fungicide, Dovetail, Lesco Twosome
thiophanate-methyl + mancozeb	Duosan
thiophanate-methyl + thiram	Bromosan
triadimefon + flutolanil	ProStar Plus
triadimefon + metalaxyl	Proturf Fluid Fungicide II
triadimefon + thiram	Proturf Fluid Fungicide III
triadimefon + trifloxystrobin	Armada
triadimefon + trifloxystrobin + stress guard	Tartan

Plot map for the fungicide evaluation for control of large patch on zoysiagrass

Driving range of the Club of Carlton Woods, Tom Fazio Championship Course

16	28	30	4	18	11	19	13	24	7	3	8	25	2	20
9	22	26	23	27	15	12	17	10	1	5	14	21	6	29
5	14	27	18	7	12	28	6	19	16	24	9	25	15	21
26	17	22	13	20	4	8	23	10	2	1	29	3	11	30
3	19	18	1	9	8	23	15	7	30	11	21	17	22	25
4	14	6	28	26	10	24	2	16	13	20	5	29	12	27
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Treatment

1.QP Ipro 4
2.QP TM 2
3.QP Chloro 3.5
4.QP TM/C 4
5. QP Propicon 4
6. 26 GT 4
7. 3336 5
8. Daconil 2.5 + 3336 5
9. Banner 4
10. PronTech
15. Headway 3
16. Headway 1.5
17. Heritage 2
18. Daconil 2.5
19. Eagle 2
20. Insignia 0.9
21. Trinity 2
22. Tartan
23-27. Triton
28. Prostar
29-30. Disarm