TURFGRASS DISEASE MANAGEMENT REPORT 1992-93

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SNOW MOLD FUNGICIDE STUDIES - 1992-93

Two snow mold fungicide studies were conducted during the fall and winter of 1992-93. One study was established at the Boyne Highlands Resort Golf Course in Harbor Springs, Michigan and a second study was established at Birchwood Farms Golf Course, also in Harbor Springs, Michigan. The treatments were applied preventively to three replicate 6' x 9' plots on bentgrass/annual bluegrass fairways mowed at ½". The Boyne Highlands study was applied on 10/27/92, and the Birchwood Farms study was applied on 10/26/92.

Boyne Highlands Resort, Harbor, Springs, MI

This study was rated on 3/31/93, immediately following snow cover melt-off. The snow molds observed this year were primarily pink snow mold (*Microdochium nivale*) and, secondarily, *Typhula ishikariensis*, gray snow mold. The unusual predominance of pink snow mold over gray snow mold may be explained by an unusually wet and cool 1992 fall which may have allowed an undetected, pre-treatment pink snow mold inoculum build-up on the golf course where this study was located. Also, the fairway on which this study was located was unusually lush at the time of treatment, due to the late season release of fertilizer applied earlier in the season. This may have allowed the turf to somewhat "outgrow" the snow mold protection. For whatever reasons, disease pressure was extremely severe in the study this year, with disease levels of 98% in the untreated controls. Unfortunately, some of the standard snow mold controls failed to control the disease in this study this year (Table 1). Examples include Calo-Gran and the Daconil 2787 + Chipco 26019 combination treatments. Conversely, PCNB fungicide formulated as Terraclor (WP) (8 oz/1000 ft^2 rate) and as Scotts F+FII (2 x rate) performed relatively well again this year.

No phytotoxicity, other than slight discoloration in Calo Clor plots, was noted.

Birchwood Farms Resort, Harbor Springs, MI

This study was rated on 4/14/93. Unlike the Boyne Highlands study, this study had an approximate 50:50 mix of pink snow mold (*Microdochium nivale*) and gray snow mold (*Typhula ishikariensis*) throughout the plot area. Disease pressure was also very severe in this study this year, with 98% disease incidence in the controls. In this study, however, we achieved higher levels of disease control with many treatments, especially the GS/SM experimentals, then in the

Boyne Highlands study. Unfortunately, we again experienced the failure of disease control by standards such as the Daconil 2787 + Chipco 26019 combination, Calo-Gran, and Calo-Clor (Table 2).

No phytotoxicity, other than slight discoloration in Calo-Clor plots, was noted.

Table 1. Snow Mold Fungicide Study #1 - 1993

Boyne Highlands Resort
Harbor Springs, MI

Rating Scale: Percent plot area infected by pink snow mold (*Microdochium nivale*) and gray snow mold (*Typhula ishikariensis*).[b]
Rating Date: 3/31/93

Treatment	Rate/1000 ft^{2c}	I	II	III	Avg	DMR (.05)[a]
GS/SM 92-06	----	10	5	5	6.7	W
Terraclor	8 oz	10	15	3	9.3	UW
GS/SM 92-05	----	10	15	7	10.7	UVW
Scotts F + F II	2x	3	15	15	11.0	UVW
UBI 1876	12 fl oz	7	20	10	12.3	T-W
GS/SM 92-16	----	5	5	30	13.3	S-W
Cleary PCNB + Spotrete + Greenzit	6 oz + 6 fl oz + 6 fl oz	3	10	35	16.0	R-W
Calo-Clor	3 oz	5	40	5	16.7	Q-W
GS/SM 92-03	----	10	15	25	16.7	Q-W
GS/SM 92-04	----	5	2	45	17.3	Q-W
GS/SM 92-15	----	10	3	40	17.7	Q-W
GS/SM 92-02	----	25	20	15	20.0	P-W
CGA 173506 + Banner	7 gm ai + 8 gm ai	25	35	25	28.3	O-W
GS/SM 92-13	----	2	50	35	29.0	O-W
Ch.26019 (WDG) + Terraclor + D.2787	2 oz + 4 oz + 4 fl oz	45	25	25	31.7	N-W
Scotts F + FII	1x	10	40	50	33.3	M-W
CGA 173506 + Banner	3.5 gm ai + 8 gm ai	45	40	30	37.3	L-W
GS/SM 92-12	----	45	60	25	43.3	K-U
ICIA 5504 (JFR 795)	10 gm ai	15	50	65	43.3	K-U
D.2787 + Fluazinam	8 fl oz + 3 fl oz	5	65	65	45.0	K-U
ICIA 5504 (WF 1594)	10 gm ai	50	20	70	46.7	J-T
Banner + D.2787	2 fl oz + 8 fl oz	65	30	50	48.3	I-S
GS/SM 92-14	----	40	30	75	48.3	J-S
GS/SM 92-01	----	30	75	45	50.0	H-R
D.2787 + Fluazinam	8 fl oz + 2 fl oz	40	50	30	50.0	H-R
Calo-Gran	6 lbs	35	75	45	51.7	F-Q
ICIA 5504 (WF 1594)	5 gm ai	50	35	70	51.7	G-Q
LAD + X-77	100 ppm + 0.1% v/v	40	35	85	53.3	F-P
GS/SM 92-08	----	50	40	75	55.0	E-P
GS/SM 92-11	----	75	65	25	55.0	E-P
ICIA 5504 (JF 12795)	5 gm ai	70	65	35	56.7	D-O
D.2787 + ASC 67103	8 fl oz + 1.25 fl oz	45	45	85	58.3	C-O
D.2787	8 fl oz	75	80	30	61.7	B-O
ICIA 5504 (WF 1594)	2.5 gm ai	60	40	98	66.0	A-N
D.2787 + ASC 67106	8 fl oz + 0.33 oz	35	75	90	66.7	A-N
Prostar (NA 313/01)	2.5 oz ai	85	65	55	68.3	A-M
Ch.26019(WDG) + Terraclor	2 oz + 4 oz	65	75	65	68.3	A-M
GS/SM 92-09	----	60	50	98	69.3	A-L
GS/SM 92-18 + Fertilizer (18-4-10)	---- + 1 lb N (nitrogen)	85	40	85	70.0	A-L
EXP 10364A	4 fl oz	95	85	35	71.7	A-L

Treatment	Rate/1000 ft[2c]	I	II	III	Avg	DMR (.05)[a]
GS/SM 92-10	----	80	40	95	71.7	A-L
CGA-173506	7 gm ai	75	80	65	73.3	A-K
GS/SM 92-18	----	90	35	98	74.3	A-K
Banner	2 fl oz	80	75	70	75.0	A-K
Rubigan + D.2787	2 fl oz + 8 fl oz	85	60	98	81.0	A-J
Bayleton	2 oz	80	65	100	81.7	A-J
RH-7592	0.5 fl oz	95	85	65	81.7	A-J
Curalan + D.2787	1 oz ai + 3 oz ai	75	75	95	81.7	A-J
EXP 10364A	3 fl oz	75	80	98	84.3	A-I
UBI 4040	5 lbs	98	80	75	84.3	A-I
Ch.26019 (WDG) + D.2787	4 oz + 8 fl oz	70	95	90	85.0	A-H
Bayleton + D.2787	2 oz + 8 fl oz	70	90	95	85.0	A-H
ICIA 5504 (JF 12795)	2.5 gm ai	90	75	95	86.7	A-G
Prostar (NA 248/04)	3 oz ai	95	70	98	87.7	A-F
Prostar (NA 248/04) + X-77	3 oz ai + 0.1% v/v	80	90	98	89.3	A-E
Curalan	1 oz ai	85	95	95	91.7	A-D
Ch.26019 (WDG) + D.2787	2 oz + 8 fl oz	85	95	95	91.7	A-D
Eagle	0.63 oz	95	85	95	91.7	A-D
Terraclor (G)	7.5 lbs	90	90	98	92.7	A-D
GS/SM 92-17	----	95	90	95	93.3	A-C
GS/SM 92-17 + Fertilizer (18-4-10)	---- + 1 lb N	98	98	90	95.3	A-C
Fertilizer (18-4-10)	1 lb N	98	98	90	95.3	AB
Rubigan	2 fl oz	95	98	95	96.0	AB
Control	----	100	95	100	98.3	A
Phyton 27	2.5 fl oz/5 gal	98	100	98	98.7	A

[a]Treatments followed by the same letter are not significantly different from each other at the 5% level.
[b]Due to intermingled infection, separate disease ratings were not feasible.
[c]Rates listed are formulation unless listed as active ingredient (ai).

Table 2. Snow Mold Fungicide Study #2 - 1993

Birchwood Farms Resort
Harbor Springs, MI

Rating Scale: Percent plot area infected by pink snow mold (*Microdochium nivale*) and gray snow mold (*Typhula ishikariensis*).[b]
Rating Date: 4/14/93

Treatment	Rate/1000 ft^{2c}	I	II	III	Avg	DMR (.05)[a]
GS/SM 92-16	----	1	0	1	0.7	U
GS/SM 92-14	----	1	1	1	1.0	U
GS/SM 92-15	----	0	1	2	1.0	TU
GS/SM 92-04	----	0	1	3	1.3	TU
GS/SM 92-06	----	1	0	3	1.3	TU
CGA 173506 + Banner	7 gm ai + 8 gm ai	2	0	3	1.7	TU
Cleary PCNB + Spotrete + Greenzit	6 oz + 6 fl oz + 6 fl oz	0	2	3	1.7	TU
GS/SM 92-01	----	5	2	0	2.3	STU
Scotts F+FII	2x	1	7	3	3.7	STU
GS/SM 92-02	----	0	7	5	4.0	STU
GS/SM 92-05	----	0	3	10	4.3	STU
GS/SM 92-13	----	1	5	20	8.7	R-U
CGA 173506 + Banner	3.5 gm ai + 8 gm ai	3	3	20	8.7	R-U
Terraclor	8 oz	5	20	5	10.0	R-U
GS/SM 92-03	----	0	5	30	11.7	Q-U
Ch.26019 + Terraclor + D.2787	2 oz + 2 oz + 4 fl oz	1	5	35	13.7	P-U
Ch.26019 + Terraclor	2 oz + 4 oz	1	35	10	15.3	P-U
UBI 1876	12 fl oz	25	1	20	15.3	P-U
Calo-Clor	3 oz	15	30	25	23.3	O-T
Scotts F + FII	1x	2	20	50	24.0	N-S
CGA 173506	7 gm ai	30	30	25	28.3	N-R
D.2787 + Fluazinam	8 fl oz + 3 fl oz	15	35	40	30.0	M-R
D.2787 + Fluazinam	8 fl oz + 2 fl oz	40	40	15	31.7	M-Q
ICIA 5504 (JF12795)	10 gm ai	30	35	35	33.3	M-P
ICIA 5504 (WF1594)	10 gm ai	40	50	25	38.3	L-O
Banner + D.2787	2 fl oz + 8 fl oz	40	40	40	40.0	L-O
EXP 10364A	4 fl oz	60	35	35	43.3	K-O
GS/SM 92-18	----	40	35	60	45.0	J-N
GS/SM 92-12	----	30	35	85	50.0	I-M
ICIA 5504 (WF 1594)	2.5 gm ai	70	35	65	56.7	H-L
ICIA 5504 (JF12795)	5 gm ai	40	75	70	61.7	G-K
Bayleton + D.2787	2 oz + 8 fl oz	60	70	55	61.7	G-K
GS/SM 92-08	----	30	85	80	65.0	F-J
GS/SM 92-09	----	55	60	85	66.7	E-I
D.2787 + ASC 67103	8 fl oz + 1.25 oz	60	65	75	66.7	E-I
Banner	2 fl oz	60	70	75	68.3	D-I
GS/SM 92-18 + 18-4-10	1 lb N (nitrogen)	65	70	70	68.3	D-I
GS/SM 92-10	----	40	80	90	70.0	C-I
ICIA 5504 (WF1594)	5 gm ai	65	55	95	71.7	C-I
Calo-Gran	6 lbs	70	80	65	71.7	C-I
GS/SM 92-11	----	45	90	80	71.7	C-I
Ch.26019 (WDG) + D.2787	4 oz + 8 oz	80	65	75	73.3	B-H

Treatment	Rate/1000 ft^{2c}	I	II	III	Avg	DMR (.05)[a]
GS/SM 92-17	----	65	80	75	73.3	B-H
GS/SM 92-17 + 18-4-10	---- + 1 lb N	75	70	85	76.7	A-H
ICIA 5504 (JF12795)	2.5 gm ai	75	65	90	76.7	A-H
Curalan + D.2787	1 oz ai + 3 oz ai	90	60	85	78.3	A-H
EXP 10364A	3 fl oz	75	85	80	80.0	A-G
Rubigan + D.2787	2 fl oz + 8 fl oz	85	90	80	85.0	A-F
Prostar (NA 313/01)	2.5 oz ai	85	90	80	85.0	A-F
Ch.26019 + D.2787	2 fl oz + 8 fl oz	85	80	90	85.0	A-F
RH 7592	0.5 fl oz	95	95	65	85.0	A-F
UBI 4040	5 lbs	95	80	85	86.7	A-F
D.2787	8 fl oz	75	90	95	86.7	A-F
Bayleton	2 oz	75	95	95	88.3	A-E
Curalan	1 oz ai	98	95	75	89.3	A-D
D.2787 + ASC 67106	8 fl oz + 0.33 oz	90	95	90	91.7	ABC
KLM liquid	2x	90	100	95	95.0	AB
KLM compost	2x	98	98	90	95.3	AB
Rubigan	2 fl oz	95	95	98	96.0	A
Terraclor (G)	7.5 lbs	95	95	98	96.0	A
Phyton 27	2.5 fl oz/5 gal	90	98	100	96.0	A
KLM liquid	1x	98	99	98	98.3	A
Eagle	0.63 oz	98	99	98	98.3	A
Prostar (NA 248/04) + X-77	3 oz ai + 0.1% v/v	100	95	100	98.3	A
Control	----	98	98	100	98.7	A
Fertilizer (18-4-10)	1 lb N	98	98	100	98.7	A
KLM compost	1x	98	100	100	99.3	A
Prostar (NA 248/04)	3 oz ai	98	100	100	99.3	A

[a]Treatments followed by the same letter are not significantly different from each other at the 5% level.
[b]Due to intermingled infection, separate disease ratings were not feasible.
[c]Rates listed are formulation, unless listed as active ingredient (ai).

SUMMER PATCH FUNGICIDE STUDIES - 1993

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" depth at the Hancock Turfgrass Research Center in East Lansing, Michigan. Studies were established on irrigated, annual bluegrass (*Poa annua*) fairways on three golf courses in Michigan where disease was present in previous years. All treatments were applied prior to disease occurrence with reapplication taking place at the intervals listed in the data tables (Tables 4 and 5). Liquid treatments were applied foliarly (unirrigated) while granular treatments were pre-weighed and hand applied. The fairways were maintained at ½" height of cut and were fertilized at ¼-½ lb. N/mo. (except treatments which included fertilizer). These areas were treated for insects, however, no general maintenance fungicides were applied to the study areas. Application equipment and procedures were as previously described. Application intervals and frequencies were occasionally altered from contract protocols in order to conform to our standard recommendations for preventive control of summer patch.

No objectional phytotoxicity was observed in the summer patch studies this year, although a number of treatments did produce a greening effect in the turf, as noted in the data tables. These effects were subtle and had largely abated by the September ratings.

Summer Patch Fungicide Study #1, Dearborn Country Club, Dearborn, Michigan

The summer patch fungicide study at Dearborn Country Club was initiated preventively on 5/11/93, with most fungicide treatments being reapplied on 6/7/93 and the fertilizer treatments being reapplied bi-weekly throughout the summer (exceptions are noted in the data table). As indicated in Table 4, a few fungicide treatments were applied initially when the soil temperature reached 75°F at a 2" depth (6/7/93), with reapplication 30 days later (7/8/93).

Disease pressure was mild this year with symptom development beginning later in the season than normal, which resulted in less extensive turf loss than usual by seasons end. Disease pressure peaked in this study around 9/1/93, when the data in Table 3 was taken.

As the data indicates, many standard and experimental products gave statistically significant control of summer patch in this study when compared to the untreated control. Because overall disease pressure in this study was relatively low this year, some products were more effective in controlling the disease than might be expected under greater disease pressure. Nevertheless, the commonly used standard summer patch controls (Rubigan, Banner, Bayleton) performed very well again this year. Sentinel, RH 7592 and EXP 10064C also looked very good in this trial, suggesting that promising new products for the control of this disease are under development.

Summer Patch Fungicide Study #2, Twin Beach Golf Club, West Bloomfield, Michigan

The summer patch fungicide study at Twin Beach Golf Club was initiated preventively on 5/14/93, with most fungicide treatments being reapplied on 6/11/93, while the fertilizer treatments were reapplied bi-weekly throughout the summer (exceptions are noted in the data table). As Table 4 indicates, a few fungicide treatments were initiated when the soil temperature reached 75°F at a 2" depth (6/11/93) with reapplication 30 days later (7/9/93).

As at Dearborn, disease pressure in the Twin Beach study was moderate this year with symptoms appearing almost a month later than normal and abating earlier then expected. Because the period of disease development was short, turf loss was limited to about 25% in the controls. As in the Dearborn study, relatively low disease presence resulted in limited statistical differentiation between most treatments, however, most treatments gave statistically significant disease control compared to the untreated controls.

Table 3. Summer Patch Fungicide Study #1 - 1993

Dearborn Country Club
Dearborn, Michigan

Rating Scale: Percent plot area infected by *Magnaporthe poae.*
Rating Date: 9/1/93

Treatment[c]	Rate/1000 ft[2b]	Application Interval (Date)	I	II	III	Avg	DMR[a]
Sentinel	0.167 oz	65° + 30 days (5/11, 6/7)	0	0	2	0.7	H
Sentinel	0.25 oz	65° + 30 days	[c]3	[c]0	[c]0	1.0	H
Rubigan	4 fl oz	75° + 30 days (6/7, 7/8)	0	2	1	1.0	H
Banner	4 fl oz	75° + 30 days	3	1	0	1.3	H
EXP 10307A	4 fl oz	65° + 30 days	3	2	0	1.7	GH

Treatment[c]	Rate/1000 ft[2b]	Application Interval (Date)	I	II	III	Avg	DMR[a]
Bayleton & FP 0492 + Urea	2 oz & 1 fl oz + ¼ lb N (nitrogen)	65° + 30 days & 14 days	5	1	0	2.0	GH
Banner & Panasea Plus	4 fl oz & 4 fl oz	65° + 30 days & monthly	3	3	0	2.0	GH
RH 7592 + Latron B1956	0.5 fl oz & 0.06% v/v	65° + 30 days	7	0	0	2.3	FGH
Bayleton & Urea	2 oz + ¼ lb N	65° + 30 days & 14 days	2	3	3	2.7	FGH
Bayleton & Astron Plus + Urea	1 fl oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	1	7	0	2.7	FGH
EXP 10064C	2 fl oz	65° + 30 days	5	2	1	2.7	FGH
EXP 10307A + EXP 02164B	3 fl oz + 2.4 fl oz	65° + 30 days	5	3	0	2.7	FGH
Banner	4 fl oz	65° + 30 days	7	1	0	2.7	FGH
EXP 10307A + EXP 02164B	4 fl oz + 3.2 fl oz	65° + 30 days	[e]5	[e]5	[e]0	3.3	E-H
Banner & Panasea Plus	2 fl oz & 4 fl oz	65° + 30 days & monthly	5	5	0	3.3	E-H
Bayleton & Urea	0.5 oz & ¼ lb N	65° + 30 days & 14 days	10	2	2	4.7	D-H
Banner	1 fl oz	65° + 30 days	1	10	5	5.3	D-H
Bayleton	2 oz	65° + 30 days	15	1	0	5.3	D-H
Rubigan	4 fl oz	65° + 30 days	15	2	0	5.3	D-H
Bayleton & Astron Plus + Urea	½ oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	10	7	2	6.3	B-H
Banner & Panasea Plus	1 fl oz & 4 fl oz	65° + 30 days & monthly	10	10	0	6.7	B-H
D 2787 + ASC 67135	4 fl oz + 2 fl oz	65° + 30 days	7	10	3	6.7	B-H
EXP 10307A	3 fl oz	65° + 30 days	10	10	0	6.7	B-H
Bayleton & Panasea Plus	1 oz & 4 fl oz	65° + 30 days & monthly	0	15	7	7.3	B-H
Bayleton & Panasea Plus	2 oz & 4 fl oz	65° + 30 days & monthly	15	7	0	7.3	B-H
Bayleton	1 oz	65° + 30 days	5	7	10	7.3	B-H
Bayleton & Astron Plus + Urea	2 oz & 4 fl oz + ¼ lb N	65° + 30 days & 14 days	20	5	0	8.3	B-H
Eagle	0.6 oz	65° + 30 days	15	10	0	8.3	B-H
Bayleton & Panasea Plus	0.5 oz & 4 fl oz	65° + 30 days	15	10	1	8.7	B-H
D.2787 + ASC 67103	6 fl oz + 16 ml	65° + 30 days	25	1	1	9.0	B-H
Fluazinam	1 fl oz	65° + 30 days	20	7	1	9.3	B-H
FP 0492 + Urea	1 fl oz + ¼ lb N	14 days (5/11)	25	2	1	9.3	B-H
Bayleton & FP 0492 + Urea	1 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	25	2	2	9.7	B-H
Astron Plus + Urea	1 fl oz + ¼ lb N	14 days	20	10	0	10.0	B-H
FP 0492 + Urea	1 fl oz	14 days	10	20	0	10.0	B-H
RH 0611	6 oz	65° + 30 days	15	15	0	10.0	B-H
Fluazinam	2 fl oz	65° + 30 days	5	25	1	10.3	B-H
Bayleton	2 oz	75° + 30 days	10	20	1	10.3	B-H
Turf Restore(10-2-6)[d]	½ lb N	30 days	10	7	15	10.7	B-H
Thatch X Blank	3 lbs	6/28, 7/30	25	3	7	11.7	B-H

Treatment[c]	Rate/1000 ft[2b]	Application Interval (Date)	I	II	III	Avg	DMR[a]
Herbruck Fertilizer	½ lb N	30 days	20	7	10	12.3	B-H
Bayleton	0.5 oz	65° + 30 days	25	10	3	12.7	B-H
ASC 67098X	6 oz	65° + 30 days	35	5	3	14.3	A-G
Thatch X	3 lbs	6/28, 7/30	30	10	5	15.0	A-F
E.I. DS (Strain #16)	3 lbs	6/28, 7/30	15	20	10	15.0	A-F
Bayleton & FP 0492 + Urea	.5 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	35	10	2	15.7	A-E
Panasea Plus	4 fl oz	30 days	35	10	2	15.7	A-E
Bayleton & Urea	1 oz & ¼ lb N	65° + 30 days & 14 days	25	25	0	16.7	A-D
E.I. DS (Strain #5)	3 lbs	6/28 only	7	20	25	17.3	A-D
Turf Restore[d]	¼ lb N	30 days	15	20	20	18.3	ABC
Ch.26019 (WDG)	4 oz	65° + 30 days	15	40	1	18.7	AB
Control	--	--	25	25	25	25.0	A

[a]Treatments followed by the same letter are not significantly different from each other at the 10% level.
[b]Rates are formulation.
[c]Deleted treatments are proprietary.
[d]Applied initially on 6/7/93.
[e]Mild greening observed, especially earlier in season.

Table 4. Summer Patch Fungicide Study #2 - 1993

Twin Beach Golf Club
West Bloomfield, Michigan

Rating Scale: Percent plot area infected by *Magnaporthe poae*.
Rating Date: 9/4/93

Treatment[c]	Rate/1000 ft[2b]	Application Interval (Date)	I	II	III	Avg	DMR[a]
EXP 10064C	2 fl oz	65° + 30 days (5/14, 6/11)	0	0	0	0	F
EXP 10307A + EXP 02164B	4 fl oz + 3.2 fl oz	65° + 30 days (5/14, 6/11)	[e]1	[e]0	[e]0	0.3	F
EXP 10307A	3 fl oz	65° + 30 days	2	0	0	0.7	F
EXP 10307A	4 fl oz	65° + 30 days	0	0	2	0.7	F
Banner	4 fl oz	75° + 30 days (6/11, 7/9)	2	0	0	0.7	F
Bayleton & Urea	2 oz & ¼ lb N (nitrogen)	65° + 30 days & 14 days	3	0	0	1.0	F
RH 7592 + Latron B1956	0.5 fl oz + 0.06% v/v	65° + 30 days	1	0	2	1.0	F
Banner & Panasea Plus	4 fl oz & 4 fl oz	65° + 30 days & 28 days	0	5	0	1.7	EF
Sentinel	0.25 oz	65° + 30 days	[e]1	[e]2	[e]2	1.7	EF
ASC 67098-X	6 oz	65° + 30 days	1	2	3	2.0	EF
Eagle	0.6 oz	65° + 30 days	2	2	2	2.0	EF
Banner & Panasea Plus	2 fl oz & 4 fl oz	65° + 30 days & monthly	2	2	3	2.3	EF
Sentinel	0.167 oz	65° + 30 days	1	5	1	2.3	EF
Bayleton	2 oz	65° + 30 days	3	3	1	2.3	EF

Treatment[c]	Rate/1000 ft^{2b}	Application Interval (Date)	I	II	III	Avg	DMR[a]
Rubigan	4 fl oz	65° + 30 days	5	2	1	2.7	DEF
Banner	4 fl oz	65° + 30 days	5	2	1	2.7	DEF
Turf Restore (10-2-6)[d]	½ lb N	monthly	3	5	0	2.7	DEF
Bayleton & FP 0492 + Urea	2 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	2	5	2	3.0	DEF
Banner	1 fl oz	65° + 30 days	7	0	2	3.0	DEF
Bayleton & Astron Plus + Urea	0.5 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	0	0	10	3.3	DEF
Bayleton & Panasea Plus	2 oz & 4 fl oz	65° + 30 days & monthly	0	3	10	4.3	C-F
Bayleton	2 oz	75° + 30 days	10	3	1	4.7	C-F
Bayleton & Panasea Plus	1 oz & 4 fl oz	65° + 30 days & monthly	0	5	10	5.0	C-F
Bayleton & Urea	1 oz & ¼ lb N	65° + 30 days & 14 days	5	7	5	5.7	C-F
Banner & Panasea Plus	1 fl oz & 4 fl oz	65° + 30 days & monthly	7	7	3	5.7	C-F
Ch.26019 (WDG)	4 oz	65° + 30 days	5	10	5	6.7	C-F
D.2787 + ASC 67103	6 fl oz + 16 ml	65° + 30 days	10	5	5	6.7	C-F
Rubigan	4 fl oz	75° + 30 days	3	3	15	7.0	C-F
Astron Plus + Urea	1 fl oz + ¼ lb N	14 days	2	10	10	7.3	C-F
EXP 10307A + EXP 02164B	3 fl oz + 2.4 fl oz	65° + 30 days	0	3	20	7.7	C-F
Bayleton & Astron Plus + Urea	2 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	15	5	3	7.7	C-F
Herbruck Fertilizer	½ lb N	monthly	10	3	10	7.7	C-F
Bayleton & Panasea Plus	0.5 oz & 4 fl oz	65° + 30 days & monthly	5	5	15	8.3	B-F
Bayleton & Astron Plus + Urea	1 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	7	10	10	9.0	B-F
Bayleton & FP 0492 + Urea	1 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	10	7	10	9.0	B-F
ASC 67098X	6 oz	65° + 30 days	5	7	15	9.0	B-F
Turf Restore[d]	¼ lb N	monthly	25	0	3	9.3	B-F
E.I. DS (Strain #5)	3 lbs	5/28, 6/28	1	3	25	9.7	B-F
Panasea Plus	4 fl oz	monthly	2	3	25	10.0	B-F
Thatch X	3 lbs	5/28, 6/28, 8/6	15	5	10	10.0	B-F
RH-0611	6 oz	65° + 30 days	0	2	30	10.7	B-F
Bayleton & FP 0492 + Urea	0.5 oz & 1 fl oz + ¼ lb N	65° + 30 days & 14 days	25	5	3	11.0	B-F
Fluazinam	1 fl oz	65° + 30 days	20	3	10	11.0	B-F
FP 0492 + Urea	1 fl oz + ¼ lb N	14 days	7	3	25	11.7	B-F
Bayleton & Urea	0.5 oz & ¼ lb N	65° + 30 days & 14 days	10	3	25	12.7	A-F
Banner	2 fl oz	65° + 30 days	0	20	20	13.3	A-F
Bayleton	0.5 oz	65° + 30 days	20	20	2	14.0	A-F
E.I. DS (Strain #16)	3 lbs	5/28, 6/28, 8/6	10	2	35	15.7	A-E
Fluazinam	2 fl oz	65° + 30 days	20	10	20	16.7	A-D
Thatch X Blank	3 lbs	5/28, 6/28, 8/6	7	30	15	17.3	ABC

Treatment[c]	Rate/1000 ft[2b]	Application Interval (Date)	I	II	III	Avg	DMR[a]
Bayleton	1 oz	65° + 30 days	25	15	25	21.7	AB
Control	--	--	15	25	35	25.0	A

[a]Treatments followed by same letter are not significantly different from each other at the 5% level.
[b]Rates are formulation.
[c]Deleted treatments are proprietary.
[d]Applied initially on 6/11/93.
[e]Mild greening of turf observed, especially earlier in season.

DOLLAR SPOT FUNGICIDE TRIAL - 1993

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

The 1993 dollar spot (*Sclerotinia homoeocarpa*) fungicide trial was conducted on an irrigated Emerald creeping bentgrass/annual bluegrass putting green at the Hancock Turfgrass Research Center on the Michigan State University campus in East Lansing, Michigan. The green was maintained at ¼" height of cut and was fertilized at ¼ # N/mo. Treatments were applied curatively to 2' x 9' plots in three replications of a random block design on 7, 10, 14, 21, or 28 day schedule as indicated in the data tables (Table 5), beginning on 8/4/93. By the date of the last rating (10/11/93) the weekly treatments had been applied 10 times, the 10-day treatments had been applied 7 times, the 14-day treatments were applied 5 times, the 21-day treatments were applied 3 times, and the 28-day treatments were applied 3 times.

Disease pressure was moderate this year and developed somewhat unevenly in the study. As the data in Table 5 indicates, however, most treatments gave statistically significant control of dollar spot when compared to the untreated controls. The Anderson 373-376 treatments were initially applied curatively on 9/3 and failed to perform as well as expected due to the early onset of turf dormancy. The dollar spot strains in this plot area are benzimidazole-resistant and have also traditionally exhibited low-level resistance to the dicarboximide fungicides (Chipco 26019, Curalan, etc.)

Table 5. Dollar Spot Fungicide Study - 1993

Hancock Turfgrass Research Center
Michigan State University
East Lansing, Michigan

Rating Scale: 0 = no disease, 10 = 100% of plot diseased
Rating Date: 10/11/93

Treatment[c]	Rate/1000 ft[2b]	Interval	I	II	III	Avg	DMR (.05)[a]
Fluazinam	1 fl oz	21 days	0	0	0	0	H
ASC 67098Z	6 oz	28 days	0	0	0	0	H
ASC 67098X	3 oz	14 days	0	0	0	0	H
D.2787 + ASC 67135	4 fl oz + 2 fl oz	21 days	0	0	0	0	H
Rubigan	1.5 fl oz	14 days	0	0	0	0	H
Thalonil	3 oz	10 days	0	0	0	0	H
TRA 0028	5.4 fl oz	10 days	0	0	0	0	H

Treatment[c]	Rate/1000 ft[2b]	Interval	I	II	III	Avg	DMR (.05)[a]
Banner	0.1376 oz ai	14 days	0	0	0	0	H
Banner + ICIA 5504	0.2752 oz ai + 0.1764 oz ai	28 days	0	0	0	0	H
Banner + ICIA 5504	0.2752 oz ai + 0.1764 oz ai	14 days	0	0	0	0	H
Curalan (DF)	1 oz ai	21 days	0	0	0	0	H
Bayleton + D.2787	0.25 oz + 3 fl oz	14 days	0	0	0	0	H
Bayleton + D.2787	0.5 oz + 4 fl oz	21 days	0	0	0	0	H
Bayleton + Curalan	0.5 oz + 0.5 fl oz	21 days	0	0	0	0	H
Bayleton + Curalan	0.75 oz + 0.75 fl oz	28 days	0	0	0	0	H
D.2787	6 fl oz	14 days	0	0	0	0	H
Bayleton	2 oz	28 days	0	0	0	0	H
Daconil SDG	3.8 oz	14 days	0	1	0	0.3	GH
EXP 10307A + EXP 02164B	1.5 fl oz + 1.5 fl oz	28 days	1	0	0	0.3	GH
Banner	2 fl oz	28 days	1	0	0	0.3	GH
EXP 10064C	1 oz	28 days	1	1	0	0.7	F-H
EXP 10307A	2 oz	28 days	1	1	0	0.7	F-H
EXP 10307A + EXP 02164B	1 fl oz + 1 fl oz	28 days	1	1	0	0.7	F-H
EXP 10512A	1.6 fl oz	28 days	1	1	0	0.7	F-H
FCI 6444	5 oz ai	7 days	[f]1	[f]1	[f]0	0.7	F-H
Ch.26019 (WDG)	2 oz	28 days	1	1	1	1.0	E-H
Sentinel	0.167 oz	28 days	1	1	1	1.0	E-H
S-4404	0.25 oz ai	28 days	1	1	1	1.0	E-H
EXP 10512A	0.8 oz	28 days	2	1	1	1.3	E-H
Banner	2 gm ai	28 days	2	1	1	1.3	E-H
CGA 173506 + Banner	1.75 gm ai + 2 gm ai	28 days	2	1	1	1.3	E-H
CGA 173506 + Banner	3.5 gm ai + 2 gm ai	28 days	2	1	1	1.3	E-H
Banner + ICIA 5504	0.1376 oz ai + 0.1764 oz ai	28 days	2	1	1	1.3	E-H
FCI 6444	2 oz ai	7 days	[e]3	[e]2	[e]0	1.7	D-G
EXP 10307A	1 fl oz	28 days	3	1	1	1.7	D-G
AND. 375[g]	4 lbs	14 days	2	3	1	2.0	C-F
S-4404	0.125 oz ai	28 days	3	2	2	2.3	B-E
AND. 374[g]	4 lbs	14 days	4	2	2	2.7	B-D
CGA 173506	3.5 gm ai	28 days	3	4	1	2.7	B-D
ICIA 5504	0.1764 oz ai	14 days	3	2	3	2.7	B-D
FCI 6444	1 oz ai	7 days	5	3	1	3.0	BC
AND. 376[g]	4 lbs	14 days	3	3	3	3.0	BC
Control	--	--	4	3	3	3.3	B
AND. 373[g]	4 lbs	14 days	5	3	2	3.3	B
Panasea Plus + Trypt.	4 fl oz	28 days	5	3	2	3.3	B
Panasea Plus	4 fl oz	28 days	4	3	3	3.3	B
FCI 6444	0.5 oz ai	7 days	6	2	3	3.7	AB
Thatch X Blank	3 lbs	28 days	5	2	4	3.7	AB
E.I. DS (Strain #16)	3 lbs	28 days	5	2	4	3.7	AB

Treatment[c]	Rate/1000 ft[2b]	Interval	I	II	III	Avg	DMR (.05)[a]
Thatch X + Trypt.	3 lbs	28 days	5	3	3	3.7	AB
Thatch X	3 lbs	28 days	5	6	3	4.7	A

[a]Treatments followed by the same letter are not significantly different from each other at the 5% level.
[b]Rates listed are formulation unless listed as active ingredient (ai).
[c]Deleted treatments are proprietary.
[e]Moderately severe phytotoxicity observed.
[f]Severe phytotoxicity observed.
[g]Treatments initiated curatively on 9/3.

NECROTIC RING SPOT FUNGICIDE STUDIES - 1993

Two necrotic ring spot (*Leptosphaeria korrae*) studies were conducted this year; one on a commercial lawn site in Grand Rapids, and another on a similar site in Lansing. Both sites consisted of diseased Kentucky bluegrass turf which was automatically irrigated and was fertilized at ½ lb N./1000 ft^2/mo., except as noted on the data tables.

Initial applications were made on symptomatic turf with necrotic ring spot patches from previous disease activity on 5/28/93 (fertilizers and natural products) and 8/28/93 (fungicides) at the Lansing site and on 6/19/93 and 7/24/93, respectively, on the Grand Rapids site. Fertilizer and natural product applications were made on monthly schedules through October on both sites. The fungicides were reapplied approximately a month after the initial applications. Liquid applications were made as foliar sprays as previously described in this report while granular products were preweighed and hand applied to the 6' x 9' plots.

As Table 6 indicate, disease severity is inversely correlated to fertility level. At somewhat elevated nitrogen levels of 1 lb/1000 ft^2/mo., Turf Restore and IBDU fertilizers provided virtually total control of patch symptoms. Statistically similar levels of disease control were achieved with lower levels of fertility (½ lb nitrogen/1000 ft^2/mo.) combined with experimental fungicides such as ASC 67103, EXP 10307A, EXP 02164B, ASC 67098-X, Eagle, etc.

No phytotoxicity or significant turf greening was observed at any time in either of these studies, however, overall turf quality and density was best in the Turf Restore and IBDU plots.

Table 6. Necrotic Ring Spot Study (Lansing Site) - 1993

Rating Scale: percent recovery/plot from pretreatment disease levels
Rating Date: 9/10/93

Treatment	Rate/1000 ft^2	I	II	III	IV	Avg	DMR (.1)[a]
IBDU Fertilizer	1 lb N (nitrogen)/mo	100	100	100	100	100.0	A
Turf Restore	1 lb N/mo	100	96.0	100	94.0	97.5	AB
ASC 67098-X	6 oz	85	100	100	100	96.3	ABC A-D
D.2787 + ASC 67103	6 fl oz + 16 ml	80	90	100	100	92.5	A-E
EXP 10307A + EXP 02164B	3 fl oz + 2.4 fl oz	100	66.7	100	100	91.7	A-E
Eagle	0.6 oz	100	100	53.3	100	88.3	A-E
Thatch X Blank	3 lbs/mo	75	85.7	82.5	90	83.3	A-F
Thatch X	3 lbs/mo	71.4	66.7	90	88	79.0	A-G
D.2787 + ASC 67135	4 fl oz + 2 oz	100	40	88	76	76.0	A-G

Treatment	Rate/1000 ft^2	I	II	III	IV	Avg	DMR (.1)[a]
RH 7592 + Latron B 1956	0.5 fl oz + 0.06% v/v	100	66.7	75	50	72.9	A-H
RH 0611	6 oz	80	100	60	50	72.5	A-H
E.I. DS (Strain #16)	3 lbs/mo	87.5	66.7	37.5	83.3	68.8	A-I
EXP 10307A	4 fl oz	50	50	66.7	100	66.7	B-I
EXP 10307A + EXP 02164B	4 fl oz + 3.2 fl oz	33.3	37.5	90	100	65.2	C-I
Fluazinam	2 fl oz	20	75	65	100	65.0	C-I
Banner	4 fl oz	40	100	75	40	63.8	D-I
EXP 10064C	2 fl oz	100	75	20	50	61.3	E-I
Banner	2 fl oz	28.6	37.5	100	60	56.5	F-I
Rubigan	4 fl oz	14.3	66.7	86.7	50	54.4	F-J
EXP 10307A	3 fl oz	25	46.7	60	85	54.2	F-J
Control (fertilized)	--	57.1	33.3	25	53.3	42.2	H-J
Fluazinam	1 fl oz	42.9	60	20	42.9	41.5	H-J
Herbruck Fertilizer	1 lb N/mo	41.7	6.7	50	60	39.6	IJ
Ch.26019 (WDG)	4 oz	16.7	50	33.3	0	25.0	J
Control (unfertilized)	--	0	0	-20	0	-5.0	K

[a]Treatments followed by the same letter are not significantly different from each other at the 10% level.

COMPOUNDS TESTED IN 1992-93 SEASON

Product	Formulation	Manufacturer
AND. 373 - AND. 376	N/A	The Andersons
ASC 67098-X	N/A	ISK Biotech
ASC 67098-Z	N/A	ISK Biotech
ASC 67103	N/A	ISK Biotech
ASC 67106	N/A	ISK Biotech
ASC 67135	N/A	ISK Biotech
Astron Plus	N/A	Floratine Products
Banner	1.1 EC	Ciba Geigy Corp
Bayleton	25 DF	Miles Corp
Calo Clor	90 W	Grace Sierra
Calo Gran	2.7 G	Grace Sierra
CGA 173506	75 WG	Ciba Geigy Corp
Chipco 26019	25 F	Rhone Poulenc
Chipco 26019 (WDG)	50 WDG	Rhone Poulenc
Cleary PCNB	75 WP	W.A. Cleary Chemical Corp
Curalan (DF)	50 DF	BASF Corp
Curalan	4.17 F	BASF Corp
Daconil 2787	40.4 F	ISK Biotech
Daconil SDG	N/A	ISK Biotech
Eagle	40 W	Rohm & Haas
E.I. DS (Strain #5)	N/A	Emerald Isle/Ocean Organics
E.I. DS (Strain #16)	N/A	Emerald Isle/Ocean Organics
EXP 02164B	45 C	Rhone Poulenc
EXP 10064C	1.67 SC	Rhone Poulenc
EXP 10307A	0.84 SC	Rhone Poulenc

Product	Formulation	Manufacturer
EXP 10364A	3.3 F	Rhone Poulenc
FCI-6444	N/A	Fermone Corp
Fertilizer (18-4-10)	G	Lebanon (Country Club)
Fluazinam	500 F	ISK Biotech
FP 0492	N/A	Floratine Products
Greenzit	N/A	W.A. Cleary Chemical Corp
GS-SM-01-GS-SM-18	N/A	Grace Sierra
Herbruck Fertilizer	10-2-10	Herbruck's
IBDU Fertilizer	31-0-0	Vigoro
ICIA 5504	50 WG	Zeneca Ag Products
ICIA 5504 (JFR 795)	N/A	Zeneca Ag Prods
ICIA 5504 (WF 1594)	N/A	Zeneca Ag Prods
ICIA 5504 (JF 12795)	N/A	Zeneca Ag Prods
KLM Liquid	N/A	Bio Grounds Keeper, Inc
KLM Compost	N/A	Bio Grounds Keeper, Inc
LAD	N/A	Vigoro, Inc
Latron B-1956	N/A	Rohm & Haas
Panasea Plus	N/A	Emerald Isle
Panasea Plus + Tryptophan	N/A	Emerald Isle
Phyton 27	N/A	Source Technology Biologicals, Inc
Prostar (NA 248/04)	70 WP	Nor-Am Chemical Corp
Prostar (NA 313/01)	70 WP	Nor-Am Chemical Corp
RH 0611	62.3 WP	Rohm & Haas
RH 7592	2 F	Rohm & Haas
Rubigan	1.1 F	Dow Elanco
S-4404	N/A	O.M. Scotts & Sons
Scotts FF II	14-3-3 fertilizer, 15.4% PCNB	O.M. Scotts & Sons
Sentinel	40 WG	Sandoz Agro, Inc
Spotrete	75 WDG	W.A. Cleary Chemical Corp
Terraclor	75 WP	Uniroyal Chemical Co
Terraclor (G)	10 G	Uniroyal Chemical Co
Thalonil	N/A	Terra International
Thatch X	N/A	Emerald Isle/Ocean Organics
Thatch X Blank	N/A	Emerald Isle/Ocean Organics
TRA 0028	N/A	Terra International
Turf Restore	10-2-6 fertilizer	Ringer Corp
UBI 1876	N/A	Uniroyal Chemical Co
UBI 4040	N/A	Uniroyal Chemical Co
Urea	46-0-0 fertilizer	The Andersons
X-77	surfactant	Nor-Am Chemical Corp