

Turfgrass Disease Management Report 1988-89

Department of Botany & Plant Pathology and Pesticide Research Center
Michigan State University, East Lansing, MI

J.M. Vargas, Jr., R. Detweiler, R. Golembiewski, B. Melvin, M. Slater

Snow Mold Fungicide Trial - 1988-89

Boyne Highlands Resort, Harbor Springs, MI

The 1988-89 snow mold fungicide studies were conducted at the Boyne Highlands Resort in Harbor Springs, MI on an irrigated Penncross (*Agrostis palustris*)/annual bluegrass (*Poa annua*) fairway which was mowed at $\frac{1}{2}$ " height of cut. Treatments were applied preventively to 6' x 9' plots in three replications of a random block design on November 2, 1988. Liquid applications were made with a CO₂ small-plot sprayer at 30 PSI and 48 gal/A (except as noted on data table). Granular treatments were pre-weighed and applied by hand.

The plots were rated as soon as the snow cover melted off on April 5, 1989.

Several commercially available fungicides once again managed snow mold in northern Michigan (Table 1). They included Calo-clor, Calo-gran, Scotts FF II, and Daconil 2787 + Chipco 26019. Terrachlor 50 DF, Terrachlor 75 WP, and Chipco 26019 also worked this season, but we have experienced erratic results with these fungicides over the years. It would appear the mercury fungicides will face a tough time in the up-coming EPA re-registration hearings. This may be a good time to start experimenting with alternative fungicides for snow mold management in case cancellation of the mercury fungicide does occur.

No phytotoxicity was observed at the time of the rating.

Kentucky Bluegrass Melting-Out Fungicide Study - 1989

Hancock Turfgrass Research Center

The 1989 melting-out (*Dreschlera poae*) fungicide trial was conducted at the Hancock Turfgrass Research Center on the MSU campus in E. Lansing, Mi, on irrigated Kenblue Kentucky bluegrass (*Poa pratensis*) turf maintained at $1\frac{1}{2}$ " height of cut. The study was set up in three replications of a random block design with a 3'x6' plot size. All treatments were applied with a CO₂ small-plot sprayer at 30 PSI and a volume of 48 gal/A. The plot area was fertilized dormant in late 1988 (1 lb. N/1000 ft²) and at the rate of $\frac{1}{2}$ lb. N/1000 ft² on 5/15 (except as noted on data table).

Treatments were initiated preventively on May 13, with subsequent treatments being applied on 14, 21, and 28 day schedules as noted on the data tables. The plots were rated on June 20, at which time the 14 day treatments had been applied three times (5/13,5/27,6/10), the 21 day treatments had been applied twice (5/13,6/5) and the 28 day treatments had been applied twice (5/13,6/10). Disease pressure was moderately severe this year with the controls exhibiting approximately 60% of maximum disease levels.

As the data table (Table 2) shows, the standard fungicides (Daconil 2787, Chipco 26019, Vorlan) continued to perform well against melting-out disease in comparison to the untreated controls. The experimental fungicides (CGA-455, SDS 66518, EXP 10069A, EXP 10072A, etc) also gave significant control of this disease at the 5% level of significance.

No phytotoxicity or "greening effect" was noted during the course of this study or at the time of data collection.

Summer Patch Fungicide Studies - 1989

As a result of our previous (1987-88) research, as well as information being generated at other universities, we again decided to attempt preventive control of summer patch (*Magnaporthe poae*) in our fungicide field trials for the 1989 season. Preventive studies were established on irrigated, annual bluegrass (*Poa annua*) fairways on two golf courses in Michigan where disease was present in previous years. All treatments were applied prior to disease occurrence in three replications of a random block design utilizing a 6'x9' plot size. The fairways were maintained at ½" cutting height and were fertilized at ½# N/Mo (except as noted on the data tables). These areas were treated for weed and insect pests, however, no fungicides, other than those being tested, were applied to the studies.

Applications were made foliarly using a CO₂ small-plot sprayer at 30 PSI and a volume of 48 gal/A. Application intervals and frequencies were altered from contract protocols when necessary to conform to a preventive, two-application format.

In general, summer patch disease pressure was only moderately severe this year. Temperatures were quite mild and we received timely rainfall which, along with irrigation, prevented severe drought stress in summer patch-infested areas. Standard treatments applied in May and June generally gave good control of summer patch through August, in contrast to last summer when the extreme heat and drought led to greater disease pressure and a mild loss of control of summer patch by July.

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

The summer patch fungicide study at Dearborn Country Club was initiated preventively on May 1 (except as noted on data tables) when the soil temperature reached 65 F at a 2" soil depth. A second application was made on May 31, or 30 days after the initial application (except as noted on data tables).

The disease developed slowly on this site with the only rating being taken as disease pressure peaked on August 18. As the data (Table 3A) shows, Banner, Bayleton, and Rubigan applications gave good control of the disease, as did a number of experimental (numbered) compounds. Of special interest were the SAN 619F and BAS 48000F experimentals which gave good disease control at very low rates relative to the standard treatments.

Phytotoxicity was not observed, although a couple compounds produced a "greening effect" in the turf as noted on the data tables.

We attempted to differentiate between early stage disease development (yellowing) and advanced disease development (yellowing and thinning) by placing a "Y" after plot ratings where yellowing was the only symptom. All other plots exhibited both yellowing and thinning of the turfgrass stand.

Summer Patch Fungicide Study, Grand Rapids Elks Golf Club, Grand Rapids, MI

The summer patch fungicide study at the Grand Rapids Elks Golf Club was established preventively on May 8, 1989, approximately one week after soil temperatures at a 2" depth reached 65 F (except as noted on the data tables). Most of the treatments were re-applied 30 days later on June 5 (except as noted on data tables). This study was identical to the Dearborn study. Disease development peaked at approximately the time of our second rating on August 21 (Table 4A and 4B). Disease pressure in both studies never exceeded 30-35% in the untreated controls, versus disease levels of 60-80% during the unusually hot summer of 1988. Disease pressure was also somewhat unevenly distributed through the study, however, the best performing compounds were consistently effective across all replicates, giving complete control of the disease through August. During the stressful summer of 1988, even our best performing treatments had some disease by August, suggesting that fungicide residues were too low to give "season-long" control of summer patch.

Mild phytotoxicity was observed in association with a few treatments in Table 4A. The treatments in Table 4B were applied later in the season than those in Tables 4A. This phytotoxicity was mild and was probably related to the hot weather we experienced following the application. The primary symptom was stunting of growth and a slight discoloration of the turf.

Dollar Spot Fungicide Trials - 1989

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

The 1989 curative dollar spot (*Moellerodiscus* sp., *Lanzia* sp.) fungicide trial was conducted on an irrigated Emerald creeping bentgrass (*Agrostis palustris* huds.) putting green at the Hancock Turfgrass Research Center on the MSU campus. The green was maintained at ¼" height of cut and fertilized at ½# N/mo. Treatments were applied curatively to 3' X 6' plots in three replications of a random block design on 14, 21 and 28 day intervals as indicated on the data tables. The initial treatments were applied on August 1. All liquid treatments were applied with a CO₂ small-plot sprayer at 30 PSI and 48 gal/A. The granular treatments were pre-weighed and applied by hand. Following the initial application (8/1), the 14 day treatments were reapplied on 8/14,8/28 and 9/11, the 21 day treatments were reapplied on 8/23 and 9/11 and the 28 day treatments were reapplied on 8/28. The plots were rated for percent plot area infected on 8/14, 8/28, 9/11 and 9/19 (Table 5).

The plot area where the dollar spot fungicide trial was conducted has a benzimidazole-resistant strain of dollar spot so Tersan 1991 (and another benzimidazole fungicide, Fungo) failed to control the disease. As the data tables show, however, many experimental compounds (SDS 66518, SDS 66811, SAN 619F, SAN 832, Lynx 2F, BAS 4800, etc.) and many standard fungicides (Dac. 2787, Banner, Vorlan, Ch. 26019, Bayleton, etc.) gave good control of dollar spot this year.

Although no phytotoxicity was observed throughout the course of this study, it is interesting to note the large number of compounds (SAN 619, Banner, ICIA 523, Bayleton, SAN 832) which seemed, at some point, to produce a "greening response" in the turf.

Red Thread Fungicide Trial - 1989

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

The 1989 red thread (*Laetisaria fuciformis*) fungicide trial was conducted on already-infected perennial ryegrass (Loretta) at the Hancock Turfgrass Research Center on the campus. The study was laid out in three replicates of a random block design utilizing a plot size of 3'/x6'. Treatments were applied foliarly with a CO₂ small-plot sprayer at 30 PSI and a volume of 48 gal/A. The first applications were made on June 17 with subsequent applications being made on 14, 21 or 28 day schedules.

At the time of the first disease rating (7/13) (Table 6), the 14 day treatments had been applied twice (6/17,6/30), and the 21 and 28 day treatments had been applied once (6/17). When the second rating was taken

(7/24) (Table 7), the 14 day treatments had been applied three times (6/17,6/30,7/13) and the 21 and 28 day treatments had been applied twice (6/17,7/7 and 6/17,7/13 respectively).

As data Table 6 indicates, Chipco 26019 and Bayleton were among the fastest curative treatments used in this test. By the date of the second rating, however, compounds such as SDS 6608, Fore, and Daconil 2787 were also quite effective at arresting disease development and promoting turf recovery (Table 7).

No phytotoxicity was observed during the course of this study.

Yellow Tuft Fungicide Trial - 1989

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

The 1989 yellow tuft (*Sclerophthora macrospora*) fungicide study was conducted on an irrigated Penneagle creeping bent grass putting green at the Hancock Turfgrass Research Center on the MSU campus. Treatments were applied preventively to 3'x6' plots in three replications of a random block design. Treatments were applied foliarly with a CO₂ small-plot sprayer at 30 PSI and 48 gal/A.

The initial applications were made on July 7, with subsequent applications being made on a 21 day schedule through September 28. Following each application, mild phytotoxicity was observed in the Aliette plots beginning on approximately day 2 and continuing through approximately day 9. This phytotoxicity was expressed as a bleaching of the leaf tips and a mild yellowing of the turf. Because of this phytotoxicity, the re-treatment interval was increased to 21 days from the contractual request of 14 days. The Subdue plots maintained good turfgrass quality and disease control throughout the season with no phytotoxicity observed (Tables 8 & 9).

Necrotic Ring Spot Fungicide Studies - 1989

Preventive Studies

As with our summer patch fungicide research, we decided to attempt preventive control of necrotic ring spot (*Leptosphaeria porrae*) in our fungicide field trials for the 1989 season. Two preventive studies were established on irrigated Kentucky bluegrass lawn areas in Novi, Michigan, where disease was present in previous years. All treatments were applied prior to disease occurrence in three replications of a random block design utilizing a 6' x 9' plot size. The turf was mowed at a 2" height of cut and was to be fertilized at the rate of 1 lb N/1000 ft² in May, July and September. These areas were treated for weeds and insects, however, no other fungicides were applied during the course of the season.

Applications were made foliarly using a CO₂ small-plot sprayer at 30 PSI and a volume of 48 gal/A. Application intervals and frequencies were altered from contractual protocols when necessary to conform to a preventive, two-application format.

Curative Study

When it appeared to us that preventive studies #1 and #2 might not yield data this year (as explained in following sections), we decided to establish a curative fungicide-fertilizer study in an area which was currently, experiencing a severe disease outbreak. This study was located on the Hancock Turfgrass Research Center on the MSU campus in East Lansing, MI, and is further described in the following sections.

Necrotic Ring Spot Curative Trial #1 - Hancock Turfgrass Research Center, MSU, East Lansing, MI

This curative necrotic ring spot study was established on an irrigated, 10-year-old seeded Fylking Kentucky bluegrass (*Poa pratensis*) turfgrass research area which has been developing increased necrotic ring spot disease pressure for the past 5 years. Fertility was applied dormantly (1 lb N/1000 ft²) in late 1988, followed by applications of 1 lb N/1000 ft² on June 8, 1989 and July 26, 1989 and ½ lb N/1000 ft² on October 16, 1989 (Turf Restore and Sustane plots received no supplemental fertility). Irrigation was provided as needed to prevent wilt. In general, fertility and irrigation were provided in adequate quantities to promote recovery and also maintain disease pressure in the study area.

Because the available research area was limited, not all contracted compounds or rates were included in the study. We did, however, attempt to include most of the experimental compounds we had been testing all season.

The initial curative application was made on Aug. 3 and the plots were rated for percent disease incidence. A second application was made on Sept. 6 and a rating of percent recovery from initial disease levels was taken. We are reporting the data as percent recovery/plot rather than as percent area diseased/plot because disease incidence was not uniform in the study area (Table 10).

Necrotic Ring Spot Preventive Trial #1 - Country Place Condominiums, Novi, MI

The necrotic ring spot study at Country Place Condominiums was initiated preventively on May 10, 1989 when the soil temperature reached 65°F at a 2" depth. A second application was made on June 8, 1989, or approximately 30 days after the first application. Fertility was applied to this study at the rate of 1 lb N/1000

ft² in May and July. The September application was omitted when it was noted that the old disease scars and grown shut and no new disease activity was occurring. Unfortunately disease pressure never did re-develop in the plot area (through Nov. 30), so no data was available from this plot site in 1989.

No phytotoxicity was observed.

Necrotic Ring Spot Preventive Trial #2 - Glen Haven Condominiums, Novi, MI

The second preventive necrotic ring spot study was located on an irrigated lawn area at the Glen Haven Condominium complex in Novi, MI. This study was first applied on May 15, 1989 shortly after soil temperatures reached 65° F at a 2" depth. A second application was made on June 14, 1989, or approximately 30 days after the initial application. Fertility was applied in late May at 1 lb. N/1000 ft². In July, the lawn care company which was maintaining the lawns at this complex inadvertently applied 2½ lbs. N/1000 ft² to the plot area. The turf growth surged, the previous years disease patches filled in, and the disease never re-developed throughout the rest of the season (through Nov. 30). Therefore, no data was available from this study either.

Necrotic Ring Spot Preventive Trial #3

The third preventive necrotic ring spot study was also located at the Glen Haven Condominium complex in Novi, MI. This study was first applied on May 26, 1989. It was established a couple weeks later than desired due to the late arrival of test compounds to our laboratory. A second application was made on June 26, 1989. Fertility was applied at ½ lb N on July 6, after which the lawn care company which was maintaining the area mistakenly applied 2½ lbs N/1000 ft² to this test site. As in study #2 above, this research area surged, filling in all existing disease patch symptoms. The area showed no renewed disease pressure until late fall (Oct. 24) when disease patches re-developed and a comparative disease rating was taken (Table 11).

As the data shows, the two standards (Rubigan, Banner) did an excellent job of preventing disease re-development five months after application. The experimental compound, Terraguard, also performed well. The proprietary experimental treatments gave erratic results which made them statistically insignificantly different from the controls, along with Chipco 26019 (F).

Table 1. Boyne Highlands Snow Mold Trial - 1988-89

Percent plot area diseased with gray snow mold (*Typhula incarnata*)
 Rating date - 4/5/89

Treatment ^c	Rate/1000 ft ^{2b}	I	II	III	AVE	DMR (.05) ^a
Terraclor 50 DF	1.5 lb	0	0	0	0.0	A
RH-3486	1 oz ai	0	0	0	0.0	A
RH-3486	1.5 oz ai	0	0	0	0.0	A
Calo-clor	3 oz	0*	0*	0	0.0	A
Terraclor 75W	1 lb	0	0	0.5	0.2	A
Calo-clor + Fert (18-5-9)	3 oz + 1 lb N	1	0	0	0.3	A
Ch 26019 (F) + Dac 2787	8fl oz + 8fl oz	2	0	0.5	0.8	A
CGA-169374 (EC)	16 gm ai	1	2	0	1.0	A
Scotts FF II	2X	2	1	0	1.0	A
Calo-gran	6 lbs	3	0	0	1.0	A
Scotts FF II	1X	0	3	1	1.3	A
RH-3486	.75 oz ai	5	0	1	2.0	A
Dac 2787 + Ch 26019 (F)	8 fl oz + 2fl oz	2	0	5	2.3	A
Ch 26019 (F)	12 fl oz	0	1	8	3.0	A
ICIA 523 + X-77	8 gm ai + 0.5%ov/v 0	1	10	3.7	AB	
Dac 2787 + T1991	8 fl oz + 2 oz	10	1	2	4.3	ABC
S-2385	1X	2	20	0	7.3	ABCD
S-2385	2X	1	1	20	7.3	ABCD
Dac 2787 + T1991 + Calo-clor	4 fl oz + 1 oz + 1 oz	2	0	20	7.3	ABCD
Spotless	.25 lb ai/A	3	4	20	9.0	ABCD
PMAS	2 fl oz	20	0	10	10.0	ABCD
G696	1 lb	5	15	10	10.0	ABCD
Spotless	1 lb ai/A	5	10	25	13.3	ABCD
Spotless	.125 lb ai/A	20	20	0.5	13.5	ABCD
Spotless	0.5 lb ai/A	2	7	35	14.7	ABCD
CGA-16937 (EC)	8 gm ai	15	6	25	15.3	ABCD
G 696	2 lb	0	3	45	16.0	ABCD
G 696	lb	13	25	40	26.0	ABCD
Terraguard	4 oz	0	30	50	26.7	ABCD
CGA 169374 (G)	8 gm ai	20	10	50	26.7	ABCD

Terraguard	8 oz	10	10	75	31.7	BCD
Fore	6.4 oz ai	20	16	61	32.3	CD
EXP10002B	0.2 fl oz	5	5	95	35.0	D
Banner	16 gm ai	20	25	60	35.0	D
Control	--	65	30	95	63.3	E

^aTreatments followed by the same letter are not significantly different at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

Table 2. Kentucky Bluegrass Melting-out Fungicide Trial - 1989

Hancock Turfgrass Research Center, MSU, East Lansing, MI
 Disease rating scale: 0=no infected leaves, 10=100% of leaves infected^a
 Plots rated on 6/20/89

Treatment	Rate ^c /1000 ft ²	Interval	I	II	III	AVE	DMR (.05) ^a
CGA-455	28 gm ai	21 day	1	2	1	1.3	F
Dac 2787	3 fl oz	14 day	1	1	2	1.3	F
Dac 2787	6 fl oz	14 day	2	1	2	1.6	EF
Ch 26019 (F)	4 fl oz	21 day	3	2	1	2.0	DEF
Ch 26019 (WP)	2 oz	21 day	3	2	1	2.0	DEF
CGA-455	7 gm ai	21 day	1	3	2	2.0	DEF
CGA-455	14 gm ai	21 day	2	2	2	2.0	DEF
SDS 66518 (90%)	3.5 oz	14 day	2	1	3	2.0	DEF
Vorlan + Fungo	1 oz + 1 oz	21 day	2	3	2	2.3	CDEF
Vorlan	2 oz	21 day	2	3	2	2.3	CDEF
SDS 66518 (90%)	1.75 oz	14 day	3	2	2	2.3	CDEF
EXP 10069A	5 lbs	21 day	3	2	2	2.3	CDEF
EXP 10072A	5 lbs	21 day	3	2	2	2.3	CDEF
Prochloraz	1.88 oz ai	21 day	3	2	2	2.3	CDEF
Vorlan + Fungo	2 oz + 2 oz	21 day	2	3	3	2.6	BCDEF
Dac 2787	5.3 oz	21 day	3	2	3	2.6	BCDEF
SDS66518XY2	1.85 oz	14 day	1	3	4	2.6	BCDEF
Vorlan	1 oz	21 day	2	3	4	3.0	BCDEF
EXP 10069A	2.5 lbs	21 day	3	3	4	3.3	BCDE
EXP 10072A ^b	2.5 lbs	21 day	4	4	3	3.6	BCD
Lesco 011092	3 fl oz	21 day	4	4	3	3.6	BCD
SDS66518XY1	2 oz	14 day	2	5	5	4.0	BC
SDS 66608	5 oz	28 day	5	4	4	4.3	B
SDS 66608	7.5 oz	28 day	5	5	3	4.3	B
Control (unfertilized) ^b	---	---	8	5	5	6.0	A
Control	---	---	7	6	6	6.3	A

^aTreatments followed by same letter are not significantly different from each other at the 5% level.

^bThese treatments were not fertilized on 5/15.

^cRates listed are formulation unless listed as active ingredient (ai).

Table 3A. Summer Patch Fungicide Trial - 1989

Dearborn Country Club Dearborn, MI Rated 8/18/89 - Percent plot area infected with summer patch <u>Magnaporthe poae</u>							
Treatment	Rate/1000 ft ^{2b}	Applic. date	I	II	III	AVE	DMR(.05) ^a
San 619F	3.78 gm ai	5/9,5/31	0	0 ^G	0 ^G	0.0	F
Lynx 2F	1 fl oz	5/1,5/31,6/30,8/1	0	0	0	0.0	F
Banner	4 fl oz	6/30,8/1	0 ^G	1	0 ^G	0.3	F
Lynx 2F	2 fl oz	5/1,5/31	1	0	0	0.3	F
San 619F	1.89 gm ai	5/9,5/31	1	1	0	0.7	F
Lynx 2F	1 fl oz	6/30,8/1	1	0	1	0.7	F
San 619F	2.84 gm ai	5/9,5/31	0	1	2 ^Y	1.0	F
San 832	63.78 gm ai	5/9,5/31	2	1	0	1.0	F
Lynx 2F	1 fl oz	5/1,5/31	2	1	0	1.0	F
Bayleton	4 oz	5/1,5/31	1	2	0	1.0	F
Rubigan	8 fl oz	5/1	2	1	1	1.3	F
Bas 48000F	.25 lb ai/A	5/1,5/31	1	0	3	1.3	F
Banner	4 fl oz	6/30,8/1 (soil 75° + 30 days)	1 ^G	1	2 ^Y	1.3	F
Rubigan	4 fl oz	5/1	1	3	1	1.3	F
Banner	4 fl oz	5/31,6/30	5 ^Y	0	0	1.7	F
Lynx 25 DF	1 fl oz	5/1,5/31	0	3	2	1.7	F
Bayleton	2 oz	5/1,5/31	2	3	1	2.0	F
Lynx 2F	2 fl oz	5/1	0	3	3	2.0	F
Ch 26019 (F)	12 fl oz	5/31,6/30,8/1	1	0	5	2.0	F
Lynx 2 F	1 fl oz	5/1	2	0	5	2.3	F
EXP 10064A	45.36 ml	5/31,6/20	2	0	5	2.3	F
Ch 26019 (F)	12 fl oz	5/1,5/31,6/30	7	1	1	3.0	EF
Bayleton	2 oz	5/1	3	5	2	3.3	EF
BAS 48000F	.12 lb ai/A	5/1,5/31	2	0	10 ^Y	4.0	EF
Rubigan	4 fl oz	5/1,5/31	1	10 ^Y	2	4.3	EF
RH 3866	.25 oz ai	5/1,5/31	5	5	5	5.0	DEF
Lesco 011092	4.4 fl oz	5/1,5/31	3	5	10	6.0	DEF
Ch 26019 (F)	8 fl oz	5/31,6/30,8/1	10 ^Y	10 ^Y	0	6.7	DEF
Lynx 2F	2 fl oz	5/31	20 ^Y	0	0	6.7	DEF
Bayleton	4 oz	5/1	3	5	15	7.7	DEF
Bayleton	2 oz	5/1,5/31,6/30,8/1	0	5	20	8.3	DEF
Banner	4 fl oz	5/1,5/31	0	5	20	11.7	CDEF

Bayleton	4 oz	5/31	10	7	10	9.0	DEF
Fungo	2 oz	5/1,5/31	15	10	5	10.0	CDEF
Ch 26019 (F)	8 fl oz	5/31,6/30	10	10	10	10.0	CDEF
Lesco 011092	8.8 fl oz	5/1,5/31	2	20	10 ^Y	10.7	CDEF
Rubigan	2 fl oz	5/1,5/31	2	30	1	11.0	CDEF
San 832	45.52 g ai	5/9,5/31	1	7 ^Y	25 ^Y	11.0	CDEF
Ch 26019 (F)	12 fl oz	5/31,6/30	10	20	5	11.7	CDEF
Bayleton	2 oz	6/30,8/1	1	35	1	12.3	BCDEF
Prochloraz	2.5 oz ai	5/1,5/31	20	20	2	14.0	BCDEF
Prochloraz	1 oz ai	5/1,5/31	10	35	1	15.3	BCDEF
Bayleton	2 oz	5/31	35	2	10	15.7	ABCDEF
Fungo + Vorlan	2 oz + 2 oz	5/1,5/31	20	0	40	20.0	ABCDE
Vorlan	1 oz	5/1,5/31	10	35	20	21.7	ABCD
Lynx 2F	1 fl oz	5/31	5	25	35	21.7	ABCD
Control	---	---	35	25	20	26,7	ABC
Vorlan	2 oz	5/1,5/31	35	25	25	28.3	AB
Fungo + Vorlan	1 oz + 1 oz	5/1,5/31	25	40	20	28.3	AB
Ch 26019 (F)	8 fl oz	5/1,5/31,6/30	15	35	35	28.3	AB
Fungo	1 oz	5/1,5/31	10	45	40	31.7	A

^aTreatments followed by the same letter are not significantly different at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

^cIndicates greening effect on turf.

^yDisease expression as yellowing only.

Table 3B. Summer Patch Fungicide Trial - 1989

Dearborn Country Club
Dearborn, MI
Rated 8/18/89 - Percent plot area infected with Magnaporthe poae

Treatment ^c	Rate/1000 ft ^{2b}	Applic. date	I	II	III	AVE	DMR(.05) ^a
Terraguard	4 oz	5/22,6/20	1	0	0	0.3	C
Terraguard	8 oz	5/22,6/20	0	1	0	0.3	C
Rubigan	4 fl oz	5/22,6/20	1	0	2	1.0	C
SDS 66811	.06 oz ai	5/22,6/20	1	10	5	5.3	BC
SDS 66811	.03 oz ai	5/22,6/20	2	10	10	7.3	BC
SDS 66811	.015 oz ai	5/22,6/20	2	20	3	8.3	BC
Ch 26019 (F)	2 oz ai	5/22,6/20	30	3	2	11.7	BC
SDS 66791	6 oz	5/22,6/20	15	15	15	11.7	BC
SDS 66791	3 oz	5/22,6/20	20	30	10	20.0	AB
Control	---	---	35	25	25	28.3	A

^aTreatments followed by the same letter are not significantly different at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

^cBlanked out treatments are proprietary.

Table 4A. Summer Patch Fungicide Trial - 1989

Grand Rapids Elks Country Club
Grand Rapids, MI
Rated 8/21/89 - Percent plot area infected with summer patch Magnaporthe poae

Treatment	Rate/1000 ft ^{2b}	Applic. date	I ^d	II	III	AVE	DMR(.05) ^a
Rubigan	4 fl oz	5/8	0	0	0	0.0	C
Rubigan	8 fl oz	5/8	0	0	0	0.0	C
San 619F	1.89 gm ai	5/8,6/5	0	0	0	0.0	C
San 619F	2.84 gm ai	5/8,6/5	0	0	0	0.0	C
San 619F	3.78 gm ai	5/8,6/5	0 ^c	0	0	0.0	C
San 832	45.52 gm ai	5/8,6/5	0	0	0	0.0	C
Bas 48000F	.25 lb ai/A	5/8,6/5	0	0 ^c	0	0.0	C
Banner	4 fl oz	6/5,6/29	0	0	0	0.0	C
Bayleton	2 oz	5/8	0	0	0	0.0	C
Bayleton	2 oz	6/5	0	0	0	0.0	C
Lynx 2F	1 fl oz	6/5	0	0	0	0.0	C
Lynx 2F	1 fl oz	6/29,7/25	0	0	0	0.0	C
Lynx 2F	1 fl oz	5/8,6/5,6/29,7/25	0	0	0	0.0	C
Lynx 25 DF	1 fl oz	5/8,6/5	0	0	0	0.0	C
EXP 10064A	45.36 ml	5/8,6/5	0	0	0	0.0	C
Ch 26019 (F)	8 fl oz	5/8,6/5,6/29	0	1	0	0.3	C
Rubigan	4 fl oz	5/8,6/5	0	1	0	0.3	C
Bas 48000F	.12 lb ai/A	5/8,6/5	1	0	0	0.3	C
Banner	4 fl oz	6/13,7/18 (75° + 30 days)	0	0	1	0.3	C
Bayleton	4 oz	6/5	0	1	0	0.3	C
Lynx 2F	2 fl oz	5/8,6/5	0	1	0	0.3	C
San 832	63.78 gm ai	5/8,6/5	0	2	0	0.7	C
Lynx 2F	2 fl oz	6/5	0	0	2	0.7	C
Ch 26019 (F)	12 fl oz	5/8,6/5,6/29	0	5	0	1.7	C
Rubigan	2 fl oz	5/8,6/5	0	5	0	1.7	C
Bayleton	2 oz	5/8,6/5	0	5	0	1.7	C
Bayleton	2 oz	6/29,7/25	0	0	5	1.7	C
Lesco 011092	8.8 fl oz	5/8,6/5	0	0	7	2.3	C
Lynx 2F	2 fl oz	5/8	0	0	7	2.3	C
Fungo	1 oz	5/8,6/5	0	5	3	2.77	C
Ch 26019 (F)	12 fl oz	6/5,6/29	0	1	7	2.7	C

Bayleton	4 oz	5/8	0	5	3	2.7	C
Banner	4 oz	6/29,7/25	0	10	0	3.3	C
Fungo + Vorlan	2 oz + 2 oz	5/8,6/5	1	10	0	3.7	C
Ch 26019 (F)	8 fl oz	5/8,6/5,6/29	1	1	10	4.0	C
Prochloraz	2.5 oz ai	5/8,6/5	10	3	1	4.7	C
Lynx 2F	1 fl oz	5/8	1	1	15	5.7	C
Bayleton	2 oz	5/8,6/5,6/29,7/25	10	0	10	6/7	C
Ch 26019 (F)	12 fl oz	6/5,6/29,7/25	0	0	20	6.7	C
Ch 26019 (F)	8 fl oz	6/5,6/29	0	20	1	7	C
Lesco 011092	4.4 fl oz	5/8,6/5	5	3	15	7.7	C
Banner	4 fl oz	5/8,6/5	0	0	25	8.3	CB
Bayleton	4 oz	5/8,6/5	0	0	25 ^Y	8.3	CB
Lynx 2F	1 fl oz	5/8,6/5	0	0	25 ^Y	8.3	CB
Vorlan	2 oz	5/8,6/5	0	2	25	9	CB
RH 3866	.25 oz ai	5/8,6/5	30	2	0	10.7	CB
Prochloraz	1 oz ai	5/8,6/5	50	0	0	16.7	CBA
Fungo + Vorlan	1 oz + 1 oz	5/8,6/5	2	25	25	17.3	CBA
Fungo	2 oz	5/8,6/5	0	45	30	25	BA
Control	---	---	35	15	40	30.0	A
Vorlan	1 oz	5/8,6/5	0	5	45	31.7	A

^aTreatments followed by the same letter are not significantly different at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

^cIndicates phytotoxicity in sprayer overlap.

^dDisease ratings not followed by a "Y" exhibited yellowing and thinning.

YYellowing of turf only.

Table 4B. Summer Patch Fungicide Trial - 1989

Grand Rapids Elks Country Club
Grand Rapids, MI
Rated 8/21/89 - Percent plot area infected w/Magnaporthe poae

Treatment ^c	Rate/1000 ft ^{2b}	Applic. date	I	II	III	AVE	DMR ^a
Terraguard	4 oz	5/23,6/29	0	0	0	0.0	B
Terraguard	8 oz	5/23,6/29	0	0	0	0.0	B
SDS-66791	3 oz	5/23,6,29	0	0	0	0.0	B
SDS-66791	6 oz	5/23,6/29	0	0	0	0.0	B
Rubigan	4 oz	5/23,6/29	0	0	0	0.0	B
SDS66811	.03 oz ai	5/23,6/29	1	2	0	1.0	B
SDS66811	.06 oz ai	5/23,6/27	0	3	0	1.0	B
Ch 26019 (F)	2 oz ai	5/23,6/29	0	0	5	1.7	B
SDS66811	.015 oz ai	5/23,6/29	0	0	5	1.7	B
Control	---	---	2	10	3	5	A

^aTreatments followed by the same letter are not significantly different at 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

^cBlanked out treatments are proprietary.

Table 5. Dollar Spot Fungicide Trial -1989

Hancock Turfgrass Research Center
Michigan State University, East Lansing, MI
Rated 9/11/89 - Percent plot area infected with dollar spot

Treatment ^c	Rate/1000 ft ^{2b}	Applic. date	I	II	III	AVE	DMR (.05) ^a
ICIA 523 + X-77	3gm ai +.05%v/v	21 days	0 ^G	0 ^G	0 ^G	0.0	G
Ch 26019 (F)	.75 oz ai	21 days	0	0	0	0.0	G
SDS66811	.015 oz ai	28 days	0	0	0	0.0	G
SDS66811	.03 oz ai	28 days	0	0	0	0.0	G
SDS66811	.06 oz ai	28 days	0	0	0	0.0	G
Dac 2787	6 fl oz	14 days	0	0	0	0.0	G
SDS66518 (90%)	3.5 oz	14 days	0	0	0	0.0	G
San 619F	1.89 gm ai	28 days	0 ^G	0 ^G	0	0.0	G
San 619F	2.84 gm ai	28 days	0 ^{GG}	0 ^{GG}	0 ^G	0.0	G
San 832	56.69 gm ai	28 days	0	0 ^G	0	0.0	G
Vorlan	2 oz	21 days	0	0	0	0.0	G
Vorlan + Fungo	2 oz + 2 oz	21 days	0	0	0	0.0	G
Banner 1.1EC	4 gm ai	21 days	0 ^G	0 ^G	0	0.0	G
Banner 1.1ME	4 gm ai	21 days	0 ^G	0 ^G	0 ^G	0.0	G
Banner 1.1E Improved	4 gm ai	21 days	0	0	0	0.0	G
Banner 1.1EC	4 gm ai	28 days	0 ^G	0 ^G	0	0.0	G
Lynx 2F	.0625 oz ai	14 days	0	0	0	0.0	G
Bayleton	.25 oz ai	28 days	0	0	0	0.0	G
BAS 48000F	.06 lb ai/A	21 days	0	0	0 ^G	0.0	G
Chipco 26019 (F)	4 oz	21 days	0	0	0	0.0	G
Lesco 017530	3 lbs	28 days	0	0	0	0.0	G
ICIA 523 + X-77	6gm ai +.05%v/v	21 days	0 ^{GG}	1 ^G	0 ^{GG}	0.3	G
Rubigan	1.5 fl oz	28 days	0	1	0	0.3	G
Lesco 011092	3 fl oz	21 days	0	0	1	0.3	G
Vorlan + Fungo	1 oz + 1 oz	21 days	2	0	0	0.7	G
BAS 48000F	.03 lb ai/A	21 days	0	1	1	0.7	G
Rubigan	.75 fl oz	21 days	0	2	1	1.0	G
Lynx 2F	.125 oz ai	28 days	2	1	1	1.3	FG
Dac 2787	3 fl oz	14 days	1	2	-	1.5	FG
Prochloraz	1.88 oz ai	21 days	3	1	3	2.3	FG
SDS 66518 (85%)	1.85 oz	14 days	10	2	3	5.0	EFG
CGA 455	14 gm ai	28 days	10	5	2	5.7	EFG

SDS 66518 (75%)	2 oz	14 days	10	7	3	6.7	EFG
EXP 10069A	5 lbs	21 days	10	10	15	11.7	DEFG
EXP 10072A	5 lbs	21 days	30	5	2	12.3	DEF
CGA 455	7 gm ai	14 days	20	5	20	15.0	DE
SDS 66518	1.75 oz	14 days	2	35	10	15.7	DE
CGA 455	7 gm ai	21 days	25	25	7	19.0	D
Banner 1GR	4 gm ai	21 days	35	40	20	31.7	C
Banner 50 (WP)	4 gm ai	21 days	25	50	35	36.7	BC
Tersan 1991	2 oz	14 days	50	35	-	28.3	AB
	Control	---	---	60	60	35	51.7A

^aTreatments followed by the same letter are not significantly different from each other at the 5% level.

^bRates listed as formulation unless listed as active ingredient (ai).

^cBlanked out treatments are proprietary.

^eMild greening of turf observed.

^gStrong greening of turf observed.

Table 6. Red Thread Fungicide Trial - 1989

Hancock Turfgrass Research Center, MSU, E. Lansing, MI
 Percent plot area infected with red thread disease
 Rating date: 7/13/89

Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	AVE	DMR (.05) ^a
Ch 26019 (F)	4 fl oz	14 days	0	0	0	0.0	C
Bayleton	2 oz	21 days	0	10	5	5.0	BC
SDS 66608	7.5 oz	28 days	25	10	2	12.3	BC
Fore	8 oz	14 days	15	10	20	15.0	BC
Dac 2787	6 fl oz	14 days	35	10	15	20.0	BC
SDS 66608	5 oz	28 days	15	40	20	25.0	BC
Fore	4 oz	14 days	25	5	45	25.0	BC
Dac 2787	3 fl oz	14 days	45	2	30	25.7	BC
ICIA 0523 + X-77	8gm ai + .25%v/v	21 days	10	45	35	30.0	B
Control	---	---	55	50	70	58.3	A

Table 7. Red Thread Fungicide Trial - 1989

Hancock Turfgrass Research Center, MSU, E. Lansing, MI
 Percent plot area infected with red thread disease
 Rating date - 7/24/89

Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	AVE	DMR (.05) ^a
Ch 26019 (F)	4 fl oz	14 days	0	0	0	0.0	B
Bayleton	2 oz	14 days	0	0	0	0.0	B
SDS 66608	7.5 oz	28 days	0	5	0	1.7	B
Fore	8 oz	14 days	5	5	0	3.3	B
Dac 2787	6 fl oz	14 days	5	0	5	3.3	B
Dac 2787	3 fl oz	14 days	15	0	10	8.3	B
Fore	4 oz	14 days	0	15	20	11.7	B
SDS 66608	5 oz	28 days	10	20	10	13.3	B
ICIA 523 + X-77	8gm ai + .25%v/v	21 days	0	25	15	13.3	B
Control	---	---	50	35	45	43.3	A

^aTreatments followed by the same letter are not significantly different from each other at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

Table 8. Yellow Tuft Fungicide Trial - 1989

Hancock Turfgrass Research Center, MSU, E. Lansing, MI
 Number of infected plants/plot
 Rating date: 9/5/89

Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	AVE	DMR (.05) ^a
Subdue	2 fl oz	21 days	0	3	0	1.0	C
Aliette	8 oz	21 days	12 ^b	10 ^b	5 ^b	9.0	B
Control	---	---	15	24	20	19.7	A

Table 9. Yellow Tuft Fungicide Trial - 1989

Hancock Turfgrass Research Center, MSU, E. Lansing, MI
 Number of infected plants/plot
 Rating date: 9/21/89

Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	AVE	DMR (.05) ^a
Subdue	2 fl oz	21 days	0	5	1	2.0	B
Aliette	8 oz	21 days	20 ^b	26 ^b	22 ^b	22.7	A
Control	---	---	17	40	47	34.7	A

^aTreatments followed by same letter are not significantly different at 5% level.

^bMild phytotoxicity observed for approximately 10 days following each application.

Table 10. Necrotic Ring Spot (curative) Fungicide Trial #1 - 1989
 Hancock Turfgrass Research Center, MSU, E. Lansing, MI
 Percent recovery from pre-treatment disease level/plot
 (negative numbers indicate disease increases)
 Rated 11/21/89

Treatment ^c	Rate/1000 ft ^{2b}	Applic. date	I	II	III	AVE	DMR (.05) ^a
Lesco 011092 (F)	8.8 fl oz	8/3,9/6	100	90	100	96.7	A
Banner	4 fl oz	8/3,9/6	100	100	80	93.3	A
SDS 66791	6 oz	8/3,9/6	100	100	75	91.7	A
Rubigan	4 fl oz	8/3,9/6	50	98	100	82.7	A
BAS 48000F	.25 lb ai	8/3,9/6	33	100	100	77.7	A
Lesco 011092 (F)	4.4 fl oz	8/3,9/6	75	30	100	68.3	A
Ch 26019 (F)	12 fl oz	8/3,9/6	80	17	100	65.7	A
Sustane	1 lb N	8/3,9/6,10/10	80	40	65	61.7	A
Turf Restore	1 lb N	8/3,9/6,10/10	88	14	80	60.7	A
SDS 66791	3 oz	8/3,9/6	70	97	-25	47.3	AB
Rubigan	8 fl oz	8/3,9/6	0	25	100	41.7	AB
SDS 66811	.06 oz ai	8/3,9/6	0	14	100	38.0	AB
SDS 66811	.03 oz ai	8/3,9/6	53	86	-33	35.3	AB
BAS 48000F	.12 lb ai	8/3,9/6	100	20	-40	26.7	AB
Control (fertilized)	---	---	-50	-16	-67	-44.3	B
Ch 26019 (F)	8 fl oz	8/3,9/6	50	14	-200	-45.3	B

^aTreatments followed by the same letter are not significantly different at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

^cBlacked out treatments are proprietary.

Table 11. Necrotic Ring Spot (Preventive) Fungicide Trial #3 - 1989

Glen Haven Condominium Complex, Novi, MI
Percent plot area infected
Rating date 10/24/89

Treatment ^c	Rate/1000 ft ^{2b}	Applic. Date	I	II	III	AVE	DMR (.05) ^a
Rubigan	4 fl oz	5/26,6/26	0	0	0	0.0	C
Terraguard	8 oz	5/26,6/26	0	0	0	0.0	C
Banner	4 fl oz	5/26,6/26	0	5	0	1.7	BC
Terraguard	4 oz	5/26,6/26	5	0	0	1.7	BC
Control	---	---	10	20	25	18.3	ABC
Ch 26019 (F)	2 oz ai	5/26,6/26	10	25	25	20.0	AB

^aTreatments followed by the same letter are not significantly different at the 5% level.

^bRates listed are formulation unless listed as active ingredient (ai).

^cBlanked out treatments are proprietary.