

**2001 – 2002 FUNGICIDE RESEARCH REPORT**  
**J.M. Vargas, Jr., A. R. Detweiler, and N. M. Dykema**  
**Michigan State University**

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## **2001-2002 Snow Mold (*Typhula ishikariensis* and *T. incarnata*)**

The corporation-sponsored snow mold fungicide field study was conducted during the fall and winter of 2001-2002. Treatments were applied preventively on the Treetops/Sylvan Resort in Gaylord, MI on the dates indicated in Table 1. Treatments were applied to four replicate 6' x 9' creeping bentgrass (*Agrostis palustris*)/annual bluegrass (*Poa annua*) fairway plots where the turf was maintained at approximately ½" height of cut. Liquid treatments were applied with a CO<sub>2</sub> backpack sprayer at a pressure of 36 PSI and a volume of 100 GPA using a flat-fan, double-nozzle boom, unless otherwise indicated in Table 1. Granular products were pre-weighed and hand-applied.

Permanent snow covered the plots from late December through April 13. The study was rated on 16-April, 2002 immediately following snow-cover melt-off. The predominant snow mold species was *Typhula ishikariensis* with lesser amounts of *Typhula incarnata*. Microdochium patch (*Microdochium nivale*) was also observed and was the predominant snow mold on some plots as indicated in Table 1.

As can be seen in Table 1, disease pressure was only moderately severe at Tree Tops this year. Disease pressure was also somewhat uneven across the study, leading to variability in the data, except with the most efficacious treatments. As in recent years, tank mixes of standard fungicides of varying chemistries seemed to perform the best. Interestingly, 18 of the 19 best performing treatments all included chlorothalonil or PCNB.

Phytotoxicity and turf greening effects were observed in some plots, as indicated the data table.

**Table 1. Michigan State University Snow Mold Data, 2001-2002**

Location: Tree Tops/Sylvan Resort, Gaylord, MI								
Rating Date: 16-April, 2002								
Rating Scale: Percent plot area diseased with a combination of <i>Microdochium nivale</i> , <i>Typhula ishikariensis</i> and <i>T. incarnata</i> unless otherwise noted.								
#	Treatment and Rate/1000 sq ft	Appl date(s)	I <sup>c</sup>	II	III	IV	Mean <sup>b</sup>	LSD <sup>a</sup>
10	CH 26GT 8 fl oz + Dac. Ultrex 5.0 fl oz + Turfcide 400 12 fl oz	10/29	1	0	0	0	0.3	a
46	Bayleton (WG) 2 oz + Compass 0.25 oz (50WG) + Turfcide 400 6 fl oz	10/29	0.3	0.5	0.5	0.3	0.4	a
25	CH26GT 4 fl oz + Dac. Ultrex 5 oz + Polar Kote 4F 8 fl oz	10/29	0.5	(1)	0.3 <sup>t</sup>	(1)	0.7	a
45A	Heritage 0.4 oz + Banner Maxx 3 fl oz + Dac. Ultrex 5 oz	9/28						
45B	Heritage 0.4 oz + Medallion 0.33 oz + Dac. Ultrex 5 oz	10/29	1	0.5	0.3	1	0.7	a
44	Heritage 0.4 oz + Medallion 0.33 oz + Dac. Ultrex 5 oz	9/28,10/29	3	0.5	0 <sup>t</sup>	0.3	1.0	ab
72	UCC-UBI 4278 12 fl oz	10/29	5	(0.5)	0	0	1.4	ab
41	Heritage 0.4 oz + Banner Maxx 3 fl oz + Dac. Ultrex 5 oz	10/29	3	0.5	0.3	2	1.5	ab
47	Bayleton (WG) 2 oz + Compass 0.25 oz (50WG) + Dac. Ultrex 3.2 oz	10/29	2	2	0.5	2 <sup>d</sup>	1.6	ab
70	Turfcide 400 9 fl oz + Dac. Ultrex 3.7 oz	10/29	0.3	(3)	(0.3)	(3)	1.7	a-c
30	CH26GT 4 fl oz + Dac. Ultrex 5 oz + TADS 13093 16 oz /100 gal + Polar Kote 4F 8 fl oz	10/29	1	0	5	1	1.8	a-c
11	Scotts F+ FII 2x	10/29	(5)	(0.3)	(0.3)	(3)	2.2	a-d
76	Par Flo 8 fl oz + Lynx 2.22 oz	10/29	5(4) <sup>d</sup>	0	2 <sup>d</sup>	2 <sup>d</sup>	2.3	a-d
40	Medallion 0.33 oz + Banner Maxx 3 fl oz + Dac. Ultrex 5 oz	10/29	2	2	0	7 <sup>d</sup>	2.8	a-d
6	Insignia 0.9 oz + Defend (75 WP) 5.4 oz	9/28,10/29	(7)	(3)	0.3	(1) <sup>t</sup>	2.8	a-d
75	Par Flo 8 fl oz + Dac. Ultrex 6 oz + CH26GT 6 fl oz	10/29	(2)	1	1	10(5)	3.5	a-d
42	Heritage 0.4 oz + Medallion 0.33 oz + Dac. Ultrex 5 oz	10/29	5	2(1)	0.5 <sup>t</sup>	7	3.6	a-d
7	CH 26GT 4 fl oz + Dac. Ultrex 3.2 fl oz + Turfcide 400 6 fl oz	10/29	(10)	0.5	(3)	2	3.9	a-d
28	CH26GT 4 fl oz + Triton 1 fl oz + Polar Kote 4F 8 fl oz + TADS 13093 16 oz/100 gal	10/29	(7)	(0.5)	5(2) <sup>f</sup>	7(1)	4.1	a-d
48	Lynx (45WP) 2.22 oz + Compass (50WG) 0.25 oz	10/29	3 <sup>e</sup>	0 <sup>d</sup>	7 <sup>d</sup>	7 <sup>d</sup>	4.3	a-d
5	Insignia 0.9 oz + Iprodione Pro-SE 4 fl oz	9/28,10/29	(15)	3	0	0.3	4.6	a-d
24	CH26GT 4 fl oz + TADS 12529 8.5 gm + Polar Kote 4F 8 fl oz	10/29	(5)	(3)	0.3	12	5.1	a-d
43	Medallion 0.5 oz + Banner Maxx 4 fl oz	9/28,10/29	0.3 <sup>d</sup>	(20) <sup>d</sup>	0	2(1)	5.6	a-d
29	CH26GT 4 fl oz + TADS 12529 8.5gm + TADS 13093 16 oz/100gal + Polar Kote 4F 8 fl oz	10/29	(20)	0.3	2(1)	0.5	5.7	a-d
68	Polar Kote 4F PCNB (4L) 6 fl oz + Dac. Ultrex 3.8 oz + CH26GT 4 fl oz	10/29	(3)	0	0 <sup>t</sup>	(20)	5.8	a-d
37	Medallion 0.5 oz + Banner Maxx 4 fl oz	10/29	3(2) <sup>t</sup>	(7)	5(2) <sup>t</sup>	10(9)	6.3	a-d
49	Lynx (45WP) 2.22 oz + Compass (50WG) 0.25 oz + Dac. Ultrex 3.2 oz	10/29	15 <sup>d</sup>	0 <sup>e</sup>	0	10 <sup>d</sup>	6.3	a-d
67	Polar Kote 4F PCNB (4L) 8 fl oz	10/12,10/29	(10)	(15)	0	(1)	6.5	a-d
38	Medallion 0.5 oz + Dac. Ultrex 5 oz	10/29	3	20	0	7(4)	7.5	a-d
19	Spectro 4 oz + Nutri-Gro 3 oz + Defend 8 oz	10/29	(25)	0	5	(0.3)	7.6	a-d
20	Spectro 5 oz + Nutri-Gro 3 oz + Defend 8oz	10/29	(20)	1	0	(10)	7.8	a-d
14A	Spectro 5 oz + Nutri-Gro 3 fl oz	9/28						
14B	Defend 8 oz	10/29	25(20)	(3)	3(2)	1	8.0	a-d

73	Par Flo 4F 12 fl oz	10/29	5(3)	(10)	0	20(5)	8.8	a-e
13A	Spectro 5 oz	9/28						
13B	Spectro 5 oz + Nutri-Gro 3 fl oz	10/29	30(20)	0.5	(0.3) <sup>f</sup>	5(1)	9.0	a-e
23	CH26GT 4 fl oz + Triton 1 fl oz + Polar Kote 4F 8 fl oz	10/29	(20)	7(5)	0	10(2) <sup>f</sup>	9.3	a-f
50	AND HG 4 lbs	9/28,10/29	(20)	10(3)	2(1)	5(3)	9.3	a-f
8	Consyst 7.34oz + Turfcide 400 6 fl oz <sup>h</sup>	10/29	(15)	3(2)	0.3	20(17)	9.6	a-g
1	Insignia (20 WG) 0.9 oz	10/29	25(15)	5(1)	2(1)	7(1)	9.8	a-g
74	Par Flo 8 fl oz + Heritage 0.4 oz	10/29	(20)	15(1)	(3)	3	10.3	a-g
16A	Spectro 5 oz	9/28						
16B	Spectro 4 oz + Nutri-Gro 3 oz + Defend 6 oz	10/29	(35)	(2)	3	0	10.0	a-h
51	AND HG5 4 lbs	9/28,10/29	35(30)	0	1	(7)	10.8	a-h
2	Insignia (20 WG) 0.9 oz	9/28,10/29	(30)	20(17)	0.5	0	12.6	a-h
39	Heritage 0.4 oz + Medallion 0.5 oz	10/29	(20)	3	25(15)	(5)	13.3	a-i
26	CH26GT 4 fl oz + Triton 1 fl oz + TADS 13093 16 oz/100 gal	10/29	0.3	25(20)	25	7(5)	14.3	a-j
71	UCC-UBI 4277 15 fl oz	10/29	12	(25)	(0.3)	20(10)	14.3	a-j
15A	Spectro 5 oz	9/28						
15B	Spectro 5 oz + Defend 6 fl oz	10/29	(10)	(35)	0	(15)	15.0	a-j
34	CH 26GT 4 fl oz + Dac. Ultrex 3.2 oz + Turfcide 400 6 fl oz	10/29	(35)	(15)	(3)	7(2)	15.0	a-j
69	Turfcide 400 12 fl oz	10/29	(10)	(0.3) <sup>f</sup>	1	50(47) <sup>f</sup>	15.3	a-k
27	CH26GT 4 fl oz + TADS 12529 8.5 gm + TADS 13093 16 oz/100 gal	10/29	3 <sup>d</sup>	5(1) <sup>f</sup>	15(2)	40	15.8	a-l
31A	Signature 4 oz	10/12						
31B	Signature 4 oz + CH 26GT 4 fl oz + Triton 1 fl oz	10/29	35	5	15	10(2)	16.3	a-l
18	Spectro 4 oz + Defend 8 oz	10/29	(35)	(35)	0	0	17.5	a-l
35	Lesco PCNB with Novex fert. 6 lbs	10/29	(35)	(5) <sup>f</sup>	(10)	(25) <sup>f</sup>	18.8	a-m
62	AND 917-01 6.66 lbs	10/29	50(35)	15(3)	5(4)	10(7)	20.0	a-m
32A	Signature 4 oz	10/12						
32B	Signature 4 oz + CH 26GT 4 fl oz + Polar Kote 4F 8 fl oz	10/29	(35)	(10)	30(10)	7(3)	20.5	a-n
55	AND 904-01 4.8 lbs	10/29	40	3(1)	20(1)	20	20.8	a-n
21	CH26GT 4 fl oz + Triton 1 fl oz	10/29	35(10)	20(15)	10	20(7)	21.3	a-n
12A	Spectro 5 oz + 12-2-12 4.2 lbs	9/28						
12B	Defend 8 oz + 12-2-12 4.2 lbs	10/29	25(20)	20(10)	(5)	40(35) <sup>f</sup>	22.5	c-n
22	CH26GT 4 fl oz + TADS 12529 8.5 gm	10/29	35(5)	15	15(5) <sup>f</sup>	25(5)	22.5	c-n
53	AND 897-01 7.2 lbs	10/29	40(15)	30(20) <sup>f</sup>	2(1)	20(5)	23.0	d-o
3	Honor (50 WG) 0.2 oz	10/29	(70)	35(30)	(5)	7(3) <sup>d</sup>	29.3	e-p
65	AND 921-01 6.66 lbs	10/29	60(10)	(7)	(25)	(25)	29.3	e-p
66	Polar Kote 4F PCNB (10G) 10 lbs	10/29	40(35)	20(15)	10	50(35)	30.0	f-p
77	AND 922-01 6.66 lbs	10/29	35(15)	0	35(30)	(50)	30.0	f-p
59	AND 908-01 7.2 lbs	10/29	40(25)	30(15)	2	50(35)	30.5	g-q
63	Tee Time 10-0-14 w/ PCNB 6.66 lbs	10/29	(60) <sup>f</sup>	(3) <sup>f</sup>	10(9)	50(25)	30.8	g-q
54	AND 898-01 7.2 lbs	10/29	40(20)	25(5)	10(5)	50(25)	31.3	h-q

36	Zerotol 6 fl oz <sup>g</sup>	10/29,10/30,10/31	20	0.3	75(35)	40(15)	33.8	i-q
56	AND 905-01 4.8 lbs	10/29	25(2)	40(5)	50(7)	25(22)	35.0	j-q
58	AND 907-01 4.0 lbs	10/29	45(10)	0.3	45(15)	50(5) <sup>f</sup>	35.1	j-q
52	AND 896-01 7.2 lbs	10/29	40(30)	35(10)	65(2)	5(1)	36.3	k-q
4	Honor (50 WG) 0.2 oz	9/28,10/29	(80)	7 <sup>d</sup>	20(3)	(40)	36.8	l-q
17	Defend 8 oz	10/29	(60)	(65)	2	20(10)	36.8	l-q
64	AND 920-01 6.66 lbs	10/29	60(50)	(35) <sup>f</sup>	(3) <sup>f</sup>	60(58)	39.5	m-q
61	AND 910-01 7.2 lbs	10/29	40	50(45)	25	50(20)	41.3	n-q
33A	Signature 4 oz	10/12						
33B	Signature 4 oz + Polar Kote 4F 8 fl oz	10/29	(75)	60(55) <sup>f</sup>	(10)	30(7)	43.8	o-q
60	AND 909-01 7.2 lbs	10/29	45(40)	60(40)	25(23)	65(60)	48.8	pq
9	Control	---	95(45)	50(2)	15(2)	40(15)	50.0	pq
57	AND 906-01 4.0 lbs	10/29	45(35)	85(75)	10(9)	65(3) <sup>f</sup>	51.3	q

<sup>a</sup>Treatments followed by the same letter are not significantly different from each other (LSD, p=0.05).

<sup>b</sup>Average rating of 4 replicate plots.

<sup>c</sup>Plot rating represent total percent plot area diseased (*Typhula* species and *Microdochium nivale*.) Parentheses represent percent of plot area infected by *Typhula* species only.

<sup>d</sup>Indicates mild phytotoxicity.

<sup>e</sup>Indicates moderated phytotoxicity.

<sup>f</sup>Indicates turf greening.

<sup>g</sup>Treatment applied in 4 gal/1000 ft<sup>2</sup> spray volume.

<sup>h</sup>Treatment applied in 3 gal/1000 ft<sup>2</sup> spray volume.

### Dollar Spot (*Rutstroemia floccosum*)

This study was set up in 4 replicates of a random block design with 2' x 6' plots. We used a CO<sub>2</sub> backpack sprayer with a single nozzle boom at 34 PSI and 48 GPA. The host was Emerald creeping bentgrass mowed at 3/16". Fertility was maintained at about 3/8#N/month/1000 ft<sup>2</sup>. The 7-day treatments were applied 8/1, 8/8, 8/15, 8/21, 8/29, 9/6, 9/12 and 9/18 (except as noted in the data table). The 14-day treatments were applied 8/1, 8/15, 8/29, and 9/12 (except as noted in Table 2). The 21-day treatments were applied 8/1, 8/21, and 9/12. The 28-day treatments were applied 8/1 and 8/29. Data represent mean percent plot area infected (Table 2).

As the data in Table 2 indicate, dollar spot disease pressure was moderately severe in this study. The DMI fungicides (Banner Maxx, Propiconazole) alone, and in combinations, performed well throughout the rating period. Chipco 26GT and Iprodione Pro performed well on a 14-day schedule and the new strobilurin fungicides performed well also. After pre-treatment disease was eradicated, chlorothalonil (Daconil, Echo, Concorde) also performed well by the end of the season. It should be noted that the dollar spot strains in this plot area are benzimidazole-resistant, explaining the failed efficacy of Cleary's 3336F. No phytotoxicity was observed in this study this year although turf quality varied greatly as indicated in Table 3.

**Table 2: Putting Green Dollar Spot 2002.**

<b>Location: Hancock Turf Research Center, E. Lansing, MI</b>					
<b>Rating Scale: Mean % plot area blighted by dollar spot.<sup>b</sup></b>					
<b>Treatment and Rate/1000 sq ft</b>	<b>Interval (days)</b>	<b>Mean<sup>a</sup> 5-Sep</b>	<b>Mean 12-Sep</b>	<b>Mean 19-Sep</b>	<b>Mean 25-Sep</b>
Emerald 0.13 oz alternated with ----- Insignia 0.9 oz	14	0.0 I	0.0 I	0.0 J	0.0 I
Insignia 0.9 oz	14	0.0 I	0.0 I	0.0 J	0.0 I
Honor 0.2 oz	28	0.1 I	0.0 I	0.0 J	0.0 I
Emerald 0.13 oz	14	0.0 I	0.0 I	0.0 J	0.0 I
Emerald 0.18 oz	21	0.0 I	0.0 I	0.0 J	0.0 I
Emerald 0.18 oz	28	0.0 I	0.0 I	1.3 J	0.0 I
BAS 516F #1 1.03 oz	14	0.0 I	0.0 I	0.0 J	0.0 I
BAS 516F #1 1.03 oz	28	0.0 I	0.0 I	0.0 J	0.0 I
BAS 516F #2 1.09 oz	14	0.0 I	0.0 I	0.0 J	0.0 I
BAS 540F 0.26 fl oz	28	0.0 I	0.3 I	0.0 J	0.0 I

BAS 540F 0.44 fl oz	28	0.0 I	0.0 I	0.0 J	0.0 I
Eagle WSP 0.6 oz + Fore 6 oz <sup>c</sup>	14	10.8 D-G	3.8 G-I	0.0 J	0.0 I
Eagle WSP 0.6 oz	14				
Eagle WSP 0.6 oz + Prostar 1.5 oz	14				
Fore 6 oz + Chipco 26GT 4 fl oz + Subdue Maxx 1 fl oz	14				
Heritage 0.2 oz + Curalan 1 oz	14				
Fore 6 oz	14				
Fore 6 oz + Chipco 26GT 4 fl oz	14				
Eagle WSP 0.6 oz	14				
Eagle WSP 0.6 oz + Fore 6 oz <sup>c</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
Daconil 825 SDG 3.2 oz	14				
Eagle WSP 0.6 oz + Prostar 1.5 oz	14				
Chipco 26GT 4 fl oz + Subdue Maxx 1 fl oz	14				
Heritage 0.2 oz + Curalan 1 oz	14				
Eagle WSP 0.6 oz + Fore 6 oz	14				
Daconil 825 SDG 3.2 oz	14				
Eagle WSP 0.6 oz	14				
Concorde 82.5 DF 3.2oz alternated with	14	0.0 I	0.0 I	0.0 J	0.0 I
Pentathlon DF 6 oz + Bayleton 1 oz	14				
Concorde SST 3.5 fl oz alternated with	14	0.0 I	0.0 I	0.0 J	0.0 I
Pentathlon DF 14 oz + Bayleton 1 oz	14				
710-140 20 fl oz alternated with Bayleton 0.25 oz <sup>f</sup>	14	1.8 HI	0.0 I	0.0 J	0.0 I
Magellan 4.1 fl oz + Iprodione 1.5 fl oz <sup>h</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
Echo 720 2 fl oz + PropiMax EC 0.36 fl oz	21	0.0 I	0.0 I	0.0 J	0.0 I
TopPro Propiconazole 14.3 1 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
TopPro Propiconazole 14.3 2 fl oz <sup>i</sup>	14	0.0 I	1.3 I	0.0 J	0.0 I
Banner Maxx 1 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
Iprodione Pro 2SE 2 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
Chipco 26GT 2 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
TMI Combo Flo 4.2 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	0.0 I
Chipco 26GT 4 fl oz	14	0.0 I	0.0 I	0.0 J	0.0 I
Banner Maxx 1 fl oz	14	0.0 I	0.0 I	0.0 J	0.0 I

V-10114 1.18 oz	7	0.0 I	0.8 I	0.0 J	0.0 I
V-10114 1.76 oz	14	0.0 I	0.8 I	0.0 J	0.0 I
V-10114 2.35 oz	14	0.0 I	0.0 I	0.0 J	0.0 I
Chipco 26GT 2 fl oz	14	0.0 I	0.0 I	0.0 J	0.1 I
BAS 516F #2 1.09 oz	28	0.0 I	0.0 I	0.0 J	0.1 I
Banner Maxx 2 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	0.1 I
Magellan 4.1 fl oz + Chlorothalonil 2.125 oz <sup>h</sup>	14	9.3 D-H	4.5 G-I	4.5 G-J	0.3 I
Scotts/Andersons Fluid Fungicide 2.1 fl oz <sup>i</sup>	14	0.8 HI	0.0 I	0.0 J	0.3 I
BAS 540F 0.35 fl oz	28	0.1 I	0.0 I	0.0 J	0.6 I
TMI Combo Flo 2.1 fl oz <sup>i</sup>	14	0.0 I	0.0 I	0.0 J	1.4 I
Echo 720 3.6 fl oz	14	3.8 G-I	0.0 I	0.0 J	1.5 I
Concorde SST 3.5 fl oz	14	8.8 D-I	2.3 HI	2.5 H-J	1.9 HI
Concorde 82.5DF 3.2 oz	14	16.3 B-E	16.3 B-E	8.5 E-I	10.0 F-H
710-140 25 fl oz	14	12.3 D-G	4.8 G-I	8.8 E-H	12.5 E-G
710-140 20 fl oz with Daconil Ultrex 3.25 oz AS NEEDED after disease reaches 5% <sup>e</sup>	14	8.8 D-I	2.0 I	6.0 F-J	17.5 D-F
710-140 15 fl oz	14	23.0 A-C	5.5 G-I	12.3 D-F	18.0 D-F
710-140 20 fl oz (switch to 3-4 day interval for 2 wks when disease reaches 5%) <sup>g</sup>	14	9.3 D-H	9.3 E-H	14.5 C-E	18.3 D-F
Daconil Weather Stik 3.5 fl oz	14	5.0 F-I	2.8 HI	1.3 J	2.8 HI
710-150 20 fl oz	14	13.8 C-F	10.5 E-G	15.0 C-E	20.0 DE
Heritage 0.4 oz	14	17.3 B-D	14.3 C-E	9.3 E-G	20.3 DE
Copper 10 ppm <sup>d</sup>	7	26.3 A	22.5 AB	14.3 C-E	25.0 CD
Cleary's 3336 4 oz	14	23.8 AB	23.3 AB	26.3 AB	25.8 B-D
Copper 1 ppm <sup>d</sup>	14	28.0 A	21.3 A-C	18.8 CD	28.8 A-C
Daconil Ultrex 82.5 3.2 oz	14	8.1 E-I	6.3 F-I	2.5 H-J	3.3 HI
710-140 20 oz alternated with Daconil Ultrex 3.25 oz <sup>f</sup>	14	16.3 B-E	13.0 D-F	2.0 IJ	3.3 HI
Copper 100 ppm <sup>d</sup>	7	26.8 A	18.8 A-D	20.0 BC	33.8 AB
Control	--	25.0 AB	25.0 A	28.8 A	35.0 A
Spectro 4 oz	14	3.9 G-I	4.5 G-I	6.3 F-J	6.3 G-I
710-140 20 fl oz	14	4.8 G-I	1.8 I	4.5 G-J	6.8 G-I

<sup>a</sup> Means followed by the same letter do not significantly differ (LSD, p=0.05).

<sup>b</sup> Benzimidazole resistant strains.



<sup>c</sup> These program treatments were initiated on 5/22/02, with applications of 16A and 17A. 16B and 17B through 16H and 17H were applied at 14 day intervals ending with the final applications of 16H and 17H on 9/12/02.

<sup>d</sup> Ionized copper was initially applied on 8/16/02, and re-applied on 8/22/02, 8/29/02, 9/6/02, 9/12/02, and 9/18/02.

<sup>e</sup> Applied combination on 8/1/02, 8/14/02, and 8/29/02 due to disease >5%. Only 710-140 applied on 9/12/02.

<sup>f</sup> Fungicide only applied on 8/1/02, 8/14/02, and 9/12/02. 710-140 only applied on 8/29/02.

<sup>g</sup> Applied on 8/1/02, 8/5/02, 8/8/02, 8/14/02, 8/29/02, and 9/12/02.

<sup>h</sup> Applied in 3 gal/1000 ft<sup>2</sup> spray volume.

<sup>i</sup> Applied in 2 gal/1000 ft<sup>2</sup> spray volume.

## Anthracnose (*Colletotrichum graminicola*)

The anthracnose study was set up on an annual bluegrass fairway at the Hancock Turfgrass Research Center in E. Lansing, MI. It was mowed at 1/2". The design was a randomized complete block with 4 replicates of each treatment. Plots were 6' x 6'. Treatments were applied using a CO<sub>2</sub> backpack sprayer with a double 8002E flat fan TeeJet nozzle boom at 48 GPA and 34 PSI. Plots were fertilized at about 3/8#N/1000 ft<sup>2</sup>/month. A 2 oz/1000 ft<sup>2</sup> rate of Chipco 26GT was applied on 19 June, 1 July, 11 July, 25 July, 6 August, and 21 August for dollar spot control. All preventive treatments were applied beginning on 4 July (except for the Program treatment which was applied as per the Table 4) with subsequent applications of the 14-day treatments on 16 July, 23 July, 30 July, and 15 August. Re-applications of the 28-day treatments were made on 30 July. Curative treatments were applied beginning on 18 July with subsequent applications on 30 July and 15 Aug. Plots were rated for percent area with anthracnose. Data are shown in Table 4 and represent the mean percent plot area with anthracnose. Data were analyzed using ANOVA and means separated with LSD (p=0.05).

On the July 19 rating, disease pressure was light with the control exhibiting 8% disease, and no significant differences occurring between treatments. As can be seen by the August 20 means, disease pressure remained light. However by this time, several treatments provided significant anthracnose control compared to the untreated control including the preventive treatments such as Banner Maxx and Daconil Ultrex, alone and in combination, Cleary's 3336, the Program treatment (see Table 4), and the curative treatments Spectro and Endorse (6 oz/1000 ft<sup>2</sup>). Surprisingly, Heritage did not provide disease control as expected. No phytotoxicity was observed in this study this year.

**Table 4. Mean Anthracnose Ratings**

Location: Hancock Turfgrass Research Center, E. Lansing, MI							
Rating Scale: Mean % plot area with anthracnose							
Treatment and Rate/1000 sq ft	Interval (Days)	19-Jul		20-Aug		% Recovery by Aug 20 <sup>c</sup>	
		Mean <sup>a</sup>	LSD <sup>b</sup>	Mean	LSD	Mean	LSD
Daconil Ultrex 82.5WG 3.2 oz + Banner Maxx 1 fl oz	14	6.8	A	0.0	A	100.0	A
Daconil Ultrex 82.5WG 3.2 oz	14	5.5	A	0.0	A	100.0	A
Program Treatment: <sup>d</sup>							
Banner Maxx 2 fl oz + Daconil Ultrex 1.8 oz	5/21	4.5	A	0.0	A	100.0	A
Banner Maxx 1 fl oz + Daconil Ultrex 1.8 oz	6/7						
Cleary's 3336F 4 fl oz + Daconil Ultrex 1.8 oz	6/19						
Cleary's 3336F 4 fl oz + Daconil Ultrex 1.8 oz	7/4						
Heritage 0.4 oz + Daconil Ultrex 3.2 oz	7/16						
Daconil Ultrex 1.8 oz	7/30						
Heritage 0.4 oz + Banner Maxx 1 fl oz	8/15						
Subdue Maxx 0.5 fl oz + Daconil Ultrex 1.8 oz	14						
Heritage 0.4 oz + Banner Maxx 1 fl oz	14						
Subdue Maxx 1 fl oz + Daconil Ultrex 1.8 oz	14						
Banner Maxx 1 fl oz + Daconil Ultrex 1.8 oz	14						
Cleary's 3336F 4 fl oz + Daconil Ultrex 1.8 oz	14						

Heritage 0.4 oz + Banner Maxx 2 fl oz							
Banner Maxx 1 fl oz	14	4.5	A	0.3	A	91.7	A-C
Banner Maxx 2 fl oz	14	6.3	A	0.3	A	97.5	AB
Spectro 4oz + Alliance 3 fl oz <sup>e</sup>	14	4.5	A	0.9	AB	63.2	B-F
Endorse 6 oz <sup>e</sup>	14	9.3	A	1.3	AB	89.6	A-C
Spectro 4 oz <sup>e</sup>	14	8.8	A	2.5	A-C	79.2	A-D
Cleary's 3336F 2 fl oz	14	8.0	A	2.8	A-C	66.7	A-E
Cleary's 3336 WDG 4 oz <sup>e</sup>	14	7.0	A	3.4	B-D	43.0	D-G
Endorse 4 oz <sup>e</sup>	14	8.3	A	3.6	B-E	55.4	C-F
Heritage 50WG 0.2 oz	14	5.8	A	4.8	C-E	12.5	G
Heritage 50WG 0.4 oz	14	7.5	A	5.0	C-E	16.7	G
Untreated Control	---	8.0	A	5.8	DE	27.5	FG
Heritage 0.4 oz	28	8.0	A	6.3	E	15.5	G

<sup>a</sup> Represents the mean of 4 replicate plots.

<sup>b</sup> Means followed by the same letter do not significantly differ (LSD, p=0.05).

<sup>c</sup> Represents percent recovery from the July 19 rating until the August 20 rating.

<sup>d</sup> Program treatments were applied on the dates indicated with the last 6 combinations not being applied since the disease pressure waned.

<sup>e</sup> Treatments applied curatively on 7/18, 7/30, and 8/15.

### Melting Out (*Dreschlera poae*)

This study was set up on an irrigated Kenblue Kentucky bluegrass block at Hancock Turfgrass Research Center, E. Lansing, MI. The study consisted of 4 replicates of each treatment, set up in a randomized complete block design with plots measuring 6' x 9' with 1' alleys. Plots were mowed at 2.5". Treatments were applied preventively, beginning on May 15 using a CO<sub>2</sub> backpack sprayer at 34 PSI with 8002E flat fan nozzles. Subsequent applications for the 14-day treatments were made on May 29 and June 11. The spray volume used was 2 gallons per 1000 ft<sup>2</sup>. Fertilizer was applied as follows: May 15 (1/4#N), May 28 (1/4#N), and June 11 (1/4#N). Plots were rated on a 0-10 scale where 0= no disease and 10=100% leaves infected (see Table 5.) Data were analyzed with ANOVA and means separated with LSD (p=0.05). No phytotoxicity was observed in this study this season.

As the data in Table 5 indicate, Endorse gave statistically significant control of melting out through the June 21 rating. Disease pressure was relatively light this year as we experienced a cool, dry spring. This low disease pressure resulted in poor statistical separation between the untreated control and the Chipco 26GT. No significant quality differences or phytotoxicity was observed.

**Table 5: Mean Melting Out Ratings**

<b>Location: Hancock Turfgrass Research Center, E. Lansing, MI</b>							
<b>Rating Scale: 0-10 where 0= best, 10= worst, 2= acceptable.</b>							
<b>Rating Date: June 21, 2002.</b>							
Treatment	Rate/1000ft <sup>2</sup>	I	II	III	IV	Mean	LSD <sup>a</sup>
Endorse	4 oz	1	1	1	1	1.0	A
Chipco 26GT	4 fl oz	1	2	1	2	1.5	AB
Control	--	4	2	3	2	2.8	B

<sup>a</sup> Means followed by the same letter do not significantly differ (LSD, p=0.05).

### Summer Stress Syndrome in Bentgrass

This trial was conducted on a Penncross creeping bentgrass green at the Hancock Turfgrass Research Center, E. Lansing, MI. The plot area was mowed at 0.130". Fertility was maintained at ¼# N/1000 ft<sup>2</sup>/ month using 18-3-12 on all treatments, except those listed in Table 6, with 1/8# N/1000 ft<sup>2</sup> applications being made on 5/23, 6/7, 6/21, 7/2, 7/16, 7/31, and 8/14. The study was set up in a randomized complete block design with four replications of each treatment. Plots measured 2' x 4.5' with 1' alleys. Treatments were applied at 34 PSI in a 48 GPA spray volume using a CO<sub>2</sub> backpack sprayer and a single 8002E Tee-Jet flat fan nozzle unless otherwise noted in Table 6. Initial application of treatments was made on 7 June unless otherwise indicated in Table 6. Re-applications of treatments were made as listed below. Due to the varied fungicide combinations tested in this study, no additional chemical applications were made to control dollar spot or other diseases. Quality ratings were visually estimated using a 1 to 10 scale, where 1 = poor, 10 = excellent, and 7 = acceptable. Data were analyzed using ANOVA and means separated by LSD (p= 0.05).

Several treatments provided good turf quality, even under the lean, dry conditions that occurred in this study. The Chipco Signature + Daconil Ultrex combination was the only treatment in the study that provided significantly better turf quality than the control on every rating date. Chipco Signature in combination with both Chipco 26GT and Triton as well as the Signature 3-combination treatments also provided better turf quality when compared to the control and many other treatments. Spectro + Alliance performed fairly consistently during the study, exhibiting improved quality as the study progressed. The Syngenta Program treatment, initiated on June 7 (see Table 6), exhibited phytotoxicity early on in the study. This was expressed as a burn followed by a stunting and darkening of the turf.

**Table 6. Mean Quality Ratings of Summer Stress in Creeping Bentgrass**  
**Location: Hancock Turf Research Center, E. Lansing, MI.**  
**Rating Scale: 1-10 scale, where 10 = excellent and 7 = acceptable.**

Treatment and Rate/1000 sq ft	Interval (Days)	Mean <sup>b</sup> 18 JUN	Mean 27 JUN	Mean 15 JUL	Mean 5 AUG	Mean 19 AUG	Mean 28 AUG
Chipco Signature 4 oz + Triton 0.5 fl oz	14 <sup>d</sup>	6.8 BC <sup>c</sup>	6.5 B-D	6.3 C-E	8.0 AB	8.3 A	8.0 A-C
Chipco Signature 4 oz + Daconil Ultrex 3.2 oz	14	8.0 A	8.0 A	7.5 A	8.5 A	8.3 A	8.5 A
Program treatment:							
Chipco Signature 4 oz + Triton 1 fl oz, then	14 (2 apps)	7.0 B	7.0 BC	6.8 BC	7.5 BC	8.0 A	8.3 AB
Chipco Signature 4 oz + Chipco 26GT 3 fl oz, then	14 (2 apps)						
Chipco Signature 4 oz + Daconil Ultrex 3.8 oz	14 (2 apps)						
Chipco Signature 8 oz +	19 Apr +	6.8 BC	7.3 AB	7.0 AB	7.5 BC	7.5 AB	7.5 B-D
Chipco Signature 4 oz + Chipco 26GT 3 fl oz	14						
Spectro 4 oz + Alliance 3 fl oz	14	6.3 C-E	6.8 BC	6.8 BC	7.0 CD	7.0 BC	7.8 A-C
Daconil Ultrex 3.2 oz.	14	7.0 B	7.0 BC	7.0 BC	7.3 BC	7.0 BC	7.3 C-E
Program Treatment::							
Chipco Signature 4 oz +	28 <sup>e</sup>	6.3 C-E	6.3 C-E	6.8 BC	6.8 CD	6.8 B-D	6.8 D-F
Chipco 26GT 3 fl oz	14						
Syngenta Program Treatment::							
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Daconil Ultrex 1.8 oz <sup>f</sup>	7-Jun	6.0 DE	5.5 E	6.5 C-E	6.8 CD	6.8 B-D	6.3 F-H
Primo Maxx 0.25 fl oz + Subdue Maxx 0.5 fl oz + Daconil Ultrex 1.8 oz <sup>f</sup>	1-Jul						
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Heritage 0.2 oz + Subdue Maxx 0.5 fl oz <sup>f</sup>	21-Jul						
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Heritage 0.2 oz + Subdue Maxx 0.5 oz <sup>f</sup>	14-Aug						
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Daconil Ultrex 1.8 oz <sup>f</sup>	7-Sep						
Banner Maxx 0.5 fl oz + Heritage 0.2 oz + Primo Maxx 0.25 fl oz <sup>f</sup>	14	5.8 E	5.8 DE	5.8 <sup>i</sup> E	6.8 CD	6.5 C-E	6.5 E-G
Endorse 4 oz + Alliance 3 fl oz	14	6.0 DE	6.8 BC	6.3 C-E	6.0 DE	6.0 D-F	5.8 G-I
0.5 gal Vital Reaction "A" + 0.5 gal Vital Reaction "B" <sup>na, g</sup>	6 weeks <sup>h</sup>	6.8 BC	7.0 BC	6.3 C-E	5.3 E	5.8 EF	5.5 HI
Banner Maxx 0.5 fl oz + Heritage 0.2 oz + Primo Maxx 0.25 fl oz <sup>e</sup>	21 <sup>j</sup>	6.0 DE	5.8 DE	5.8 E	6.0 DE	5.5 F	5.5 HI
Control	--	6.0 DE	6.5 B-D	6.3 C-E	5.5 E	5.5 F	5.5 HI
1 quart Vital Reaction "A" + 1 quart Vital Reaction "B" <sup>na, g</sup>	6 weeks <sup>h</sup>	6.3 C-E	6.3 C-E	6.0 DE	5.5 E	5.5 F	5.0 I
1 pint Vital Reaction "A" + 1 pint Vital Reaction "B" <sup>na, g</sup>	6 weeks <sup>h</sup>	6.5 B-D	6.3 C-E	5.8 E	5.5 E	5.5 F	5.0 I
24 fl oz Vital Reaction "A" + 24 fl oz Vital Reaction "B" <sup>na, g</sup>	6 weeks <sup>h</sup>	6.8 BC	6.5 B-D	6.0 DE	5.5 E	5.3 F	5.5 HI

<sup>a</sup> Treatment applied in 4 gal /1000 ft<sup>2</sup> spray volume.

<sup>b</sup> Mean of 4 replicate plots.

<sup>c</sup> Treatments means followed by the same letter do not significantly differ (LSD, p=0.05).

<sup>d</sup> 14-day interval treatments applied on 6/7, 6/18, 7/3, 7/16 (7/19 for treatment 4B), 7/30, and 8/15.

<sup>e</sup> 28-day interval treatments were applied on 6/7, 7/3, and 7/30.

<sup>f</sup> Ammonium sulfate fertilizer applied at 0.25#N/1000 ft<sup>2</sup> with each treatment application.

<sup>g</sup> Treatment did not receive supplemental fertility.

<sup>h</sup> Treatment applied on 6/10 and 7/23.

<sup>i</sup> Mid-July application on 7/16 was omitted.

<sup>j</sup> Applied on 6/7 and 8/15 only.

## Summer Stress Syndrome in Annual Bluegrass

This trial was conducted on a *Poa annua* fairway at the Hancock Turfgrass Research Center, E. Lansing, MI. The plot area was mowed at 0.5". The study was set up in a randomized complete block design with four replications of each treatment. Plots measured 2' x 4.5' with 1' alleys. Treatments were applied at 34 PSI in a 48 GPA spray volume using a CO<sub>2</sub> backpack sprayer and a single 8002E TeeJet flat fan nozzle. Initial treatment applications were made on 7 June unless otherwise indicated in Table 7. Re-applications were made on intervals as indicated below with subsequent applications for 14 day intervals on 6/18, 7/3, 7/16, 7/30, and 8/15, for 21 day intervals on 8/16, for 28 day intervals on 7/3 and 7/30, and for 6 week intervals on 7/23. Fertility was maintained at ¼# actual N/1000 ft<sup>2</sup>/ month using 18-3-12 on all treatments, except those listed in Table 7, with 1/8# N/1000 ft<sup>2</sup> applications being made on 5/23, 6/5, 6/19, 7/3, 7/31, and 8/15. Due to varied fungicide combinations tested in this study, no additional chemical applications were made to control dollar spot. Quality ratings were visually estimated using a 1 to 10 scale, where 10 = excellent, and 7 = acceptable. Data were analyzed using ANOVA and means separated by LSD (p=0.05).

Turf quality varied during this trial for many treatments where good quality was observed on one rating, a decline in quality on the next, and then recovery following that. As the study progressed, dollar spot became severe on many treatments, hence, an overall decline in turf quality for many treatments can be seen as noted by the poorer quality ratings in mid August. The Signature (April 19 application) with Signature + Chipco 26GT treatment provided good turf quality that was statistically significant compared to the control for the entire duration of the study. All of the Signature combination treatments performed well in August with some reaching peak performance in July. The Syngenta Program treatment exhibited phytotoxicity early on in the study, and the turf was slow to recover.

**Table 7. Mean quality ratings for summer decline in annual bluegrass 2002.**  
**Location: Hancock Turf Research Center, E. Lansing, MI.**  
**Rating Scale: 1-10 scale, where 10 = excellent and 7 = acceptable.**

Treatment and Rate/1000 sq ft	Interval (Days)	Mean <sup>b</sup> 18-Jun	Mean 11-Jul	Mean 15-Jul	Mean 5-Aug	Mean 15-Aug	Mean 28-Aug
Chipco Signature 8 oz +	April 19 +						
Chipco Signature 4 oz + Chipco 26GT 3 fl oz	14 <sup>d</sup>	7.0 A <sup>c</sup>	7.25 A	7.5 A	6.0 AB	6.0 A	7.5 A
Chipco Signature 4 oz + Triton 0.5 fl oz	14 <sup>d</sup>	6.5 AB	7.0 BA	7.0 A	6.8 A	6.0 A	6.8 AB
Chipco Signature 4 oz + Triton 1 fl oz, then	14 (2 apps)						
Chipco Signature 4 oz + Chipco 26GT 3 fl oz, then	14 (2 apps)						
Chipco Signature 4 oz + Daconil Ultrex 3.8 oz	14 (2 apps)	6.0 BC	7.3 A	7.0 A	6.0 AB	5.5 A	6.8 AB
Chipco Signature 4 oz + Daconil Ultrex 3.2 oz	14 <sup>d</sup>	6.3 BC	6.8 A-C	7.0 A	6.3 AB	5.8 A	6.8 AB
Banner Maxx 0.5 fl oz + Heritage 0.2 oz + Primo Maxx 0.25 fl oz <sup>f</sup>	14 <sup>h</sup>	5.8 C	6.0 C-E	6.0 B	5.5 <sup>i</sup> B	5.5 A	6.8 AB
Chipco Signature 4 oz +	28 <sup>e</sup>						
Chipco 26GT 3 fl oz	14 <sup>d</sup>	6.3 BC	6.8 A-C	6.0 B	6.8 A	5.8 A	6.5 AB
Spectro 4 oz + Alliance 3 fl oz	14 <sup>d</sup>	6.0 BC	5.8 D-F	6.0 B	6.0 AB	4.5 B	6.0 B
Daconil Ultrex 3.2 oz.	14 <sup>d</sup>	6.0 BC	6.0 C-E	6.0 B	5.7 B	4.0 B	5.7 BC
Endorse 4 oz + Alliance 3 fl oz	14 <sup>d</sup>	6.3 BC	6.0 C-E	5.0 C-E	4.5 C	2.0 D	4.8 CD
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Daconil Ultrex 1.8 oz <sup>f</sup>	7-Jun						
Primo Maxx 0.25 fl oz + Subdue Maxx 0.5 fl oz + Daconil Ultrex 1.8 oz <sup>f</sup>	1-Jul						
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Heritage 0.2 oz + Subdue Maxx 0.5 fl oz <sup>f</sup>	21-Jul						
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Heritage 0.2 oz + Subdue Maxx 0.5 oz <sup>f</sup>	14-Aug						
Primo Maxx 0.25 fl oz + Banner Maxx 1.0 fl oz + Daconil Ultrex 1.8 oz <sup>f</sup>	7-Sep	6.0 BC	6.3 B-D	5.8 BC	5.8 B	4.0 B	4.8 CD
24 fl oz Vital Reaction "A" + 24 fl oz Vital Reaction "B" in <sup>g, a</sup>	6 weeks <sup>h</sup>	6.3 BC	5.0 F	4.3 E	3.8 CD	2.5 D	4.8 CD
Control	--	6.0 BC	6.0 C-E	5.5 BC	4.3 C	2.5 D	4.5 DE
0.5 gal Vital Reaction "A" + 0.5 gal Vital Reaction "B" in 4 <sup>g, a</sup>	6 weeks <sup>h</sup>	7.0 A	5.3 EF	4.5 DE	3.8 CD	3.3 C	4.5 DE
Banner Maxx 0.5 fl oz + Heritage 0.2 oz + Primo Maxx 0.25 fl oz <sup>f</sup>	21 <sup>j</sup>	6.0 BC	5.8 D-F	5.3 B-D	4.3 C	2.3 D	4.3 DE
1 quart Vital Reaction "A" + 1 quart Vital Reaction "B" <sup>g, a</sup>	6 weeks <sup>h</sup>	6.0 BC	5.0 F	4.3 E	3.0 D	2.0 D	4.0 DE
1 pint Vital Reaction "A" + 1 pint Vital Reaction "B" <sup>g, a</sup>	6 weeks <sup>h</sup>	5.8 C	5.0 F	4.3 E	3.0 D	2.3 D	3.5 E

<sup>a</sup> Treatment applied in 4 gal / 1000 ft<sup>2</sup> spray volume.

<sup>b</sup> Mean of 4 replicate plots.

<sup>c</sup> Treatments means followed by the same letter do not significantly differ (LSD, p=0.05).

<sup>d</sup> 14-day interval treatments applied on 6/7, 6/18, 7/3, 7/16 (7/19 for treatment 4B), 7/30, and 8/15.

<sup>e</sup> 28-day interval treatments were applied on 6/7, 7/3, and 7/30.

<sup>f</sup> Ammonium sulfate fertilizer applied at 0.25#N/1000 ft<sup>2</sup> with each treatment application.

<sup>g</sup> Treatment did not receive supplemental fertility.

<sup>h</sup> Treatment applied on 6/10 and 7/23.

<sup>i</sup> Mid-July application on 7/16 was omitted.

<sup>j</sup> Applied on 6/7 and 8/15 only.



### **Brown Patch (*Rhizoctonia solani*)**

Two preventive studies were set up this year, one on a ryegrass plot area and a second on a bentgrass green at the Hancock Turfgrass Research Center, E. Lansing, MI. Both studies were randomized complete block designs with 4 replicates of each treatment. Plots measured 2' x 4.5' with 1' alleys. Treatments were applied using a CO<sub>2</sub> backpack sprayer at 34 PSI and 48 GPA, unless otherwise noted in Table 8, using a single 8002E Tee Jet flat fan nozzle. Subdue Maxx was applied at 1 oz/1000 ft<sup>2</sup> on 7/3, 7/18, and 7/30 to prevent a Pythium blight outbreak. The study area was inoculated (6/24, 7/11, 7/30) with *Rhizoctonia solani* growing on a sand/cornmeal mixture using a drop spreader at approximately 2.5#/1000 sq ft. Plots were fertilized at a rate of 1.25# N/1000 ft<sup>2</sup>/month on the ryegrass area and a rate of 0.75# N/1000 ft<sup>2</sup>/month on the bentgrass study. Treatments were applied beginning on June 24 unless otherwise noted in Table 8. The seven day combination treatment (Magellan + Mancozeb) was reapplied on 7/1, 7/8, 7/16, 7/23, 7/30, 8/6, and 8/15, and the Spotrete from the alternating combination treatment on 7/8, 7/30, and 8/15. Subsequent applications of the 14-day treatments were made on 7/8, 7/23, and 8/6. The 21-day treatments were reapplied on 7/16 and 8/16, and the 28-day treatments on 7/23. Application of the curative treatment (Spotrete) was delayed in anticipation of disease development. The treatment was applied on 8/15 and, as a result, no data are available for this treatment in the preventive study. Plots were rated for percent area blighted by brown patch (see Table 8.) Data were analyzed using ANOVA and means separated with LSD (p=0.05).

A third study was set up curatively on an adjacent area on the bentgrass green after a relatively uniform brown patch outbreak occurred. The area was rated on August 2, just prior to treatment application, for percent plot area blighted by brown patch. All treatments were applied on August 2, except for the program treatment. The 7 and 14-day treatments were reapplied on August 19. Plots were rated prior to the initial treatment and rating (see Table 9). Data were analyzed using ANOVA and means separated with LSD (p=0.05).

As the data in Table 8 indicate, disease pressure was very low in both preventive studies with the untreated control having a slightly higher mean in the ryegrass study than in the bentgrass study at 10.8%. As a result, separation of treatment means was not strong. Several treatments provided significant disease control at this low pressure level including Prostar, Insignia in combination, Heritage, Cleary's 3336 alternated with Spotrete, Magellan and Mancozeb in combination, and Spectro.

Data in Table 9 represent the curative (third) study. Several treatments provided good curative control of brown patch including Heritage, Insignia in combination, Prostar, Iprodione Pro, Chipco 26GT, and Endorse.

**Table 8. Preventative Brown Patch 2002.**

Location: Hancock Turf Research Center, E. Lansing, MI		Ryegrass		Bentgrass			
Rating Scale: Mean % area with Brown Patch.	Interval (Days)	22-Jul		22-Jul		6-Aug	
Treatment/rate		Mean <sup>a</sup>	LSD <sup>b</sup>	Mean	LSD	Mean	LSD
Prostar 70WP 2.2 oz	21	0.0	D	0.0	C	0.0	C
Insignia 0.5 oz	14	0.0	D	0.4	BC	0.1	C
Insignia 0.5 oz alternated with Iprodione Pro 4 fl oz	14	0.0	D	0.0	C	1.3	A-C
Heritage 0.2 oz	14	0.0	D	0.0	C	0.0	C
Program Treatment:		0.0	D	0.0	C	0.0	C
Eagle WSP 0.6 oz + Fore 6 oz	5/24						
Eagle WSP 0.6 oz	6/7						
Eagle WSP 0.6 oz + Prostar 1.5 oz	6/20						
Fore 6 oz + Chipco 26GT 4 fl oz + Subdue Maxx 1 fl oz	7/3						
Heritage 0.2 oz + Curalan 1 oz	7/18						
Fore 6 oz	7/23						
Fore 6 oz + Chipco 26GT 4 fl oz	8/15						
Eagle WSP 0.6 oz <sup>f</sup>	--						
Prostar 70WP 2.2 oz	14	0.0	D	0.0	C	0.0	C
Clearys 3336 4 oz alt Spotrete 4 oz	14 alt 7	0.0	D	0.1	C	0.0	C
Magellan 4.1 fl oz + Mancozeb 4 oz <sup>c</sup>	7	0.1	D	0.0	C	0.1	C
Echo 720 2 fl oz + PropiMax EC 0.36 fl oz	21	0.1	D	0.0	C	0.0	C
Insignia 0.5 oz alt. with Concorde DF 3.2 oz	14	0.3	D	0.3	BC	0.5	BC
Spectro 4 oz	14	0.3	D	2.1	BC	0.0	C
Daconil Ultrex 3.2 oz	14	2.3	CD	0.0	C	0.1	C
Endorse 4 oz	14	2.3	CD	2.1	BC	1.3	A-C
Echo 720 3.6 fl oz	14	2.6	CD	2.5	BC	0.1	C
TD 2390 6 oz	14	4.3	B-D	0.0	C	0.0	C
Clearys 3336 50 WSP 3 oz <sup>d</sup>	14	4.4	B-D	0.3	BC	0.0	C
Insignia 0.9 oz	28	4.5	B-D	0.0	C	0.0	C
Chipco 26GT 4 fl oz	14	4.5	B-D	0.5	BC	0.1	C
Chipco 26GT 4 fl oz <sup>d</sup>	14	4.8	B-D	2.1	BC	0.8	A-C
Clearys 3336 4 oz	14	5.3	B-D	0.5	BC	0.0	C
TMI Combo Flo 2.1 fl oz <sup>d</sup>	14	5.8	B-D	1.0	BC	0.1	C
Clearys 3336F 2 fl oz <sup>d</sup>	14	6.5	B-D	3.3	BC	0.7	A-C
Heritage 0.4 oz	28	6.5	B-D	2.6	BC	0.0	C
T Methyl Pro 4.5F 2 fl oz <sup>d</sup>	14	7.3	B-D	0.0	C	0.0	C

Iprodione Pro 2SE 4 fl oz <sup>d</sup>	14	7.5	B-D	2.0	BC	0.8	A-C
TMI Combo Flo 4.2 fl oz <sup>d</sup>	14	7.8	B-D	0.9	BC	0.0	C
Control	---	9.3	A-C	8.3	AB	2.8	A
Scotts/Andersons Fluid Fungicide 2.1 fl oz <sup>d</sup>	14	10.8	A-C	4.8	AB	0.6	BC
Spotrete 3 oz <sup>e</sup>	7						
T Methyl Pro 50WSP 3 oz <sup>d</sup>	14	16.6	A	0.3	BC	0.0	C

<sup>a</sup> Represents the mean of 4 replicate plots.

<sup>b</sup> Means followed by the same letter do not differ significantly (LSD, p=0.05).

<sup>c</sup> Treatment applied in a 3 gal/1000 ft<sup>2</sup> spray volume.

<sup>d</sup> Treatment applied in a 2 gal/1000 ft<sup>2</sup> spray volume.

<sup>e</sup> Treatment applied curatively beginning on August 15, however, disease pressure decreased, therefore no data are available for this treatment.

<sup>f</sup> Treatment not applied due to lack of disease pressure.

**Table 9. Curative Brown Patch 2002.**

<b>Location: Hancock Turf Research Center, E. Lansing, MI</b>										% Recovery <sup>d</sup>
<b>Rating Scale: Mean % area infected with Brown Patch.</b>		2-Aug <sup>a</sup>		9-Aug		15-Aug		22-Aug		
Treatment/Rate	Interval	Mean <sup>b</sup>	LSD <sup>c</sup>	Mean	LSD	Mean	LSD	Mean	LSD	
Insignia 0.5 oz alt. With Concorde DF 3.2 oz	14	15	C	6	E	3	D	0.8	E	80
Insignia 0.5 oz	14	21.3	A-C	16.8	A-E	8	B-D	3	DE	62.4
Heritage 0.2 oz	14	14.8	C	6.3	DE	3.8	CD	3	DE	74.6
Iprodione Pro 2SE 4 fl oz <sup>f</sup>	14	15	C	9.8	C-E	6.3	CD	3	DE	58.3
Spectro 4 oz	14	18	A-C	6.3	DE	5.3	CD	3.5	DE	70.8
Insignia 0.5 oz alt with Iprodione Pro 4 fl oz	14	21.3	A-C	14.3	A-E	11	B-D	5	C-E	48.2
Chipco 26GT 4 fl oz	14	19.3	A-C	18	A-C	11.3	B-D	5.8	C-E	41.6
T Methyl Pro 50 WSP 3 oz <sup>f</sup>	14	14.3	C	12.3	C-E	9.8	B-D	6.8	B-E	31.6
Daconil Ultrex 3.2 oz	14	15	C	15.5	A-E	11.8	A-D	7.3	B-E	21.7
Prostar 70WP 2.2 oz	21	18.5	A-C	15.8	A-E	11.3	B-D	7.8	B-E	39.2
Insignia 0.9 oz	28	19.3	A-C	15	A-E	11.3	B-D	8	B-E	41.6
Chipco 26GT 4 fl oz <sup>f</sup>	14	20.5	A-C	17.3	A-E	14.3	A-D	8	B-E	30.5
TMI Combo Flo 2.1 fl oz <sup>f</sup>	14	20.5	A-C	17.5	A-D	14.3	A-D	8.3	B-E	30.5
Magellan 4.1 fl oz + Mancozeb 4 oz <sup>e</sup>	7	15.5	C	11.3	C-E	10	B-D	8.8	A-E	35.5
Spotrete 3 oz	7	16.8	BC	10.8	C-E	10.5	B-D	9.3	A-E	37.3
T Methyl Pro 4.5F 2 fl oz <sup>f</sup>	14	22.5	A-C	16.8	A-E	13.5	A-D	9.8	A-D	40
Cleary's 3336 50 WSP 3 oz <sup>f</sup>	14	22.5	A-C	13.8	A-E	12.3	A-D	9.8	A-D	45.6
Cleary's 3336 4 oz	14	15.5	C	14.3	A-E	10.8	B-D	9.8	A-D	30.6
Echo 720 3.6 fl oz	14	18	A-C	14.3	A-E	12.3	A-D	10	A-D	31.9
Cleary's 3336 4 oz alternated with Spotrete 4 oz	14 alt 7	20	A-C	15.8	A-E	11.5	B-D	10	A-D	42.5
Endorse 4 oz	14	24.3	A-C	20.5	A-C	18.8	AB	10.3	A-D	22.7
Echo 720 2 fl oz + PropiMax EC 0.36 fl oz	21	17.5	A-C	14.3	A-E	14.3	A-D	10.5	A-D	18.6
Cleary's 3336F 2 fl oz <sup>f</sup>	14	19.3	A-C	14.3	A-E	15.5	A-C	10.5	A-D	19.5
Scotts/Andersons Fluid Fungicide 2.1 fl oz <sup>f</sup>	14	20	A-C	17.5	A-D	13.8	A-D	11.3	A-D	31.3
TMI Combo Flo 4.2 fl oz <sup>f</sup>	14	28.8	A	23.8	AB	19.3	AB	11.8	A-D	33
TD 2390 6 oz	14	13.8	C	13.5	B-E	15	A-D	13	A-C	-9.1
Prostar 70WP 2.2 oz	14	25	A-C	23.8	AB	18.8	AB	15	AB	25
Control	---	27.5	AB	25	A	23.8	A	17.5	A	13.6

<sup>a</sup> Pretreatment rating.

<sup>b</sup> Represents the mean of 4 replicate plots.

<sup>c</sup> Means followed by the same letter do not differ significantly (LSD, p=0.05).

<sup>d</sup> Represents the percent recovery from August 2 until August 15.

<sup>e</sup> Treatment applied in a 3 gal/1000 ft<sup>2</sup> spray volume.

<sup>f</sup> Treatment applied in a 2 gal/1000 ft<sup>2</sup> spray volume.

Note: Program Treatment omitted.

### Red Thread (*Laetisaria fuciformis*)

This study was set up on a ryegrass fairway at the Hancock Turfgrass Research Center, E. Lansing, MI. The study consisted of 4 replicates of each treatment set up in a randomized complete block design with plots measuring 6' x 6'. Treatments were applied curatively using a CO<sub>2</sub> backpack sprayer at 48 GPA and 34 PSI with two 8002E flat fan nozzles. A pre-treatment rating was taken on 6/13 (Table 10), and then initial treatment applications were made. All treatments were applied on a 14 day schedule with subsequent applications made on 6/28, 7/11, 7/26, 8/8, 8/21, and 9/6. Fertilizer was applied as follows: 5/17 (1#N), 6/6 (1/8#N), 6/14 (1/8#N), 6/20 (1/8#N), 7/2 (1/8#N), 7/18 (1/8#N), 7/31 (1/8#N), and 8/6 (1/2#N). A second curative study was established on an adjacent colonial bentgrass/annual bluegrass fairway plot area. Plots measured 6' x 9' and were initially treated on June 14 with subsequent applications made as stated above. Plots were rated for percent area infected with red thread. Data were analyzed with ANOVA and means separated with LSD (5%).

Disease pressure was very low in this study this year with the control having a maximum mean of 5%. With such low pressure, treatment means did not separate from each other statistically, but all provided good control of red thread compared to the control. No phytotoxicity was observed.

**Table 10. Red Thread**  
**Location: HTRC, E. Lansing, MI**  
**Rating Scale: Mean % red thread**

		Study 1				Study 2				Study 2	
		13-Jun <sup>a</sup>		11-Jul		17-Jun		10-Jul		% Recovery Jun 17 – July 10	
Treatment/Rate	Interval (Days)	Mean <sup>b</sup>	LSD <sup>c</sup>	Mean	LSD	Mean	LSD	Mean	LSD	Mean	LSD
Endorse 4oz	14	1.0	A	0.2	A	3	A	0.13	A	93.8	A
Ch. 26 GT 4 oz	14	1.3	A	0.0	A	3.25	A	0	A	100	A
Heritage 0.2 oz	14	1.5	A	0.1	A	2.5	A	0.13	A	95.8	A
Control	--	1.1	A	0.4	B	4	A	0.88	B	70.6	B

<sup>a</sup> Pretreatment rating.

<sup>b</sup> Represents the mean of 4 replicate plots.

<sup>c</sup> Means followed by the same letter do not differ significantly (LSD, p=0.05).

## Summer Patch (*Magnaporthe poae*)

This study was established on an irrigated annual bluegrass fairway at the Dearborn Country Club in Dearborn, MI. The study consisted of 4 replicate 6' x 9' plots in a random block design. Treatments were applied preventively with a CO<sub>2</sub> backpack sprayer at 34 PSI and 100 GPA (except as noted in Table 11). Treatments were initiated on 6/10/02 when we reached 75°F at a 2" soil depth. The 14 and 28-day treatments were re-applied as indicated in Table 11. Fertility was maintained at 1/2#N/1000 ft<sup>2</sup>/month. The study was background sprayed with 2 oz Echo (chlorothalonil) and 1 oz Subdue Maxx on 7/23 to control dollar spot and Pythium. Data represent percent plot area diseased on 7/23 and 8/20 when disease development peaked.

As the data in Table 11 indicate, summer patch disease pressure was moderately severe this year due to the warm, stressful summer we experienced. Under these stressful conditions, many treatments that controlled summer patch in the early rating (7/23), failed to control summer patch disease as the summer progressed and disease pressure increased (8/20 rating). Surprisingly, the strobilurin fungicides (Heritage, Insignia, Emerald) failed this year, except in combinations. The propiconazole fungicides, thiophanate methyl fungicides, TADS 12529, and Lynx + Compass are among the treatments that performed significantly better than the untreated control this year. No phytotoxicity was observed in this study.

**Table 11: Summer Patch Data 2002**

Dearborn Country Club, Dearborn, MI		7/23	8/20
Rating scale: % plot area exhibiting summer patch symptoms		Mean <sup>a</sup>	Mean
Treatment and Rate/1000 sq ft	Interval (Days)		
Insignia 0.9 oz alt with Emerald 0.18 oz	75F+28 (6/10, 8/5) alt 28 (7/8)	15.3 <sup>b</sup> A	43.8 A
Emerald 0.18 oz	75F+28 (6/10, 7/8, 8/5)	13.5 AB	36.3 AB
Compass 50WG 0.2 oz	75F+21 (6/10, 7/8, 7/23)	5.3 CD	33.8 A-C
Control	--	6.8 CD	32.5 A-D
Insignia 0.5 oz	75F+28 (6/10, 7/8, 8/5)	4.3 CD	30.0 A-E
Heritage 50WG 0.2 oz	75F+28 (6/10, 7/8)	3.8 BD	30.0 A-E
Heritage 50WG 0.4 oz	75F+28 (6/10, 7/8)	11.25 AC	30.0 A-E
Bayleton 50WG 1 oz + Compass 50WG 0.2 oz	75F+21 (6/10, 7/8, 7/23)	4.0 CD	28.8 A-E
Heritage 50WG 0.4 oz	75F+28 (6/10, 7/8)	3.8 D	23.8 B-E
Signature 80WG 4 oz + TADS 12529 8.5 g	75F+28 (6/10, 7/8)	0.5 D	22.5 B-G
TADS 12529 8.5 g + Surfactant 32 fl oz/100 gal	75F+28 (6/10, 7/8)	1.25 D	21.0 C-H
Heritage 50WG 0.2 oz	75F+21 (6/10, 7/8, 7/23)	1.3 D	20.0 C-H
Insignia 0.9 oz	75F+28 (6/10, 7/8, 8/5)	3.0 D	19.3 C-I
TopPro Propiconazole 14.3 2 fl oz	75F+28 (6/10, 7/8)	3.8 D	18.0 D-J
Banner Maxx 2 fl oz	75F+28 (6/10, 7/8)	3.0 BD	15.5 E-K
TADS 12529 17 g	75F+28 (6/10, 7/8)	0.0 D	11.0 F-L
TADS 12529 8.5 g	75F+28 (6/10, 7/8)	0.5 D	10.5 F-L

TopPro Propiconazole 14.3 4 fl oz	75F+28 (6/10, 7/8)	0.8 D	9.5 F-L
Magellan 4.1 fl oz + thiophanate methyl 4 fl oz <sup>c</sup>	75F+21(6/10, 7/1, 7/23)	0.3 D	8.0 G-L
Heritage 50WG 0.2 oz + Banner Maxx 2 fl oz	75F+28 (6/10, 7/8)	0.0 D	6.5 H-L <sup>b</sup>
TADS 12529 17 g + Surfactant 32 fl oz/100 gal	75F+28 (6/10, 7/8)	0.0 D	4.3 I-L
Banner Maxx 4 fl oz	75F+28 (6/10, 7/8)	0.0 D	4.3 I-L
Cleary's 3336F 6 fl oz	75F +14(6/10, 6/24, 7/8, 7/23, 8/5)	0.0 D	3.0 J-L
Banner Maxx 2 fl oz (2 apps, then Heritage)	75F+14 (6/10, 6/24)	0.0 D	2.3 LK <sup>b</sup>
Heritage 50WG 0.4 oz	14 (7/8, 7/23)		
Cleary's 3336F 6 fl oz + Nutri-grow 3 fl oz	75F+14 (6/10, 6/24, 7/8, 7/23, 8/5)	0.0 BD	0.8 LK <sup>b</sup>
Lynx 45WP 1.11 oz + Compass 50WG 0.2 oz	75F+21 (6/10, 7/8, 7/23)	0.0 D	0.0 L <sup>b</sup>

<sup>a</sup> Means followed by the same letter are not significantly different (LSD, p=0.05).

<sup>b</sup> One or more replicate plots within treatment displayed superior turfgrass quality/color on 8/20/02.

<sup>c</sup> Treatment applied in 3 gal/1000ft<sup>2</sup> spray volume.

### Take-All Patch (*Gaeumannomyces graminis*) 2001-2003

This multi-year take-all patch disease study is being conducted on an irrigated and diseased creeping bentgrass fairway at the Golf Club of Michigan, Brighton, MI. The study is setup in four replications of a randomized complete block design utilizing 6' X 9' plots, each of which has displayed active take-all in recent years. Applications were made with a CO<sub>2</sub> small plot sprayer with flat fan 8002E nozzles, operating at 36 PSI and approximately 100 GPA. Fertilizer treatments were pre-weighed and hand applied.

Because take-all patch is most severe under low fertility conditions, we applied only 1#N/1000 ft<sup>2</sup> of background fertilizer this season, except in the fertilizer treatments. This level of fertility was deemed adequate to promote fungicide efficacy while not discouraging disease symptom development. Fertilizer (18-3-12) was applied as follows: ¼#N/1000 ft<sup>2</sup> on 5/14/02 and 8/13/02; and 1/8#N/1000 ft<sup>2</sup> on 6/14/02, 7/12/02, 7/26/02, and 9/11/02. Chlorothalonil and metalaxyl fungicides were applied at low rates on 7/12/02 and 8/2/02 to control dollar spot and Pythium blight in the study.

As in 2001, take-all patch in this study developed in the spring once again. As the data indicates, however, disease pressure was modest and occurred somewhat unevenly in the study. This variability led to poor statistical separation between the treatment means of all the fertilized treatments. On the other hand, the benefit of fertility in take-all patch management is evident by comparing the unfertilized control with many of the fertilized treatments, most of which exhibited significantly less disease than the unfertilized control.

**Table 14: Take-All Patch  
Golf Club of Michigan, Brighton, MI  
Rating Date: 6/6/02, Rating Scale: Percent plot area infected**

Treatment and Rate/1000 ft <sup>2</sup>	Interval (Days)	I	II	III	IV	Mean	LSD
Nitroform (38-0-0) (1/2 lb N) <sup>a</sup>	May, June, Jul, Aug	0	10	20	0	7.5	A-D
Nutralene (40-0-0) (1/2 lb N) <sup>a</sup>	May, June, Jul, Aug	0	0	5	0	1.3	B-D
Nitroform (2 lb N) <sup>a</sup>	May	0	1	0	0	0.3	D
Nutralene (2 lb N) <sup>a</sup>	May	0	0	10	0	2.5	B-D
Nitroform (1 lb N) <sup>a</sup>	May, June	0	0	25	0	6.3	A-D
Nutralene (1 lb N) <sup>a</sup>	May, June	0	0	10	0	2.5	B-D
Urea (46-0-0) (1/2 lb N) <sup>a</sup>	May, June, Jul, Aug	0	1	0	0	0.3	D
Lebanon (18-3-8) (1/2 lb N) <sup>a</sup>	May, June, Jul, Aug	0	0	15	0	3.8	A-D
Lebanon (18-3-8) (1lb N) <sup>a</sup>	May, June, Jul, Aug	0	0	0	0	0	D
Control (unfertilized)	--	10	0	25	10	11.3	A
Urea (46-0-0) (1/2 lb N)	14	0	0	0	0	0	D
Insignia (0.9 oz) <sup>b</sup>	2 fall 01', 2 spring 02'	0	0	10	0	2.5	B-D
Honor (0.2 oz) <sup>b</sup>	2 fall 01', 2 spring 02'	0	0	2	0	0.5	D
Tads 12529 (8.5 g/100 sq. ft.) <sup>c</sup>	2 spr. 02', 2 fall 02', 2 spr. 03'	2	0	2	0	1	CD
Tads 12529 (8.5g / 1000 sq ft) & Surfactant (32oz/ 100gal) <sup>c</sup>	2 spr. 02', 2 fall 02', 2 spr. 03'	0	10	0	3	3.3	B-D
Tads 12529 (17 g/ 1000 sq. ft.) <sup>d</sup>	2 spring 02'	2	0	20	0	5.5	A-D
Tads 12529 (17g/ 1000 sq. ft.) & surfactant (32oz/ 100 gal) <sup>d</sup>	2 spring 02'	3	0	25	5	8.3	A-C
Bayleton (50wg) (2 oz) <sup>d</sup>	2 spring 02'	0	5	20	5	7.5	A-D
Signature (80wdg) (4oz/ 1000 sq. ft) & Tads 12529 (17g /1000 sq.ft) <sup>d</sup>	2 spring 02'	0	0	0	0	0	D
Insignia (insignia) (0.9 oz) <sup>e</sup>	2 fall 02' + 2 spr. 03' @ 28 day intervals	5	5	25	0	8.8	AB
Honor (Honor) (0.2 oz) <sup>e</sup>	2 fall 02' + 2 spr. 03' @ 28 day intervals	0	0	0	0	0	D
Heritage (standard) (0.4 oz) <sup>e</sup>	2 fall 02' + 2 spr. 03' @ 28 day intervals	0	0	0	5	1.3	B-D
Heritage (0.4 oz) <sup>f</sup>	2 spring 02'	0	0	15	1	4	A-D
Control <sup>g</sup>		0	15	15	0	7.5	A-D
Banner Maxx (2fl oz) <sup>f</sup>	2 spring 02'	0	0	0	0	0	D

<sup>a</sup> Treatments applied initially on 5/17/01 and reapplied monthly during 2001 and 2002 as indicated in the table

<sup>b</sup> Treatments applied on 9/26/01, 10/24/01, 4/26/02, and 6/6/02

<sup>c</sup> Treatments applied on 5/3/02, 6/6/02, 8/2/02, and 8/28/02

<sup>d</sup> Treatments applied on 5/3/02 and 6/6/02

<sup>e</sup> Treatments applied on 8/2/02 and 8/28/02

<sup>f</sup> Treatments applied on 4/26/02 and 6/6/02

<sup>g</sup> Applied 1/4# N / 1000 ft<sup>2</sup> (Lebanon 18-3-12) on 5/14/02.