

**TURFGRASS DISEASE MANAGEMENT REPORT  
1993-94**

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**Snow Mold Fungicide Studies - 1993-94**

**Studies A & B**

Two corporation-sponsored snow mold fungicide studies were conducted during the fall and winter of 1993-94. Study A was established at the Boyne Highlands Resort golf course in Harbor Springs, Michigan and Study B was established on the Tree Tops/Sylvan Resort course in Gaylord, Michigan. Treatments were applied preventively to three replicate 6' x 9' plots on bentgrass/annual bluegrass fairways mowed at 1/2". Study A was applied between 10/28/93 and 11/2/93. Study B was applied on 11/3/93 and 11/4/93. Liquid treatments were applied with a CO<sub>2</sub> backpack sprayer at 32 PSI and 48 GPA. Granular treatments were pre-weighed and hand-applied.

Study A was rated on 4/11/94, immediately after snow cover melt-off. The predominant gray snow mold species this year was *Typhula incarnata*, except as noted in the data table (Table 1).

As the data indicates, statistical treatment (Tukeys Honestly Significant Differences Test) separation was modest in study A because of variability in disease levels between replicate plots. The standard treatments (Turficide 400, Chipco 26019 + Dac. 2787, Calo Clor, Calo Gran, etc.) performed well again this year after succumbing to tremendous disease pressure last year. Experimental products such as ICIA 5504, ASC 67153, Fluazinam, etc., also performed well (Table 1).

Study B was rated on 4/12/94, immediately after snow cover melt-off. The predominant gray snow mold in this study was *Typhula ishkariensis*, compared to *T. incarnata* in Study A (Table 2).

As the data indicates, many treatments also gave statistically significant control of snow mold, compared with the untreated control, in this study. As in Study A, variability in disease levels between the replicate plots also reduced statistical treatment separation. In general, the standards (Turficide 400, Chipco 26019 + Dac. 2787, Scts F FII, etc.) and experimentals (ICIA 5504, GSSM 9302, etc.) which performed well in Study A also performed well in Study B. A notable exception, however, is the Calo Clor treatment, which had more disease in the Tree Tops study than we normally observe. Turf greening was observed as noted in the data Tables 1 and 2.

No unexpectable phytotoxicity was observed at the time of rating.

Table 1. Snow Mold Fungicide Study #A - 1993-94

## Boyne Highlands Resort, Harbor Springs, MI

Rating Scale: Percent plot area infected by gray snow mold (*Typhula ishikariensis*) and pink snow mold (*Microdochium nivale*) (in parentheses).

Rating Date: April 11, 1994

Treatment	Rate/1000 ft <sup>2b</sup>	I <sup>c</sup>	II	III	Avg	Tukeys(.05) <sup>a</sup>
Turficide 400 + IBDU	12 fl. oz. + 0.5 lb. N.	0	0 <sup>d</sup>	0	0	D
Turficide 400 + D. 2787	9 fl. oz. + 6 fl. oz.	0	0	0	0	D
Turficide 400 + D. 2787 + IBDU	9 fl. oz. + 6 fl. oz. + 0.5 lb N.	0 <sup>d</sup>	0	0	0	D
TRA 0028 + TRA 0041	14 fl. oz. + 32 fl. oz.	0	0	0	0	D
Ch. 26019 + D. 2787	8 fl. oz. + 8 fl. oz.	0	0	0	0	D
Ch. 26019 + PCNB + D. 2787	4 fl. oz. + 4 oz. + 8 fl. oz.	0	0 <sup>d</sup>	0	0	D
GSSM 9301	----	0	0	0	0	D
Syl. 309 + D. 2787 + Ch. 26019 (F)	16 fl. oz./100 gal. + 8 fl. oz. + 4 fl. oz.	0	0	0	0	D
Calo Clor	3 oz.	0 <sup>e</sup>	0	0	0	D
ICIA 5504 + D. 2787	0.7 oz. + 8 fl. oz.	0 <sup>d</sup>	0	0	0	D
ICIA 5504 + D. 2787 + PCNB	0.7 oz. + 8 fl. oz. + 8 oz.	0	0	0	0	D
TRA 0025 + TRA 0040	9 oz. + 8 oz.	0.5	0	0	0.2	D
GSSM 9303	----	0.5	0	0	0.2	D
ICIA 5504 + PCNB	0.7 oz. + 8 oz.	0.5	0	0	0.2	D
Fluazinam	2.5 fl. oz.	0	0.5	0	0.2	D
Ch. 26019 (WDG) + D. 2787	2 oz. + 8 fl. oz.	0.5	0	0.5	0.3	D
GSSM 9302	----	0	1	0	0.3	D
Ch. 26019 + D. 2787	4 fl. oz. + 8 fl. oz.	1	0	0.5	0.5	D
Calo Gran	6 lbs.	0.5	0.5	0.5	0.5	D
ASC 67153	8 fl. oz.	0	0.5 <sup>d</sup>	1	0.5	D
Fluazinam	1 fl. oz.	0.5	0.5	0.5	0.5	D
Turficide 400	12 fl. oz.	2	0	0	0.7	CD
Ch. 26019 + PCNB	4 fl. oz. + 8 oz.	0.5	0.5	1	1.3	CD
ANDFG 143	3.2 lbs.	0.5	0.5	1	1.3	CD
Vigoro #7	12.5 lbs.	1	0.5	3	1.5	CD
Fluazinam + D. 2787	1 fl. oz. + 8 fl. oz.	0	0	(5)	1.7	CD
Vigoro #9	12.5 lbs.	2	2	1 <sup>d</sup>	1.7	CD
Ch. 26019 + Prostar	8 fl. oz. + 4.3 oz.	3	2	2	1.8	CD
GSSM 9306	----	3	2	0.5	1.8	CD
Sets F + F II	2x	5	0	1	2.0	CD
Ch. 26019 (F) + Prostar	4 fl. oz. + 4.3 oz.	3	2	2	2.3	BCD
GSSM 9305	----	7	0.5	0.5	2.7	BCD
Vigoro 6	12.5 lbs.	0.5	3 <sup>d</sup>	5	2.8	BCD
Vigoro 8	12.5 lbs.	4	5	0.5	3.2	BCD
TRA 0041	32 fl. oz.	3	5	2	3.3	BCD
D. 2787 + Fungo 85	8 fl. oz. + 1.2 oz.	10	0	0.5	3.5	BCD
D. 2787 + ASC 67103	8 fl. oz. + 16 ml/100 gal.	0	1 <sup>d</sup>	(10) <sup>d</sup>	3.7	BCD
Consyst	6 oz.	9	3	0.5	4.5	BCD
Revere	8 oz.	5	2	7	4.7	BCD
Vigoro 16	12.5 lbs.	5	5	5	5	BCD
Vigoro 5	12.5 lbs.	0.5	0	15	5.2	BCD
Vigoro 15	12.5 lbs.	0.5 <sup>d</sup>	15 <sup>d</sup>	1	5.5	BCD
ICIA 5504	0.7 oz.	2	0.5	15	5.8	BCD
Vigoro 10	12.5 lbs.	7	8 (2)	1	6	BCD
Vigoro 4	12.5 lbs.	2 (3) <sup>d</sup>	0.5	5 (10)	6.8	BCD
ANDFG 142	4 lbs.	2	0.5	20	7.5	BCD
Terraclor	8 oz.	15	0.5	10	8.5	BCD
GSSM 9311	----	20	3	5	9.3	BCD
ANDFG 141	4 lbs.	3	2	25	10	BCD
Vigoro 12	12.5 lbs.	3	20	7	10	BCD
TRA 0040	8 oz.	1	10	20	10.3	BCD
Vigoro 14	12.5 lbs.	3	20	(10)	11	BCD

Treatment	Rate/1000 ft <sup>2b</sup>	I <sup>c</sup>	II	III	Avg	Tukeys(.05) <sup>a</sup>
Banner	16 gm. ai.	35	1	0	12	BCD
Consyst	9 oz.	4	35	0.5	13.3	BCD
GSSM 9312	----	20	0.5	20	13.5	BCD
CGA 173506 + Banner	7 gm. ai. + 8 gm. ai.	15	25	1	13.7	BCD
Vigoro 13	12.5 lbs.	7	1	45	17.7	A-D
ANDFG 135	4 lbs.	7	25	24 (1)	19	A-D
CGA 173506 + Banner	10 gm. ai. + 8 gm. ai.	35	1	25	20.3	A-D
ANDFG 136	4 lbs.	17	5	40	21.7	A-D
ANDFG 139	4.16 lbs.	5	35	23 (2)	21.7	A-D
Syl. 309 + Penstar	8 fl. oz/100 gal. + 8 oz.	50	3	15	22.7	A-D
GSSM 9304	----	5	65	3	24.3	A-D
GSSM 9309	----	7	0 (5)	2	24.7	A-D
Scts. F + F II	1x	15	15	45	25	A-D
ANDFG 137	4 lbs.	10	15	50	25	A-D
ANDFG 138	4 lbs.	40 <sup>d</sup>	15	20	25	A-D
CGA 173506 + Banner	7 gm. ai. + 16 gm. ai.	30	2	45	25.7	A-D
ANDFG 144	3.2 lbs.	35	7	40	27.3	A-D
Vigoro 3	12.5 lbs.	10 (15)	35	25	28.3	A-D
ANDFG 140	4.16 lbs.	7	30	40 (10)	29	A-D
GSSM 9307	----	20	1	60 (10)	30.3	A-D
CGA 173506 + Banner	3.5 gm. ai. + 16 gm. ai.	40	25	30	31.7	A-D
EXP 10452A	4 oz.	50 (5)	5	35	31.7	A-D
UCC 4044	120 oz.	25 (2)	20	50 (5)	34	A-D
GSSM 9310	----	35 (5)	2	20 (40)	34	A-D
CGA 173506	14 gm. ai.	65	35	3	34.3	A-D
GSSM 9308	----	40	40	23 (2)	35	A-D
CGA 173506	----	50	5	65	40	A-D
UCC 4040	80 oz.	5 (2)	65	50	40.7	A-D
Syl. 309	8 oz/100 gal.	43 (2)	8 (2)	20	41.7	A-D
Vigoro 11	12.5 lbs.	35	40	55	43.3	A-D
CGA 173506 + Banner	3.5 gm. ai. + 8 gm. ai.	40	35	60	45	A-D
CGA 173506	10 gm. ai.	30	45	65	46.7	A-D
ANDFG 133	4 lbs.	65	4	65 (10)	48	A-D
Control	----	70	3 (2)	65	53.3	A-D
ANDFG 145	1.93 lbs.	50	30	80	53.3	A-D
ANDFG 146	1.93 lbs.	85	4	80	56.3	A-D
Vigoro 2	12.5 lbs.	5 (10)	3 (2)	53 (7)	56.7	A-D
Syl. 309	16 oz/100 gal.	83 (2)	30	50 (5)	56.7	A-D
GSSM 9313	----	85	45	50	60	ABC
Banner	8 gm. ai.	35	70	73 (2)	60	ABC
CGA 173506	3.5 gm. ai.	75	35	70 (5)	61.7	AB
ANDFG 134	4 lbs.	65	80	80	75	A

<sup>a</sup>Treatments followed by the same letter are not significantly different from each other at the 5% level.

<sup>b</sup>Rates listed are formulation unless listed as "ai" (active ingredient).

<sup>c</sup>Numbers inside parentheses represent percent of plot area infected by pink snow mold (*Microdochium nivale*). Total percent area infected/plot is sum of both numbers.

<sup>d</sup>Slight greening effect noted.

<sup>e</sup>Slight phytotoxicity noted.

**Table 2. Snow Mold Fungicide Study B - 1993-94**

Tree Tops/Sylvan Resort, Gaylord, MI

Rating Scale: Percent plot area infected by gray snow mold (*Typhula ishikariensis*).  
 Rating Date: April 12, 1994

Treatment	Rate/1000 ft <sup>2b</sup>	I	II	III	Avg	Tukeys(.05) <sup>a</sup>
GSSM 9305	----	0	0	0.5	0.2	C
Turficide 400	12 fl. oz.	0.5	0	0.5	0.3	C
TRA 0028 + TRA 0041	14 fl. oz. + 32 fl. oz.	0.5	0.5	0	0.3	C
GSSM 9304	----	0	0	1	0.3	C
D. 2787 + Fungo 85	8 fl. oz. + 1.18 oz.	0.5	0	0.5	0.3	C
ICIA 5504 + D. 2787 + PCNB	0.7 oz. + 8 fl. oz. + 8 oz.	0	0.5	0.5	0.3	C
Turficide 400 + D. 2787 + IBDU	9 fl. oz. + 6 fl. oz. + 0.5 lb N.	0	0.5	1	0.5	BC
TRA 0041	32 fl. oz.	0.5	0	1	0.5	BC
Ch. 26019 + PCNB + D. 2787	4 fl. oz. + 4 oz. + 8 fl. oz.	0.5	0	1	0.5	BC
GSSM 9301	----	0	0.5	1	0.5	BC
Consyst	9 oz.	0.5	0.5	0.5	0.5	BC
ICIA 5504 + PCNB	0.7 oz. + 8 oz.	0	1	0.5	0.5	BC
Terraclor	8 oz.	0	0	2	0.7	BC
Ch. 26019 (F) + PCNB	4 fl. oz. + 8 oz.	1	0.5	0.5	0.7	BC
CGA 173506 + Banner	10 gm. ai. + 8 gm. ai.	0.5	1	0.5	0.7	BC
GSSM 9312	----	0.5	0.5	1	0.7	BC
Consyst	6 oz.	0	0.5	2	0.8	BC
GSSM 9303	----	0.5	1	1	0.8	BC
Turficide 400 + IBDU	12 fl. oz. + 0.5 lb N.	1	1	1	1	BC
TRA 0025 + TRA 0040	9 oz. + 8 oz.	0.5	0.5	2	1	BC
Ch. 26019 + D. 2787	4 fl. oz. + 8 fl. oz.	0.5	0.5	2	1	BC
Revere	8 oz.	0.5	0.5	2	1	BC
Sylgard 309 + Penstar	8 oz/100 gal. + 8 oz.	0.5	2	0.5	1	BC
Sets F + F II	1x	0	1	2	1	BC
GSSM 9302	----	0.5	2	1	1.2	BC
Vigoro 12	12.5 lbs.	0.5	0	3	1.2	BC
ANDFG 144	3.2 lbs.	0.5	0	3	1.2	BC
Vigoro 15	12.5 lbs.	0.5	0	3	1.2	BC
Turficide 400 + D. 2787	9 fl. oz. + 6 fl. oz.	0.5	0.5	3	1.3	BC
Sets. F+F II	2x	0.5	2	2	1.5	BC
CGA 173506 + Banner	7 gm. ai. + 16 gm. ai.	3	1	1	1.7	BC
TRA 0040	8 oz.	3	0	3	2	BC
GSSM 9311	----	0.5	3	3	2.2	BC
CGA 173506 + Banner	7 gm. ai. + 8 gm. ai.	5	0	3	2.7	BC
Ch. 26019 + D. 2787	8 fl. oz. + 8 fl. oz.	10	0	0.5	3.5	BC
ICIA 5504 + D. 2787	0.7 oz. + 8 fl. oz.	0.5	0.5	10	3.7	BC
Sylgard 309 + D. 2787 + Ch. 26019	16 oz/100 gal. + 8 fl. oz. + 4 fl. oz.	7	1	3	3.7	BC
CGA 173506	14 gm. ai.	5	0	7	4	BC
GSSM 9307	----	3	10	2	5	BC
CGA 173506	10 gm. ai.	10	0.5	7	5.8	BC
ANDFG 145	1.93 lbs.	1	7	10	6	BC
Vigoro 14	12.5 lbs.	1	7	10	6	BC
Fluazinam	1 fl. oz.	20	0.5	3	7.8	BC
Fluazinam + D. 2787	1 fl. oz. + 8 fl. oz.	25	2	1	9.3	BC
Vigoro 16	12.5 lbs.	25	0.5	5	10.2	BC

Treatment	Rate/1000 ft <sup>2b</sup>	I	II	III	Avg	Tukeys(.05) <sup>a</sup>
Ch. 26019 + Prostar	8 fl. oz. + 4.3 oz.	15	7	10	10.7	BC
Fluazinam	2.5 fl. oz.	0.5	30	2	10.8	BC
Vigoro 5	12.5 lbs.	0.5	2	39	10.8	BC
Calo Clor	3 oz.	25	0.5	10	11.8	BC
ANDFG 139	4.16 lbs.	20	1	15	12	BC
Vigoro 11	12.5 lbs.	2	15	20	12.3	BC
D. 2787 + ASC 67103	8 fl. oz. + 16 ml.	5	25	10	13.3	BC
CGA 173506 + Banner	3.5 gm. ai. + 16 gm. ai.	25	0.5	15	13.5	BC
GSSM 9306	----	40	1	2	14.3	BC
ANDFG 133	4 lbs.	20	1	25	15.3	BC
ASC 67153	8 fl. oz.	10	0	40	16.7	ABC
Ch. 26019 (WDG) + D. 2787	2 oz. + 8 fl. oz.	50	0.5	1	17.2	ABC
GSSM 9313	----	50	0.5	2	17.5	ABC
CGA 173506 + Banner	3.5 gm. ai. + 8 gm. ai.	25	20	10	18.3	ABC
GSSM 9308	----	20	20	15	18.3	ABC
Vigoro 9	12.5 lbs.	10	20	25	18.3	ABC
CGA 173506	7 gm. ai.	30	20	7	19	ABC
ICIA 5504	0.7 oz.	40	1	25	22	ABC
Vigoro 8	12.5 lbs.	25	1	40	22	ABC
GSSM 9309	----	25	20	25	23.3	ABC
Calo Gran	6 lbs.	2	0.5	80	27.5	ABC
Ch. 26019 + Prostar	4 fl. oz. + 4.3 oz.	40	10	35	28.3	ABC
ANDFG 140	4.16 lbs.	30	7	50	29	ABC
ANDFG 143	3.2 lbs.	0.5	2	90	30.8	ABC
ANDFG 142	4 lbs.	75	15	10	33.3	ABC
Vigoro 13	12.5 lbs.	0	30	75	35	ABC
ANDFG 137	4 lbs.	35	20	50	35	ABC
VCC 4044	120 oz.	0	30	75	35	ABC
Banner	8 gm. ai.	30	60	20	36.7	ABC
GSSM 9310	----	35	35	40	36.7	ABC
Vigoro 10	12.5 lbs.	5	40	65	36.7	ABC
ANDFG 141	4 lbs.	65	15	35	38.3	ABC
ANDFG 138	4 lbs.	40	30	45	38.3	ABC
Banner	16 gm. ai.	50	25	45	40	ABC
ANDFG 136	4 lbs.	45	1	80	42	ABC
Vigoro 7	12.5 lbs.	90	3	35	42.7	ABC
UCC 4040	80 oz.	65	25	40	43.3	ABC
Sylgard 309	16 oz/100 gal.	70	0	75	48.3	ABC
Vigoro 6	12.5 lbs.	95	20	35	50	ABC
ANDFG 146	1.93 lbs.	25	65	65	51.7	ABC
ANDFG 134	4 lbs.	85	45	45	58.3	ABC
Vigoro 2	12.5 lbs.	75	45	60	60	ABC
ANDFG 135	4 lbs.	90	20	80	63.3	ABC
CGA 173506	3.5 gm. ai.	80	75	35	63.3	ABC
Sylgard 309	16 oz/100 gal.	98	20	75	64.3	ABC

Treatment	Rate/1000 ft <sup>2b</sup>	I	II	III	Avg	Tukeys(.05) <sup>a</sup>
EXP 10452A	4 oz.	95	85	20	66.7	ABC
Vigoro 4	12.5 lbs.	95	15	95	68.3	AB
Control	----	90	75	85	83.3	A
Vigoro 3	12.5 lbs.	95	95	75	88.3	A

<sup>a</sup>Treatments followed by the same letter are not significantly different from each other at the 5% level.

<sup>b</sup>Rates listed are formulation unless listed as ai. (active ingredient).

### Kentucky Bluegrass Melting-Out Fungicide Study - 1994

#### Hancock Turfgrass Research Center

The 1994 melting-out (*Dreschlera poae*) fungicide trial was conducted at the Hancock Turfgrass Research Center on the MSU campus in East Lansing, MI on irrigated Kenblue Kentucky bluegrass (*Poa pratensis*) turf maintained at 1 1/2" height of cut. The plot area was fertilized dormant in late fall of 1993 at 1 lb. nitrogen/1000 ft<sup>2</sup> and with .25 lb. actual nitrogen/1000 ft<sup>2</sup> on 5/24/94. Application procedures were as previously described in this report.

Treatments were applied preventively on May 4, with subsequent applications being made at the intervals listed on the data table (Table 3). By the time of the 6/15/94 rating, the 14 day treatments had been applied three times and the 21 and 28 day treatments had been applied twice.

As the data indicate (Table 3), disease levels were moderate this year with the controls averaging about 45% of maximum disease levels. Statistically, all of the treatments gave significant disease control, compared to the untreated control. No phytotoxicity was observed.

**Table 3. Kentucky Bluegrass Melting-Out Fungicide Study - 1994**

#### Hancock Turfgrass Research Center Michigan State University, East Lansing, MI

Rating scale: 1 = no disease, 9 = 90% or more of leaves infected

Rating date: 6/15/94

Treatment	Rate/1000ft <sup>2b</sup>	Interval	I	II	III	IV	Avg	Tukeys (.05) <sup>a</sup>
Ch. 26019	4 fl. oz.	21 day	1	1	1	1	1.0	A
ASC 67098-Z	3.6 oz.	14 day	1	1	1	1	1.0	A
ASC 67098-X	2.5 oz.	14 day	1	1	1	2	1.3	A
RH-0611	10 oz.	14 day	1	2	1	1	1.3	A
Fore	6.4 fl. oz.	14 day	1	1	1	2	1.3	A
Curalan	2 oz.	28 day	1	1	2	2	1.5	A
D. 2787	6 fl. oz.	14 day	1	2	1	2	1.5	A
Dac. 825	3.8 oz.	14 day	1	2	1	2	1.5	A
Fluazinam	1 fl. oz.	14 day	2	2	1	2	1.8	A
Control	--	--	4	4	4	5	4.3	B

<sup>a</sup>Treatments followed by the same letter are not significantly different from each other at the 5% level.

<sup>b</sup>Rates listed are formulation.

### Summer Patch Fungicide Studies - 1994

Fungicide studies for the preventive control of summer patch (*Magnaporthe poae*) on annual bluegrass were initiated when soil temperatures reached 65° F at a 2" soil depth at the Hancock Turfgrass Research center on the MSU campus in East Lansing, MI. Studies were established on irrigated, annual bluegrass (*Poa annua*) fairways on two golf courses in

Michigan where disease was present in past years. All treatments were applied prior to disease occurrence, with re-application taking place at the intervals listed in the data table (Table 4). Application equipment and procedures were as described previously in this report (refer to snow-mold report). The fairway studies were maintained at 1/2" height of cut and were fertilized at 1/4-1/2 lb. N/MO. (except for treatments containing fertilizer). Application intervals and frequencies were occasionally altered from contract protocols in order to conform to our standard recommendations for preventive control of summer patch in Michigan.

No objectionable phytotoxicity was observed in these studies this year.

#### Summer Patch Fungicide Study #2, Twin Beach Country Club, W. Bloomfield, MI

The summer patch fungicide study at Twin Beach Golf Club was initiated preventively on May 3, 1994, with most treatments being re-applied on June 3, except as noted on the data table (Table 4). As Table 4 indicates a few treatments were initiated when the soil temperature reached 75° F at a 2" depth (6/15) with re-application 30 days later (7/13).

As at Dearborn, disease pressure in the Twin Beach Study was light this year with disease pressure in July being followed by gradual symptom recovery for the rest of the season. We were, however, able to take a disease rating on August 5 when, in retrospect, symptom development was at its peak. In a normal weather year, symptom development generally increases through mid-September.

As data Table 4 indicates, all of the fungicide treatments, and most of the fertilizer treatments, gave statistically significant disease control, compared to the fertilized controls. If disease pressure had continued to build throughout the summer, greater treatment separation would probably have been observed.

**Table 4. Summer Patch Fungicide Study #2 - 1994**

Twin Beach Golf Club, West Bloomfield, MI

Rating Scale: Percent plot area infected by summer patch (*Magnaporthe poae*).

Rating Date: July 29, 1994

Treatment	Rate/1000 ft <sup>2b</sup>	Application Interval	I	II	III	Avg	Tukeys(.05)a
EXP 80318A	3 fl. oz.	65° + 30 days	0	0	0	0	C
Rubigan (W)	0.75 oz.	65° + 30 days + 30 days	0	0	0	0	C
Banner	4 fl. oz.	75° + 30 days	0	0	0	0	C
Sentinel	0.33 oz.	65° + 45 days	0	0	0	0	C
Banner + Astron	4 fl. oz. + 2 fl. oz.	75° + 30 days & monthly	0	0	0	0	C
EXP 10452A	3 oz.	65° + 30 days	0	0	1	0.3	C
Sentinel	0.25 oz.	65° + 45 days	0	1	0	0.3	C
Banner + Astron	2 fl. oz. + 2 fl. oz.	75° + 30 days & monthly	0	0	1	0.3	C
EXP 10452A	4 oz.	65° + 30 days	0	2	0	0.7	C
EXP 80318A	1 fl. oz.	65° + 30 days	1	0	1	0.7	C
EXP 80318A	2 fl. oz.	65° + 30 days	0	1	1	0.7	C
Banner	2 fl. oz.	75° + 30 days	0	1	1	0.7	C

Treatment	Rate/1000 ft <sup>2b</sup>	Application Interval	I	II	III	Avg	Tukeys(.05)a
Bayleton	2 oz.	75° + 30 days	0	0	3	1.0	BC
Banner + Astron	1 fl. oz. + 2 fl. oz.	75° + 30 days & monthly	0	1	3	1.3	BC
Rubigan	4 fl. oz.	75° + 30 days	5	0	0	1.7	BC
Sentinel	0.25 oz.	65° + 30 days	2	2	1	1.7	BC
Ch. 26019 (WDG)	6 oz.	65° + 30 days	2	3	1	2.0	BC
Fluazinam	2 fl. oz.	65° + 30 days	2	1	3	2.0	BC
ASC 67098-Z	3.6 fl. oz.	65° + 30 days	0	5	2	2.3	BC
Bayleton	2 oz.	65° + 30 days	5	1	1	2.3	BC
Fluazinam	1 fl. oz.	65° + 30 days	1	7	3	3.7	BC
Ringer Turf Restore Fert.	0.5 lb. N.	monthly	3	3	10	5.3	BC
Ch. 26019 (WDG)	4 oz.	65° + 30 days	5	5	7	5.7	BC
Sustane	0.5 lb. N.	monthly	5	7	5	5.7	BC
Control (unfert.)	--	--	7	7	3	5.7	BC
Herbruck's Fert.	0.5 lb. N.	monthly	7	7	5	6.3	BC
Astron	2 fl. oz.	monthly	5	10	5	6.7	BC
Banner	1 fl. oz.	75° + 30 days	0	1	20	7.0	BC
Thatch X	3 lbs.	monthly	5	5	15	8.3	ABC
Panasea Plus	4 fl. oz.	monthly	15	10	10	11.7	ABC
Ringer Amm. Sulf.	0.5 lb. N.	monthly	10	10	15	11.7	ABC
Ocean Organics 5044	4 fl. oz.	monthly	3	25	10	12.7	AB
Control (fertilized)	0.5 lb. N.	monthly	20	25	15	20.0	A

<sup>a</sup>Treatments followed by the same letter are not significantly different from each other at the 5% level.

<sup>b</sup>Rates are formulation, unless listed as a.i. (active ingredient).

## Dollar Spot Fungicide Trial - 1994

### Hancock Turfgrass Research Center, MSU, E.Lansing, MI

The 1994 dollar spot (*Sclerotinia homoeocarpa*) fungicide trial was conducted on an irrigated Emerald creeping bentgrass green at the Hancock Turfgrass Research Center on the MSU campus in East Lansing, MI. The green was maintained at 1/4" height of cut and was fertilized at 1/4 # N/mo. Treatments were applied preventively to 2' X 9' plots in three replications of a random block design on 7,14,21 and 28 day schedules as indicated on the data tables (Tables 5, 6 and



7), beginning on 8/16/94. By the last rating date (Oct. 14), the 7 day treatments had been applied 9 times, the 14 day treatments had been applied 5 times, the 21 day treatments had been applied 3 times and the 28 day treatments had been applied twice. The dollar spot strain in this plot area is benzimidazole-resistant but DMI-sensitive.

As data Table 5 indicates, most treatments gave statistically significant control of dollar spot compared to the fertilized controls. These differences persisted throughout the rest of the season as disease pressure increased. It should be noted that Banner, Bayleton, and Rubigan are excellent dollar spot fungicides, however, the 28 day re-treatment interval used in this study was too long.

The treatments induced various turfgrass responses, from yellowing and greening to mild phytotoxicity, as noted in the data Table 5.

<sup>f</sup>Mild turf yellowing.

<sup>i</sup>Dramatic turf greening.

**Table 5. Dollar Spot Fungicide Study - 1994**

**Hancock Turfgrass Research Center  
Michigan State University, East Lansing, MI**

Rating Scale: 0 = no disease, 10 = 100% of plot disease

Rating Date: September 30, 1994

Treatment	Rate/1000ft <sup>2b</sup>	Interval	I	II	III	Avg	Tukeys (.05) <sup>a</sup>
CGA 173506	0.25 oz.	7 day	0	0	0	0	F
Banner + CGA 173506	0.5 oz. + 0.25 oz.	14 day	0	0	0	0	F
Banner + CGA 173506	1 oz. + 0.25 oz.	14 day	0	0	0 <sup>c</sup>	0	F
Bayleton + D.2787	0.5 oz. + 3 fl. oz.	14 day	0	0	0	0	F
TRA 0028	6 oz.	14 day	0	0	0	0	F
Sentinel	0.25 oz.	28 day	0 <sup>c</sup>	0	0	0	F
Fluazinam	0.5 oz.	28 day	0	0	0	0	F
Fluazinam	1 fl. oz.	21 day	0	0	0	0	F
ASC 66825	.67 oz.	21 day	0	0	0	0	F
ASC 66825	1 oz.	21 day	0	0	0	0	F
Curalan	2 oz.	21 day	0	0	0	0	F
Chipco 26019 (WDG)	1.5 oz.	14 day	0	0	0	0	F
Chipco 26019 (WDG)	2 oz.	14 day	0	0	0	0	F
Ch. 26019	4 fl. oz.	14 day	0	0	0	0	F
ANDFG 156	4 lbs.	14 day	0	0	0	0	F
ASC 67098-Z	3.6 fl. oz.	21 day	0	0	0	0	F
D. 2787	3 fl. oz.	14 day	1 <sup>c</sup>	0	0	.3	EF

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Treatment	Rate/1000ft <sup>2b</sup>	Interval	I	II	III	Avg	Tukeys (.05) <sup>a</sup>
Exp 80318 A	0.25 oz.	14 day	1	0	0	.3	EF
ANDFG 155	4 lbs.	14 day	0 <sup>e</sup>	1 <sup>ce</sup>	0	.3	EF
Chipco 26019	2 fl. oz.	14 day	1 <sup>c</sup>	0	0	.3	EF
Banner	0.5 oz.	7 day	1	1 <sup>c</sup>	0	.7	DEF
CGA 264501	.44 oz.	7 day	1 <sup>c</sup>	1 <sup>c</sup>	0	.7	DEF
Bayleton	1 oz.	28 day	1	0	1 <sup>c</sup>	.7	DEF
ICIA 5504 + D. 2787	.4 oz. + 3 fl. oz.	14 day	1 <sup>c</sup>	1 <sup>c</sup>	0	.7	DEF
ICIA 5504 + D. 2787 + Chipco 26019	4 oz. + 3 fl. oz. + 2 oz.	21 day	1	1 <sup>c</sup>	0	.7	DEF
ICIA 5504 + Chipco 26019	.4 oz. + 2 oz.	14 day	1	0	1	.7	DEF
Thalonil	3.5 oz.	14 day	1 <sup>c</sup>	1 <sup>c</sup>	0	.7	DEF
D. 2787	6 fl. oz.	14 day	1 <sup>c</sup>	1 <sup>c</sup>	0	.7	DEF
Dac 825	3.8 oz.	14 day	0	1 <sup>c</sup>	1 <sup>c</sup>	.7	DEF
S-4404	2x	14 day	0	1 <sup>c</sup>	1 <sup>c</sup>	.7	DEF
Eagle	.6 oz.	28 day	0 <sup>e</sup>	1 <sup>ce</sup>	1	.7	DEF
Eagle + D.2787	.6 oz. + 3 fl. oz.	28 day	1 <sup>ce</sup>	0	1 <sup>c</sup>	.7	DEF
Exp 10452A	1.2 oz.	14 day	1 <sup>c</sup>	1	0	.7	DEF
Exp 10452A	.34 oz.	14 day	0	1 <sup>ce</sup>	1 <sup>c</sup>	.7	DEF
Exp 80318A	0.5 oz.	14 day	1	0	1 <sup>c</sup>	.7	DEF
Exp 80318A	1 oz.	14 day	0	1 <sup>c</sup>	1	.7	DEF
ANDFG 149	4 lbs.	7 day	1 <sup>f</sup>	1 <sup>ef</sup>	0 <sup>f</sup>	.7	DEF
ANDFG 150	4 lbs.	7 day	1 <sup>f</sup>	1 <sup>c</sup>	0	.7	DEF
ANDFG 161	4 lbs.	14 day	1 <sup>ci</sup>	1 <sup>ci</sup>	0 <sup>i</sup>	.7	DEF
ANDFG 163	2 lbs.	14 day	0 <sup>i</sup>	1 <sup>ce</sup>	1 <sup>i</sup>	.7	DEF
ANDFG 164	2 lbs.	14 day	1 <sup>ce</sup>	0	1 <sup>ce</sup>	.7	DEF
ANDFG 151	2 lbs.	21 day	1 <sup>eh</sup>	1 <sup>e</sup>	1 <sup>ce</sup>	1	C-F
Bayleton	0.5 oz.	14 day	1 <sup>c</sup>	1	1 <sup>c</sup>	1	C-F
Bayleton & Prostar	1 oz. + 2 oz.	28 day	1 <sup>c</sup>	1 <sup>c</sup>	1 <sup>c</sup>	1	C-F

Treatment	Rate/1000ft <sup>2b</sup>	Interval	I	II	III	Avg	Tukeys (.05) <sup>a</sup>
S-6044	1x	14 day	1 <sup>ce</sup>	1 <sup>ce</sup>	1 <sup>e</sup>	1	C-F
ANDFG 148	4 lbs.	7 day	1	1	1 <sup>e</sup>	1	C-F
ANDFG 152	2 lbs.	21 day	1 <sup>eh</sup>	1 <sup>e</sup>	1 <sup>eh</sup>	1	C-F
ANDFG 153	4 lbs.	21 day	2 <sup>e</sup>	0 <sup>i</sup>	1 <sup>chi</sup>	1	C-F
ANDFG 159	5 lbs.	21 day	1 <sup>f</sup>	1 <sup>f</sup>	1 <sup>ef</sup>	1	C-F
ANDFG 162	4 lbs.	14 day	1 <sup>ce</sup>	1 <sup>e</sup>	1 <sup>ce</sup>	1	C-F
Banner	2 fl. oz.	28 day	1	1 <sup>e</sup>	1	1	C-F
ICIA-5504 + D. 2787	.4 oz. + 3 fl. oz.	21 day	2	1	1	1.3	B-F
ICIA 5504 + Chipco 26019	.4 oz. + 2 oz.	21 day	2	1	1 <sup>e</sup>	1.3	B-F
ICIA 5504 + Chipco 26019	.4 oz. + 2 oz.	28 day	1	1	2	1.3	B-F
S-4404	1x	14 day	1	2	1	1.3	B-F
Rubigan(W)	1.25 oz.	14 day	1	1 <sup>e</sup>	2	1.3	B-F
ANDFG 158	3.33 lbs.	21 day	2 <sup>f</sup>	1 <sup>i</sup>	1 <sup>f</sup>	1.3	B-F
ANDFG 160	5 lbs.	21 day	2 <sup>j</sup>	1 <sup>i</sup>	1 <sup>f</sup>	1.3	B-F
Rubigan	1.5 fl. oz.	28 day	1	1 <sup>e</sup>	2	1.3	B-F
ICIA 5504 + D.2787	.4 oz. + 3 fl. oz.	28 day	2	1 <sup>e</sup>	2	1.7	B-F
ANDFG 147	3 lbs.	7 day	2	2 <sup>f</sup>	1 <sup>e</sup>	1.7	B-F
ANDFG 154	4 lbs.	21 day	2	2	1 <sup>eh</sup>	1.7	B-F
Control (unfertilized)	--	--	2	2	2	2.0	B-E
ANDFG 157	3.3 lbs.	21 day	2	2	2	2.0	B-E
ANDFG 166	27.9 L	7 day	1	3	3	2.3	A-D
ICIA 5504	0.4 oz.	14 day	3	3	2	2.7	ABC
ANDFG 165	18.7 L	7 day	2	4	3	3.0	AB
Control (fertilized)	0.25 lb. N.	28 day	4	4	4	4.0	A

<sup>a</sup>Treatments followed by the same letter are not significantly different from each other at the 5% level.

<sup>b</sup>Rates are formulation.

<sup>c</sup>Plot has fewer than 10 very small dollar spots, indicating very recent control breakdown.

<sup>e</sup>Mild turf greening.

<sup>f</sup>Mild turf yellowing.

<sup>g</sup>Mild phytotoxicity.

<sup>h</sup>Turf mottled.

<sup>i</sup>Dramatic turf greening.

<sup>j</sup>Dramatic turf yellowing.

### Take-All Patch Fungicide Studies - 1994

Fertilizer/fungicide studies for the management of take-all patch (*Gaeumannomyces graminis*) on creeping bentgrass (*Agrostis palustris*) were conducted on three Michigan golf courses this year. These studies were established on irrigated bentgrass fairways where disease was present in prior years or where disease was currently active. Two studies were initiated in late May, corresponding roughly to the same timing used for summer patch study initiation. The third study was initiated in mid-summer. Treatment preparation and application, and experimental design, were as previously described in this report. The fairways were maintained at approximately 3/8" height of cut and the studies were fertilized at approximately 1/4 - 1/2 lb. actual nitrogen/mo. (except for fertilizer treatments) using Lebanon Country Club Fertilizer (18-4-10). Some phytotoxicity was observed and is discussed below.

#### Take-All Patch Study, St. Clair Golf Club, St. Clair, MI

This study was established on a 6 month-old bentgrass fairway which was exhibiting poorly-defined, weak areas of turfgrass which were infected with the take-all fungus. In general, distinct patches had not yet formed.

All treatments were initiated on Aug. 2, shortly after the site was discovered. A second application was made on September 6, except as noted on the data table. Plot design and application procedures were as previously described. The ratings in table 10 were taken on Sept. 23.

Phytotoxicity was sufficiently severe in the EXP 10452A and Sentinel (0.33 oz) treatments following one application that a second application was omitted. Phytotoxicity was moderately severe in the Sentinel (0.25 oz) plots, but they were re-treated. The high rates of Bayleton and Rubigan also exhibited moderate phytotoxicity following the second application while Banner (4 fl. oz) exhibited a mild greening effect. Phytotoxicity was probably more severe in this study than in the other take-all studies because, in addition to the low fertility and slow turf growth, the turf was new, had no thatch, and treatments were applied in mid-summer heat.

As the data indicates, all treatments except Ch. 26019 (2 oz) and Banner (2 fl. oz) gave statistically significant control of take-all patch compared to the unfertilized control. As in the other take-all patch studies, the role of fertility, alone, in preventing disease symptom expression is quite evident in this data. Fertility, by itself, would probably have been less effective in all three take-all studies if disease development had been more severe.

**Table 6. Take-All Patch Fungicide Study - 1994**

#### St. Clair Golf Club, St. Clair, MI

Rating scale: Percent plot area diseased.

Rating date: September 23, 1994

Treatment	Rate/1000ft <sup>2b</sup>	I	II	III	IV	Avg	Tukeys(.05) <sup>a</sup>
Sulfur-Control Fertilizer	Urea 1 lb. N./mo.	0	0	0	0	0	B
Ringer Fertilizer	Ammon. Sulf 1 lb. N./mo.	0	0	0	0	0	B
RH 0611	10 oz.	0	1	0	0	.25	B
EXP 80318A	1 fl. oz.	3	0	0	3	1.5	B
Bayleton	2 oz.	3	5	0	0	2	B
Fungo 85	3.6 oz.	2	0	1	5	2	B

Treatment			Rate/1000ft <sup>2b</sup>	I	II	III	IV	Avg	Tukeys(.05)*
Ringer Fertilizer	Turf	Restore	1 lb. N./mo.	3	5	0	0	2	B
IBDU Fertilizer			1 lb. N./mo.	5	5	0	0	2.5	B
Sulfur-control Fertilizer		Urea	1/2 lb. N./mo.	0	5	5	0	2.5	B
Ringer Fertilizer	Ammon.	Sulf.	1/2 lb. N./mo.	2	0	5	3	2.5	B
Ringer Fertilizer	Turf	Restore	1/2 lb N./mo.	5	3	0	3	2.8	B
Sentinel			.25 oz.	5	3	5	0	3.3	B
Banner			4 fl. oz.	3	0	0	10	3.3	B
Fungo 85			1.8 oz.	0	3	0	10	3.3	B
EXP 80318A			2 fl. oz.	5	5	3	3	4	B
IBDU Fertilizer			1/2 lb N./mo.	3	5	0	10	4.5	B
Eagle			0.6 oz.	3	5	3	10	5.3	B
ASC-67098-Z			3.6 oz.	3	10	0	10	5.8	B
EXP 10452A <sup>c</sup>			4 oz.	7	5	5	10	6.8	B
Control (Fert)			1/4 lb N./mo.	5	5	7	10	6.8	B
Bayleton			4 oz.	5	5	0	20	7.5	B
Rubigan			2 fl oz.	5	10	5	10	7.5	B
Fluazinam			1 oz.	3	10	0	20	8.3	B
Sentinel <sup>c</sup>			.33 oz.	3	7	15	10	8.8	B
Rubigan			4 fl. oz.	3	20	2	10	8.8	B
Fluazinam			2 oz.	7	3	25	7	10.5	B
Chipco 26019 (WDG)			2 oz.	5	10	25	10	12.5	AB
Banner			2 fl. oz.	5	25	3	20	13.3	AB
Control (unfert.)			--	5	35	30	40	27.5	A

\*Treatments followed by the same letter are not significantly different from each other at the 5% level.

<sup>b</sup>Rates are formulation.

<sup>c</sup>Applied once only due to phytotoxicity.

### Necrotic Ring Spot Fungicide Studies - 1994

Fertilizer/fungicide studies for the management of necrotic ring spot (*Leptosphaeria korrae*) were conducted on irrigated, previously diseased Kentucky bluegrass turf at the Blue Care Network headquarters in Lansing, MI and at the

Hancock Turfgrass Research Center on the MSU campus in East Lansing, MI. Experimental design and treatment application was as previously described in this report. The turfs were maintained at approximately 2" height of cut and were fertilized at 1/4 lb-3/4 lb N/1000 ft<sup>2</sup>/mo. (except for fertilizer treatments) with Country Club fertilizer (18-4-10). Irrigation was provided as necessary to prevent wilt. Ratings were taken as percent recovery from original disease levels since disease symptoms were already present when the studies were established. Unfortunately, new disease pressure was mild in both studies, so statistical treatment separation was limited (Tables 7).

#### Necrotic Ring Spot Study #1 Blue Care Network Headquarters, Lansing, MI.

This study was initiated on May 25, 1994, with the application of the Sustane, Turf Restore, and IBDU treatments, which were re-applied monthly throughout the season. The fungicide treatments were applied twice, at monthly intervals beginning on August 1. This timing was based on past studies where we successfully controlled the disease outbreak that often appears in the fall. Ratings were taken on Oct. 1, 1994.

The test results in this study resemble the results we saw in our take-all studies where modest amounts of background fertility gave statistically significant disease control, compared with the unfertilized control treatment. The same was true of all other fertilizer and fungicide treatments (Table 8). Despite the statistical similarity between all treatments except the unfertilized control, there were dramatic differences in density and overall turfgrass quality, with the three fertility treatments at 1 lb. N/mo. exhibiting much better quality than all other treatments, which were more lightly fertilized.

No phytotoxicity was observed.

**Table 7. Necrotic Ring Spot Study #1 - 1994**

#### **Blue Care Network Bldg., Lansing, MI**

Rating scale: Percent recovery/plot from pretreatment disease levels.

Rating date: Oct. 12, 1994

Treatment	Rate/1000ft <sup>2b</sup>	I	II	III	IV	Avg	Tukeys(.05)*
Turf Restore	1 lb. N(nitrogen)/mo.	100	100	100	100	100.0	A
Sustane	1 lb. N/mo.	100	100	100	100	100.0	A
IBDU Fertilizer	1 lb. N/mo.	100	100	100	100	100.0	A
Ch. 26019 (WDG)	4 oz.	50	100	80	100	82.5	A
ICIA 5504	0.2 oz.	27	67	100	100	81.0	A
EXP 10452A	4 oz.	80	80	100	63	80.8	A
EXP 10452A	2 oz.	75	67	100	57	74.8	A
Fluazinam	2 fl. oz.	67	60	100	50	69.3	A
RH-0611	10 oz.	29	40	100	100	67.3	A
Rubigan	4 fl. oz.	100	67	50	50	66.8	A
Banner	4 fl. oz.	60	60	33	100	63.3	A
ASC-67098Z	3.6 oz.	20	0	100	100	55.0	A
Eagle	0.6 oz.	50	12.5	100	50	53.1	A
Thatch X	3 lbs.	60	75	29	30	48.5	A

Treatment	Rate/1000ft <sup>2b</sup>	I	II	III	IV	Avg	Tukeys(.05) <sup>a</sup>
ICIA 5504	0.4 oz.	29	70	50	40	47.3	A
Fluazinam	1 fl. oz.	67	70	20	29	46.5	A
Control (fertilized)	0.75 lb. N./mo.	0	-20	25	100	26.3	A
Control (unfertilized)	--	-100	-25	0	-100	-56.3	B

<sup>a</sup>Treatments followed by same letter are not significantly different from each at the 5% level.

<sup>b</sup>Rates are formulation