

Turfgrass Disease Management Report 1996-97
Dr J.M. Vargas, R. Detweiler, N. Dykema, and D. Taube
Dept. Of Botany & Plant Pathology
Michigan State University
E. Lansing, MI 48824

Boyne Highlands Snow Mold Data (1996-97)

Snow Mold Fungicide Studies - 1996-97

Studies A & B

Two corporation-sponsored snow mold fungicide studies were conducted during the fall and winter of 1996-97. Study A was applied on Oct. 26, 1996, and study B was applied on Oct. 27, 1996. Treatments were applied preventively to 6' x 9' creeping bentgrass (*Agrostis palustris*) / annual bluegrass (*Poa annua*) fairway plots where the turf was mowed at about 1/2". Liquid treatments were applied with a CO₂ back-pack sprayer at a pressure of 32 PSI and at a volume of 48 GPA. Granular products were pre-weighed and hand-applied.

Study A was rated following snow cover melt-off on April 22, 1997. The predominant snow mold was gray snow mold, caused primarily by *Typhula incarnata*, in this case. There was, however, sufficient Microdochium patch (pink snow mold), caused by *Microdochium nivale*, to warrant an individual rating of each disease in this study (table 1).

Study B was rated on April 23, 1997. The predominant snow mold disease in this study was Microdochium patch, but there was sufficient gray snow mold (*Typhula ishkariensis*) present to warrant individual ratings for each disease in this study also (table 2).

As the data in table 1 indicates, most of the standard snow mold fungicides (Daconil, Turfcide 400, Terraclor, Scotts FFII, etc.) gave good control of snow mold disease in the Boyne Highlands test this past winter. Relatively new compounds, such as Heritage and Sentinel also performed well, especially when used in combinations. In the Tree Tops study (table 2), we experienced significantly greater disease pressure, so the only treatments that performed satisfactorily were combinations of standards such as Turfcide 400 with Daconil, or Turfcide 400 with Heritage or Sentinel. Variability in disease pressure between the replicate plots led to diminished statistical separation between treatments in this study, but some standard products, when used alone, did have surprisingly high levels of disease in individual plots.

Table 1. Snow Mold Fungicide Study A - 1996-97
 Boyne Highlands Resort, Harbor Springs, MI

Rating Scale: Percent plot area infected by gray snow mold (*Typhula incarnata*) and by Microdochium patch (*Microdochium nivale*).

Rating Date: April 22, 1997

Treatment	Rate per 1000 ft ^{2d}	Rep <i>M.nv</i>	1 <i>T.in</i>	Rep <i>M.nv</i>	2 <i>T.in</i>	Rep <i>M.nv</i>	3 <i>T.in</i>	Mean ^a
Heritage + Turficide 400	0.7 oz + 12 fl oz	0	0	0	0	0	0	0.0 L
Heritage + Turficide 400	0.7 oz + 6 fl oz	0	0	0	0	0	0	0.0 L
Rizolex + Turficide 400	4 oz + 6 fl oz	0	0	0	0	0	0	0.0 L
EXP 10790A +Dac. 2787 + Turficide 400	4 fl oz + 8 fl oz + 8 fl oz	0	1	0	0	0	0	0.3
UBI SF-4860	106.7oz	0	0.5	0	1	0	0	0.5 L
Turficide (75 WG) + Daconil Ultrex	6 oz + 5 oz	0	2	0	0	0	0	0.6 L
Turficide 400	12 fl oz	0	2	0	0	0	0	0.6 L
Fore + Terraclor	8 oz + 8 oz	0	1	0	1	0	0	0.6 L
Sentinel + Turficide 400	0.33 oz + 6 fl oz	2	0	0	0	0	0	0.6 L
Heritage + Turficide 400	0.4 oz + 6 fl oz	0	0	0	3	0	0	1.0 L
Sentinel + Heritage	0.33 oz + 0.4 oz	3	0	0	0	0	0	1.0 L
Heritage + Turficide 400	0.4 oz + 12 fl oz	0	3	0	0	0	0	1.0 L
Terraclor	8 oz	0	0	0	2	0	2	1.3 L
Caloclor	3 oz	0	1	0	0	0	3	1.3 L
Turficide (75 WG) + Ch 26019 FLO	6 oz + 4 fl oz	0	5	0	0	0	0	1.6 L
Banner Maxx + Daconil 2787	3 fl oz + 8 fl oz	0	1	0	3	0	1	1.6 L
L002	Preweigh-ed	0	3	0	0.5	0	2	1.8 L

Table 1 cont.

Treatment	Rate per 1000 ft ^{2d}	Rep <i>M.nv</i>	1 <i>T.in</i>	Rep <i>M.nv</i>	2 <i>T.in</i>	Rep <i>M.nv</i>	3 <i>T.in</i>	Mean ^a
UBI SF-3048	106.7	0	1	0	2	0	3	2.0 L
Fore + Terraclor	6 oz + 8 oz	0	3	0	3	0	0.5	2.2 L
Dac. Weather Stik + Turficide 400	5.5 fl oz + 6 fl oz	0	0	0	7	0	0	2.3 L
Daconil ZN + Ch. 26019 FLO	8 fl oz + 4 fl oz	2	0	0	5	0	0	2.3 L
Dac. Ultrex + Ch. 26019 FLO	3.8 oz + 4 fl oz	7	0	0	0	0	0.5	2.5 L
L004	Prewritegh-ed	4	1	0	1	0	2	2.7 L
CGA-BMP	2 oz	0	0	0	1	0	7	2.7 L
EXP 10790A + Dac. Weather Stik	4 fl oz + 6 fl oz	0	1	0	2	5	0	2.7 L
Banner Maxx + Heritage	3 fl oz + 0.4 oz	0	5	0	3	0	1	3.0 L
EXP 10790A + PCNB (75WP)	4 fl oz + 8 oz	0	5	0	2	0	2	3.0 L
Ch. 26019 FLO + Dac. 2787	4 fl oz + 8 fl oz	0	0	0	3	0	7	3.3 L
Turficide (75WG) + Spotrete (WDG)	6 oz + 6 oz	0	3	0	0	0	7	3.3 L
EXP 10790A + Dac. 2787	4 fl oz + 8 fl oz	0	2	0	1	7	0	3.3 L
Scotts FFII	103.9 oz (2x)	0	5	0	1	0	5	3.7 KL
Vig. Fert. + PCNB	5 lbs	0	10	0	0	0	5	5.0 J-L
Rizolex	4 oz	7	0	0	0	10	0	5.7 J-L
L005	Prewritegh-ed	3	7	0	0.5	0	7	5.8 J-L
EXP 10790A + Heritage	4 fl oz + 0.4 oz	0	5	0	7	0	7	6.3 J-L
Turficide (75WG)	8 oz	0	2	0	2	0	15	6.3 J-L
L003	Prewritegh-ed	0	7	0	10	1	4	7.3J-L
UBI 4121	160 oz	0	15	0	0	0	7	7.3 J-L
UBI 4141	160 oz	0	10	0	5	0	10	8.3 J-L

Table 1 cont.

Treatment	Rate per 1000 ft ^{2d}	Rep <i>M.nv</i>	1 <i>T.in</i>	Rep <i>M.nv</i>	2 <i>T.in</i>	Rep <i>M.nv</i>	3 <i>T.in</i>	Mean ^a
Banner Maxx + Turfside 400	3 fl oz + 9 fl oz	0	7	0	5	5	10	9.0 J-L
UBI 4142	106.7 oz	0	5	0	15	0	7	9.0 J-L
UBI 4140	160 oz	0	20	0	0	0	7	9.0 J-L
WAC 71	12 oz	5	2	0	1	10	10	9.3 J-L
UBI 4118	106.7 oz	0	5	15	10	0	1	10.3 I-L
WAC 71	8 oz	8	2	30	0	0	5	15.0 H-L
CGA-BMP ^b	1 oz (fall) 1 oz (spring)	0	15	0	25	1	11	17.3 G-L
Fore + Eagle	8 oz + 1.2 oz	0	10	5	25	5	20	21.7 F-K
UBI 4143	160 oz	0	25	0	20	5	15	21.7 F-K
CGA-BMP	1 oz	0	15	0	12	0	40	22.3 E-J
UBI 4040-01	106.7 oz	3	9	5	60	0	7	28.0 D-I
Consys	8 oz	20	15	25	15	2	13	30.0 D-H
Spotrete F	16 fl oz	10	10	35	5	15	25	33.3 D-G
Defend 4F ^c	12 fl oz	0	20	0	7	30	45	34.0 D-G
Defend 4F ^c + Spotrete (WDG)	8 fl oz + 4 oz	10	25	25	10	5	30	35.0 D-G
UBI 4044	160 oz	10	60	0	35	20	5	41.7 CD
Fore	8 oz	5	35	50	30	0	7	42.3 B-D
Control	----	30	50	15	35	40	40	70.0 A

^aMeans followed by the same letter are not significantly different from each other (LSD - 0.05).

^bSpring re-application omitted due to failure of fall treatment.

^cMay have mistakenly used Defend 2F due to possible product mis-labelling.

^dRates are formulation/1000 ft², unless otherwise indicated.

Table 2. Snow Mold Fungicide Study B - 1996-97
Tree Tops/Sylvan Resort, Gaylord, MI

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

Rating Date: April 23, 1996

Treatment	Rate per 1000 ft ^{2d}	Rep <i>M.nv</i>	1 <i>T.in</i>	Rep <i>M.nv</i>	2 <i>T.in</i>	Rep <i>M.nv</i>	3 <i>T.in</i>	Mean ^a
EXP 10790A + Dac. 2787 + Turficide 400	4 fl oz + 8 fl oz + 8 fl oz	0	0.5	0	0	0	0	0.2 R
Heritage + Turficide 400	0.7 oz + 6 fl oz	0.5	0	0	2	0	0.5	1.0 QR
Dac. Weather Stik + Turficide 400	5.5 fl oz + 6 fl oz	0	2	0	1	0	0	1.0 QR
Heritage + Turficide 400	0.4 oz + 12 fl oz	0	0	0	2	0	2	1.3 P-R
Proprietary								
Heritage + Turficide 400	0.4 oz + 6 fl oz	0	3	0	5	0	1	3.0 O-R
Heritage + Turficide 400	0.7 oz + 12 fl oz	0.5	0	0	5	0	7	4.2 N-R
Rizolex + Turficide 400	4 oz + 6 fl oz	0	2	0	10	0	2	4.7 N-R
Fore + Terraclor	6 oz + 8 oz	0	10	0	3	0	2	5.0 N-R
Caloclor	3 oz	0	7	1	1	0	12	7.0 M-R
Fore + Terraclor	8 oz + 8 oz	0	3	0	20	0	0	7.7 M-R
Dac. Weather Stik + 3336 WP	5.3 fl oz + 2 oz	0	20	0	2	0	2	8.0 M-R
Sentinel + Turficide 400	0.33 oz + 6 fl oz	20	0	1	4	0	0	8.3 M-R
Terraclor	8 oz	0	20	0	5	0	2	9.0 M-R
Banner Maxx + Turficide 400	3 fl oz + 9 fl oz	25	5	2	3	3	0	12.7 L-R
Turficide (75 WG) + Daconil Ultrex	6 oz + 5 oz	0	35	0	3	0	1	13.0 L-R
L002	Preweighed	0	20	0	20	0	2	14.0 K-R
L004	Preweighed	20	10	2	5	5	10	14.0 K-R
Scotts FFII	103.9 oz (2x)	0	35	0	7	0	0.5	14.2 K-R

Table 2. cont.

Treatment	Rate per 1000 ft ^{2d}	Rep <i>M.nv</i>	1 <i>T.in</i>	Rep <i>M.nv</i>	2 <i>T.in</i>	Rep <i>M.nv</i>	3 <i>T.in</i>	Mean ^a
UBI SF-4860	106.7oz	0	40	0	10	0	3	17.7J-R
Turfcide 400	12 fl oz	0	25	0	25	0	10	20.0 I-R
Rizolex	4 oz	10	0	20	20	10	2	20.7 I-R
UBI SF-3048	106.7oz	0	50	0	1	0	12	21.0 I-R
EXP 10790A + PCNB (75WP)	4 fl oz +8 oz	0	60	1	1	0	3	21.7 I-R
Consyst	8 oz	0	55	0	7	0	0.5	23.0 I-R
Daconil ZN + Ch. 26019 FLO	8 fl oz + 4 fl oz	30	0	15	0	25	0	23.3 I-R
WAC 71	12 oz	65	0	0	7	0	0.5	24.2 H-R
EXP 10790A + Dac. Weather Stik	4 fl oz +6 fl oz	0	40	30	0	0	5	25.0 H-R
L005	Preweighed	30	10	20	15	0	2	25.7 H-R
UBI 4141	160 oz	0	65	0	7	0	7	26.3 H-R
Banner Maxx + Daconil 2787	3 fl oz +8 fl oz	40	15	15	0	10	0	26.7 G-R
UBI 4040-01	106.7 oz	0	75	0	2	0	5	27.3 G-R
UBI 4118	106.7 oz	5	25	0	45	2	5	27.3 G-R
Ch. 26019 FLO + Dac. 2787	4 fl oz +8 fl oz	75	5	0	1	0	3	28.0 G-R
L003	Preweighed	45	5	30	0	5	0	28.3 G-R
Banner Maxx + Heritage	3 fl oz +0.4 oz	55	5	20	0	3	2	28.3 G-R
EXP 10790A + Dac. 2787	4 fl oz +8 fl oz	75	10	0	1	0	3	29.7 G-R
CGA-BMP ^b	1 oz (fall) 1 oz (spring)	30	20	15	5	15	5	30.0 G-R
UBI 4142	160 oz	20	55	5	10	0	3	31.0 G-Q
Turfcide (75 WG)	8 oz	0	65	0	30	0	0	31.7 F-P
Turfcide (75 WG) + Ch 26019 FLO	6 oz + 4 fl oz	25	50	0	20	0	0.5	31.8 F-O

Table 2. cont.

Treatment	Rate per 1000 ft ^{2d}	Rep <i>M.nv</i>	1 <i>T.in</i>	Rep <i>M.nv</i>	2 <i>T.in</i>	Rep <i>M.nv</i>	3 <i>T.in</i>	Mean ^a
CGA-BMP	2 oz	0	80	5	7	2	5	33.0 F-O
WAC 71	8 oz	70	0	0	25	2	5	34.0 F-N
Vig. Fert. + PCNB	5 lbs	0	75	0	20	0	7	34.0 F-N
Defend 4F ^c	12 fl oz	40	40	0	3	15	10	36.0 F-M
Turfcide (75WG) + Spotrete (WDG)	6 oz +6 oz	50	35	0	10	0	15	36.7 F-M
Dac. Ultrex + Ch. 26019 FLO	3.8 oz +4 fl oz	65	15	30	0	0	1	37.0 F-M
UBI 4121	160 oz	0	80	0	30	0	15	41.7 E-L
UBI 4143	160 oz	0	80	5	45	0	2	44.0 D-K
EXP 10790A + Heritage	4 fl oz +0.4 oz	30	45	0	30	30	5	46.7 C-J
UBI 4140	160 oz	0	95	5	35	0	7	47.3 C-J
Sentinel + Heritage	0.33 oz + 0.4 oz	48	50	15	10	23	2	49.3 B-I
CGA-BMP	1 oz	70	25	10	40	23	2	56.3 A-G
Fore + Eagle	8 oz + 1.2 oz	50	35	3	12	80	5	61.7 A-F
EXP 10806A	10 lbs	50	40	10	0	85	0	61.7 A-F
Fore	8 oz	65	25	50	10	20	15	61.7 A-F
EXP 10806A	5 lbs	58	40	0	80	20	5	67.7 A-E
Spotrete F	16 fl oz	75	20	65	30	20	5	73.0 A-D
UBI 4044	160 oz	60	35	30	40	20	40	75.0 A-C
Control	-----	60	40	60	30	35	15	80.0 A
Defend 4F ^c + Spotrete (WDG)	8 fl oz +4 oz	65	30	10	65	50	30	83.3 A

^aMeans followed by the same letter are not significantly different from each other (LSD - 0.05).

^bSpring re-application omitted due to failure of fall treatment.

^cMay have mistakenly used Defend 2F due to possible product mis-labelling.

^dRates are formulation per 1000 ft², unless indicated otherwise.

Dollar Spot Fungicide Trial - 1997

Hancock Turfgrass Research Center
Michigan State University, E. Lansing, MI

The 1997 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 E. Lansing, MI. The green was maintained at 1/4" height of cut and was fertilized with 3/8 lb. nitrogen/1000 ft²/mo. Treatments were applied preventively to 2' x 9' plots in four replications in a randomized block design on 7, 14, 21, or 28 day re-treatment schedule, as indicated in the data tables. Treatments were applied with a CO₂, back-pack sprayer at a volume of 48 GPA, except as noted in the data tables. Sprayer pressure was 42 PSI and a flat-fan, 8002E nozzle was utilized.

By the last rating date (9/22), the 7 day treatments had been applied 7 times (8/8, 8/15, 8/23, 8/29, 9/5, 9/12, 9/19), the 14 day treatments had been applied 4 times (8/8, 8/23, 9/5, 9/19), the 21 day treatments had been applied 3 times (8/8, 8/29, 9/19), and the 28 day treatments had been applied twice (8/8, 9/5), except as noted on the data tables. The dollar spot strains in this plot area are benzimidazole-resistant. No objectionable phytotoxicity was observed, except as noted in the data tables.

As the data in table 30 indicates, most treatments gave statistically significant disease control, compared to the untreated control. Statistical separation among the treatment means was less clear cut, but all treatments gave statistically significant disease control, compared to the untreated control. Disease pressure continued to increase steadily in the plot area throughout the duration of this study.

Table 3. Dollar Spot Fungicide Study - 1997
 Hancock Turfgrass Research Center
 Michigan State University, E. Lansing, MI

Rating Scale: Percent plot area infected.
 Rating Date: September 16, 1997

Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	IV	AVG. (LSD-.05) ^a
CGA-BMP	0.5 oz	7 days	0	0	0	0	0G
CGA-BMP	1 oz	14 days	0	0	0	0	0G
CGA-BMP + Primo	0.5 oz + 0.1 fl oz	14 days	0	0	0	0	0G
CH.26019 FLO	4 fl oz	14 days	0	0	0	0	0G
EXP 10790A	4 fl oz	14 days	0	0	0	0	0G
EXP 10702B	4 fl oz	14 days	0	0	0	0	0G
Thalonil (4L) + Heritage	6.2 fl oz + 0.4 oz	14 days	0	0	0	0	0G
Terraguard + Dac. Weather Stik	2 oz + 2.2 fl oz	14 days	0	0	0	0	0G
Terraguard + Dac. Weather. Stik.	1 oz + 4 fl oz	14 days	0	0	0	0	0G

Table 3. cont.							
Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	IV	AVG. (LSD-.05) ^a
Procymidone ^c	1 oz	14 days	0	0	0	0	0G
Procymidone ^c	3 oz	14 days	0	0	0	0	0G
Procymidone ^c	5 oz	14 days	0	0	0	0	0G
Signature + CH.26 GT	4 oz + 3 fl oz	14 days	0	0	0	0	0G
Dac. Weather Stik	4 fl oz	14 days	0	0	0	0	0G
CGA-BMP	0.5 oz	14 days	.25	0	0	0	.06G
Banner MAXX	1 fl oz	21 days	0	0	0	.25	.06G
CH.26019 FLO	3 fl oz	14 days	0	0	0	.25	.06G
EXP 80318A	0.5 fl oz	14 days	.25	0	0	0	.06G
Signature + CH.26GT + Heritage	4oz + 3 fl oz + 0.2 oz	14 days + 14 days + 28 days	0	.25	0	0	.06G
Heritage + CH.26GT	0.2 oz + 3 fl oz	28 days + 14 days	0	0	0	.25	.06G
EXP 80318A	1 fl oz	14 days	.25	0	0	.25	.13G
EXP 10702B	3 fl oz	14 days	0	0	.25	.25	.13G
Eagle	1.2 oz	28 days	.25	.25	.25	0	.19G
Bayleton	1 oz	21 days	0	.25	.25	.25	.19G
Terraguard	4 oz	14 days	1	0	0	0	.25G
EXP 10790A	3 fl oz	14 days	.25	0	.25	.5	.25G
Heritage + Dac. Ultrex	0.2 oz + 3.8 oz	28 days + 14 days	.5	.25	.5	0	.31G
Rubigan AS	2 fl oz	21 days	1	0	0	.25	.31G
A-815-50WP -EXP	2 fl oz	14 days	.33	0	0	1	.31G
EXP 10702B	2 fl oz	14 days	.25	0	2	.25	.63G
EXP 10790A	2 fl oz	14 days	.5	.25	.25	2	.75FG
Thalonil (4L)	6.2 fl oz	14 days	0	.25	0	3	.81FG
Dac. Ultrex	3.8 oz	14 days	0	0	2	2	1.0FG

Table 3. cont.

Treatment	Rate/1000 ft ^{2b}	Interval	I	II	III	IV	AVG. (LSD-.05) ^a
CH26019 + 3336F	2 fl oz + 2 fl oz	14 days	.25	3	0	1	1.06FG
Thalonil (90F)	3.5 fl oz	14 days	.25	0	0	5	1.31FG
WAC 71	4 oz	14 days	1	.25	2	3	1.56FG
CH.26019 FLO	2 fl oz	14 days	.5	5	.25	.5	1.56FG
Terraguard	2 oz	14 days	5	3	0	.25	2.06FG
Dac. Weather Stik	2.2 fl oz	14 days	10	20	.25	2	8.1E
Terraguard	1 oz	14 days	7	3	3	20	8.25E
A-815-50WP -EXP	1 oz	14 days	15	3	7	12	9.25E
Heritage	0.2 oz	14 days	35	35	40	40	37.5 BC
Control	---	---	40	35	40	40	38.8B

^aTreatment means followed by the same letter are not significantly different from each other at the 5% level (LSD-.05).

^bRates are formulation/1000 ft².

^cApplied in 2x water rate (2 gal/1000 ft²).

Brown Patch Fungicide Study - 1997

Hancock Turfgrass Research Center
Michigan State University, E. Lansing, MI

The 1997 brown patch fungicide study was conducted on a mixed stand of colonial bentgrass and annual bluegrass at the Hancock Turfgrass Research Center on the campus of MSU in E. Lansing, MI. The turf was maintained at about 1 1/2 inches, was well irrigated, and was fertilized with 1/2 # N/1000 ft² per week. To encourage disease development, plots were inoculated with *Rhizoctonia solani*, the causal agent of brown patch. The inoculum was grown on a sand/cornmeal medium and applied with a drop spreader over the entire study area on a weekly basis from 6/10/97 through 8/4/97. In addition, for better disease development, plots were covered at night with plastic greenhouse trays to maintain humidity. Treatments were applied preventively to 4 replications of 2' x 4.5' plots arranged in a randomized complete block design. Treatments were applied beginning on 6/24/97, unless otherwise indicated, with re-applications made according to company protocols as listed in the data table. Spray applications were made using a CO₂ back pack sprayer at a 48 GPA spray volume. Sprayer pressure was 42 PSI and a flat-fan (8002E) nozzle was utilized.

Data were collected by visually estimating the percent of the area covered by the plastic greenhouse trays in each plot which was infected with brown patch (see Table 4.) Areas that were not covered at night did not develop disease symptoms. As it was a relatively cool summer, disease development was not as strong as we like and there was some variability in disease pressure. The control plots had an average of only 11% infection, and this, coupled with the variability in pressure, led to statistical separation of treatment means which was not as strong as we usually see. No phytotoxicity was observed.

Table 4. Brown Patch Fungicide Study - 1997.
Hancock Turfgrass Research Center, E. Lansing, MI.

Rating scale: Percent area under pan infected.

Rating date: July 29, 1997.

Treatment	Rate/1000 ft ²	Interval	I	II	III	IV	Ave. (LSD ^a)
WAC 71	4 oz	14 days	0	0	0	0	0 I
A815-50W Expt.	2 oz	14 days	0	0	0	2	0.5 HI
Dac. Ultrex	3.8 oz	14 days	0	2	0	1	0.8 HI
Terraguard + Dac. 2787	1 oz + 5.8 fl oz	14 days	0	1	2	0	0.8 HI
Heritage	0.2 oz	21 days	5	0	0	0	1.3 G-I
Dac. Weather Stik	3.6 fl oz	10 days	0	5	0	0	1.3 G-I
Thalonil 4L	6 fl oz	14 days	0.5	5	0	0	1.4 G-I
Dac. 2787	3.1 fl oz	14 days	0	1	0.5	5	1.6 G-I
Heritage	0.4 oz	21 days	1	5	1	0	1.8 G-I
Procymidone	3 oz ^b	14 days	5	0	2	0	1.8 G-I
A815-50W Expt.	1 oz	14 days	0	1	0	7	2 G-I
Terraguard	1 oz	14 days	5	0.5	3	0	2.1 F-I
Terraguard + Dac 2787	2 oz + 3.1 fl oz	14 days	1	1	2	5	2.3 F-I
Procymidone	10 oz ^b	14 days	0	10	0	0	2.5 F-I
Terraguard	4 oz	14 days	0	0	10	0	2.5 F-I
Spotrete	5 oz	7 days	0.5	0	0	10	2.6 F-I
Procymidone	5 oz ^b	14 days	0.5	5	0	5	2.6 F-I
RH-0753	0.25 oz ai	June 10 only	0	5	10	0	3.8 E-I

Table 4. cont.

Treatment	Rate/1000 ft ²	Interval	I	II	III	IV	Ave. (LSD ^a)
RH-0753	0.5 oz ai	28 days	0	0.5	10	5	3.9 E-I
Thalonil 90 DF	3.5 oz	14 days	2	0	15	0	4.3 E-I
RH-0753	0.25 oz ai	28 days	5	15	0	0	5 D-I
Terraguard	2 oz	14 days	10	15	0	0	6.3 C-I
Prostar	3 oz	21 days	10	10	2	5	6.8 C-I
Prostar Plus	2.5 oz	28 days	5	5	5	20	8.8 C-I
3336 WP	4 oz	14 days	5	5	5	20	8.8 C-I
RH-0753	0.5 oz ai	June 10 only	2	25	5	10	10.5 C-H
RH-0753	0.5 oz ai	June 10 + June 24	10	15	10	10	11.3 C-G
Ch 26GT + 3336 F	2 fl oz+ 2 fl oz	14 days	25	20	0	0	11.3 C-G
Control	-----	-----	5	5	5	30	11.3 C-G
RH-0753	0.25 oz ai	June 10 + June 24	5	40	30	25	25 B

^aMeans followed by the same letter are not significantly different from each other based on the least significant difference test (LSD) at the 5% level.

^bTreatments applied in 3x water rate (3 gal/1000 ft².)

Hancock Turfgrass Research Center
Michigan State University, E. Lansing, MI

The 1997 Pythium blight fungicide study was conducted on a perennial ryegrass/annual bluegrass mixed stand at the Hancock Turfgrass Research Center on the campus of MSU in E. Lansing, MI. The turf was maintained at about a 1 1/2 inch height of cut and was fertilized with 1/2 # N/1000 ft² per week. To encourage disease development, plots were inoculated with *Pythium aphanidermatum*, the causal agent of Pythium blight. The inoculum was grown on a sand/cornmeal medium and applied with a drop spreader over the entire study area on a weekly basis from 6/10/97 through 8/4/97. In addition, for better disease development, plots were covered at night with plastic greenhouse trays and/or a large plastic tarp to maintain humidity. Treatments were applied preventively to 4 replications of 2' x 4.5' plots arranged in a randomized complete block design. Treatments were applied beginning on 6/24/97, unless otherwise indicated, with re-applications made according to company protocols as listed in the data table until 8/19/97. Spray applications were made using a CO₂ back pack sprayer at a 48 GPA spray volume. Sprayer pressure was 42 PSI and a flat-fan (8002E) nozzle was utilized.

Data were collected on July 18 and July 29, 1997 by visually estimating the percent of the plot area which was infected with Pythium blight (see Table 5.) As it was a relatively cool summer, disease development was weak and the control plots averaged only 15% disease. However, there was significant disease control by the chemical standards. No phytotoxicity was observed.

Table 5. Pythium Blight Fungicide Study - 1997.
Hancock Turfgrass Research Center, E. Lansing, MI.

Rating scale: Percent area infected.

Rating date: July 29, 1997.

Treatment	Rate	Interval	I	II	III	IV	Avg. (LSD ^a)
Banol +Heritage	1 fl oz + 0.2 oz	21 days	0	0	0.5	0	0.1 A
Subdue	2 fl oz	14 days	5	0	5	1	2.8 AB
Banol	2 fl oz	21 days	7	5	1	5	4.5 A-C
Aliette	6 oz	14 days	5	5	5	5	5 A-C
Control	---	-----	10	25	15	10	15 D

^aMeans followed by the same letter are not significantly different from each other based on the least significant difference test (LSD) at the 5% level.

Biological Control of Dollar Spot on Annual Bluegrass - 1997

J. Vargas, Jr., N. Dykema, and R. Detweiler

Hancock Turfgrass Research Center
Michigan State University, E. Lansing, MI

The 1997 biocontrol dollar spot study was conducted on annual bluegrass plots at the Hancock Turfgrass Research Center on the MSU campus in E. Lansing, MI. The turf was maintained at about ½ inch height of cut. Fertility was applied as needed to maintain acceptable turf quality. Treatments were applied to four replications of 2 x 3 ft plots which were arranged in a randomized complete block design. All treatments were applied using a back pack sprayer with CO₂, except the Tx-1 bacterial treatments which used N₂ in order to avoid killing the bacteria. Treatments were sprayed using a flat-fan (8002E) nozzle and sprayer pressure of 42 PSI. Spray volumes of 1, 2 or 3 gallons per 1000 ft² were used as indicated in the tables that follow. Treatments were initiated at several different times as some products were late additions to the study (see footnotes on each table.) All treatments were applied through September 22, 1997. Data were collected by visually estimating the percent area infected with dollar spot in each plot. Plots were rated on August 8, prior to most treatment applications since some dollar spot had moved in to the study area, and on September 26 (see table 6) Proprietary treatments and data have been omitted from all data tables.

The standard Daconil Ultrex treatment (3.8 oz, 14 day interval) and those treatments containing the Tx-1 bacteria either alone, boiled, or in combination with a single Daconil Ultrex application all provided excellent dollar spot control throughout the season.

Table 6. Biocontrol Dollar Spot Study - 1997.
Hancock Turfgrass Research Center, E. Lansing, MI.

Rating scale: Percent area infected with dollar spot.

Rating date: September 26, 1997.

Treatment	Rate/1000ft ²	Interval	I	II	III	IV	Avg.(LSD ^a)
Daconil Ultrex [®]	3.8 oz	14 days	0	0	0	0	0.0 F
Tx-1 [®] (boiled)	10 ⁷ CFU/cm ²	Daily	7	3	1	2	3.3 F
Tx-1 [®]	10 ⁷ CFU/cm ²	Daily	7	5	1	3	4.0 F
Tx-1 [®] +	10 ⁷ CFU/cm ² +Daily		5	5	7	1	4.5 F
Daconil Ultrex [®]	3.8 oz	1 appl.					

Table 6. cont.

Treatment	Rate/1000ft ²	Interval	I	II	III	IV	Avg.(LSD ^a)
RD 100 ^f	9.6 fl oz ^b	Variable ^c	50	10	20	10	22.5 E
RD 100 alt. RD 101 ^f	3.2 fl oz ^b	Variable ^d	30	20	25	20	23.8 DE
Heritage ^h	0.4 oz	30 days	20	30	20		23.8 DE
RD 100 alt. RD 101 ^f	9.6 fl oz ^b	Variable ^d	35	30	15	20	25.0 C-E
RD 101 ^f	3.2 fl oz ^b	Variable ^c	40	30	20	15	26.3 B-E
Biotrek Sprayable ^h + R-11 Surfactant ^h	12 fl oz ^c + 0.25 fl oz ^c	10 days 10 days	40	20	25	20	26.3 B-E
Daconil Ultrex ^g	3.8 oz	1 appl.	15	30	25	40	27.5 A-E
RD 100 ^f	3.2 fl oz ^b	Variable ^c	30	35	20	25	27.5 A-E
RD-200 ^f	4% v/v	Variable ^c	40	20	35	30	31.3 A-E
Control	-----	-----	35	25	40	25	31.3 A-E
RD 100 ^f	6.4 fl oz ^b	Variable ^c	40	25	30	40	33.8 A-D
RD 101 ^f	6.4 fl oz ^b	Variable ^c	50	35	20	30	33.8 A-D
RD 101 ^f	9.6 fl oz ^b	Variable ^c	40	20	40	40	35.0 A-C
Heritage ^h + Biotrek sprayable ^h + R-11 Surfactant ^h	0.4 oz + 12 fl oz ^c + 0.25 fl oz ^c	30 days 10 days 10 days	40	30	35	40	36.3 AB
RD 100 alt. RD 101 ^f	6.4 fl oz ^b	Variable ^d	50	20	45	35	37.5 A

^a Treatment means followed by the same letter are not significantly different from each other based on the least significant different test (LSD) at the 5% level.

^b Treatments applied in 3x spray volume (3 gal/ 1000 ft²) using 4% RD 200 in distilled water.

^c Treatments applied during weeks 1, 2, 4, 5, 7, and 8.

^d Treatment RD 100 applied during weeks 1, 4, and 7, and treatment RD 101 applied during weeks 2, 5, and 8.

^e Treatments applied in 2x spray volume (2 gal/ 1000 ft²) using 4% RD 200 in distilled water.

^f First application applied on August 21, 1997.

^g First application applied on August 4, 1997.

^h First application applied on August 8, 1997.

Bentgrass Decline Field Trial - 1997

J.M. Vargas, Jr., N.M. Dykema, and A.R. Detweiler
Michigan State University

A summer decline study was conducted on an irrigated bentgrass (*Agrostis palustris*) putting green at the Hancock Turfgrass Research Center on the MSU campus in E. Lansing, MI. The height of cut was maintained at 1/8 inch, and the area was fertilized as needed to maintain acceptable quality turf. Treatments were applied to 4 replicate 2' x 4.5' plots in a randomized complete block design. Treatments were applied using a CO₂ backpack sprayer with a 8002E flat fan nozzle at a spray volume of 48 GPA and pressure

of 42 PSI. First applications were made on May 22, 1997 and were continued through August 25, 1997. All treatments were applied on a 14 day schedule.

Turf quality ratings were taken on June 10 (Table 7), June 27 (Table 9), and July 25 (Table 9). In addition, a *Microdochium* patch rating was taken on June 10 (Table 8) and a brown patch rating was taken on July 25 (Table 10.)

Table 7. Turf quality rating

Rating scale: 1 - 10, worst - best

Rating date: June 10, 1997

Treatment	Rate/1000 ft ²	I	II	III	IV	Ave. (LSD*)
Signature + EXP 10790 B	4 oz + 4 fl oz	7	7	7	6	6.8 A
Signature + Daconil Ultrex	4 oz + 3.8 oz	7	7	7	6	6.8 A
Signature + Ch 26019 FLO	4 oz + 4 fl oz	6	6	6	6	6 AB
Protect + Aliette Signature	8 oz + 4 oz	6	6	6	6	6 AB
Thalonil 90 DF + Signature	3.5 oz + 4 oz	6	6	6	6	6 AB
Signature + EXP 10790 A	4 oz + 4 fl oz	6	6	5	6	5.8 BC
Control	----	5	4	6	5	5 C
EXP 10790 A + Cleary 3336 F	2 oz + 2 fl oz	4	5	5	6	5 C

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test (p=.05).

Table 8. *Microdochium* patch rating

Rating scale: Percent area infected with *Microdochium* patch

Rating date: June 10, 1997

Treatment	Rate/1000 ft ²	I	II	III	IV	Ave. (LSD*)
Signature + EXP 10790 B	4 oz + 4 fl oz	0	0	0	0	0 A
Signature + Daconil Ultrex	4 oz + 3.8 oz	0	0	0	1	0.3 A
Signature + Ch 26019 FLO	4 oz + 4 fl oz	0	1	1	1	0.8 A
Thalonil 90 DF + Signature	3.5 oz + 4 oz	0	5	0	0	1.3 A
EXP 10790 A + Cleary 3336 F	2 oz + 2 fl oz	0	1	5	2	2 A
Control	----	1	0	3	10	3.5 A
Protect +Aliette Signature	8 oz + 4 oz	15	5	0	0	5 A
Signature + EXP 10790 A	4 oz + 4 fl oz	15	0	7	0	5.5 A

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test (p=.05).

Table 9. Turf quality rating

Rating scale: 0 - 9, worst - best

Rating date: June 27, 1997

Treatment	Rate/1000 ft ²	I	II	III	IV	Ave. (LSD*)
Signature + Daconil Ultrex	4 oz + 3.8 oz	8	8	8	8	8 A
Thalonil 90 DF + Signature	3.5 oz + 4 oz	8	8	8	8	8 A
Signature + EXP 10790 B	4 oz + 4 fl oz	8	8	7	7	7.5 AB
Protect + Aliette Signature	8 oz + 4 oz	7	7	7	8	7.3 BC
Signature + Ch 26019 FLO	4 oz + 4 fl oz	7	7	7	7	7 BC
Signature + EXP 10790 A	4 oz + 4 fl oz	7	7	7	6	6.8 CD
EXP 10790 A + Cleary 3336 F	2 oz + 2 fl oz	6	6	6	7	6.3 D
Control	----	5	5	6	6	5.5 E

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test (p=.05).

Table 9. Turf quality rating

Rating scale: 0 - 9, worst - best

Rating date: July 25, 1997

Treatment	Rate/1000 ft ²	I	II	III	IV	Ave. (LSD*)
Signature + Daconil Ultrex	4 oz + 3.8 oz	7	8	8	8	7.8 A
Signature + EXP 10790 B	4 oz + 4 fl oz	8	8	8	7	7.8 A
Thalonil 90 DF + Signature	3.5 oz + 4 oz	6	7	8	8	7.3 AB
Protect + Aliette Signature	8 oz + 4 oz	7	7	7	7	7 ABC
Signature + Ch 26019 FLO	4 oz + 4 fl oz	7	6	7	6	6.5 BC
Signature + EXP 10790 A	4 oz + 4 fl oz	7	7	6	6	6.5 BC
EXP 10790 A + Cleary 3336 F	2 oz + 2 fl oz	6	6	6	7	6.3 C
Control	----	5	4	6	5	5 D

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test (p=.05).

Table 10. Brown patch rating

Rating scale: Percent area infected with Brown patch

Rating date: July 25, 1997

Treatment	Rate/1000 ft ²	I	II	III	IV	Ave. (LSD*)
Signature + EXP 10790 B	4 oz + 4 fl oz	5	0	0	0	1.3 A
Protect + Aliette Signature	8 oz + 4 oz	0	5	0	10	3.8 AB
Thalonil 90 DF + Signature	3.5 oz + 4 oz	5	5	5	5	5 AB
Signature + Daconil Ultrex	4 oz + 3.8 oz	5	7	5	5	5.5 AB
Signature + Ch 26019 FLO	4 oz + 4 fl oz	7	5	5	7	6 AB
EXP 10790 A + Cleary 3336 F	2 oz + 2 fl oz	15	10	10	10	11.3 BC
Signature + EXP 10790 A	4 oz + 4 fl oz	10	5	20	25	15 C
Control	----	30	30	10	25	23.8 D

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test (p=.05).

Summer Decline on *Poa annua* - 1997

J.M. Vargas, Jr., N.M. Dykema, and A.R. Detweiler
Michigan State University

A summer decline study was conducted on an irrigated annual bluegrass (*Poa annua*) fairway at the Hancock Turfgrass Research Center on the MSU campus in E. Lansing, MI. The height of cut was maintained at 1/2 inch, and the area was fertilized as needed to maintain acceptable quality turf. Treatments were applied to 3 replicate 2' x 4.5' plots in a randomized complete block design. Treatments were applied using a CO₂ backpack sprayer with a 8002E flat fan nozzle at a spray volume of 48 GPA and pressure of 42 PSI. First applications were made on May 22, 1997 and were continued through August 25, 1997. All treatments were applied on a 14 day schedule.

Turf quality ratings were taken on June 10 (Table 11), June 27 (Table 13), and July 25 (Table 14). In addition, a *Microdochium* patch rating was taken on June 10 (Table 12) and a dollar spot/summer patch disease rating was taken on July 25 (Table 15.)

Table 11. Turf quality rating

Rating scale: 1 - 10, worst - best

Rating date: June 10, 1997

Treatment	Rate	I	II	III	Ave. (LSD*)
Aliette + Fore WP	4 oz + 8 oz	7	7	6	6.7 A
Aliette Signature + Exp 10790 A	4 oz + 4 fl oz	6	7	6	6.3 A
Aliette Signature + Daconil Ultrex	4 oz + 3.8 oz	6	6	6	6.0 A
Control	-----	4	5	4	4.3 B

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test (p=.05).

Table 12. *Microdochium* patch ratingRating scale: Percent area infected with *Microdochium* patch

Rating date: June 10, 1997.

Treatment	Rate	I	II	III	Ave. (LSD*)
Aliette Signature + Exp 10790 A	4 oz + 4 fl oz	0	0	0	0 A
Aliette + Fore WP	4 oz + 8 oz	0.5	0	0	0.2 A
Aliette Signature + Daconil Ultrex	4 oz + 3.8 oz	1	1	0.5	0.8 A
Control	-----	0.5	7	20	9.2 A

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test ($p=0.05$).

Table 13. Turf quality rating

Rating scale: 0 - 9, worst - best

Rating date: June 27, 1997

Treatment	Rate	I	II	III	Ave. (LSD*)
Aliette + Fore WP	4 oz + 8 oz	8	8	6	7.7 A
Aliette Signature + Exp 10790 A	4 oz + 4 fl oz	6	7	7	6.7 AB
Aliette Signature + Daconil Ultrex	4 oz + 3.8 oz	6	6	8	6.7 AB
Control	-----	4	7	4	5 B

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test ($p=0.05$).

Table 14. Turf quality rating

Rating scale: 0 - 9, worst - best

Rating date: July 25, 1997

Treatment	Rate	I	II	III	Ave. (LSD*)
Aliette Signature + Daconil Ultrex	4 oz + 3.8 oz	8	8	8	8 A
Aliette Signature + Exp 10790 A	4 oz + 4 fl oz	7	8	8	7.7 A
Aliette + Fore WP	4 oz + 8 oz	8	8	7	7.7 A
Control	-----	5	7	6	6 B

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test ($p=0.05$).

Table 15. Dollar spot/ summer patch rating

Rating scale: Percent area infected

Rating date: July 25, 1997

Treatment	Rate	I	II	III	Ave. (LSD*)
Aliette + Fore WP	4 oz + 8 oz	0	1	1	0.7 A
Aliette Signature + Daconil Ultrex	4 oz + 3.8 oz	2	0	0	0.7 A
Aliette Signature + Exp 10790 A	4 oz + 4 fl oz	3	0	0.5	1.2 A
Control	-----	10	2	0.5	4.2 A

*Means followed by the same letter are not significantly different from each other when separated using Least Significant Difference test ($p=0.05$).