

Turfgrass Disease Management Report, 1980-81

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Snow Mold Fungicide Trials - 1980-81

Establishment

The 1980-81 snow mold fungicide trials were conducted at the Boyne Highlands Resort on Penncross creeping bentgrass mowed at 1/2". Treatments were applied to 6' x 9' plots in three replications of a random block design on November 4, 1980. The wettable powders and flowables were applied with a small-plot CO₂ sprayer at a volume of 40 gal/acre. The granular applications were made with a 3' drop-type Scotts spreader. The plot ratings were made on April 11, 1981 (Table 1).

Results

All fungicides except MF 563 and Tersan 1991 2 oz. gave significant snow mold management when compared to the untreated control. Those giving the best management in order were ProTurf F + F II 2X, MF 647 + Calo-clor 4 oz. + 3 oz., Calo-gran 6 lbs., Calo-clor 3 oz., Daconil 2787 fl. 8 oz. plus Ronilan 4 oz., Actidione RZ 8 oz., ProTurf Broad Spectrum 2X, CGA 64251 20 gm ai, Tersan SP 9 oz., MF 647 8 oz., CGA-64251 10 gm ai, Bayleton 4 oz., Daconil fl. 8 oz., and Tersan SP 13 oz. (large nozzle application). It should be noted there were high levels of Fusarium patch present where the ergosterol inhibiting fungicides CGA 64251 and Bayleton were used.

Table 1. Boyne Highlands Snow Mold Study. Percent area infected with snow mold (Typhula blight - Typhula ishikarensis). Ratings taken 4/11/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
ProTurf F + FII	2X	0	0	0	0	A
MF647 + Calo-Clor	4 oz. + 3 oz.	0	1	0	.3	A
Calo-Gran	6 lbs.	1	1	2	1.3	A
Calo-Clor	3 oz.	2	2	2	2	A
Daconil 2787 Fl. + Ronilan	8 fl. oz. + 4 oz.	2	2	5	3	A
Acti-dione RZ	8 oz.	10	0	2	4	AB
Pro-Turf - Broad Spect.	2X	5	2	5	4	AB
CGA 64251	20 gm. ai.	20	5*	20*	15	ABC
Tersan SP	9 oz.	7	35	7	16.3	ABC
MF 647	8 oz.	20	10	30	20	ABC
CGA 64251	10 gm. ai.	20	40*	30*	23.3	ABC
Bayleton	4 oz.	10	20*	40*	23.3	ABC
Daconil 2787 Fl.	8 fl. oz.	40	25	10	25	ABCD
Tersan SP (large nozzle)	13 oz.	20	20	40	26.7	ABCD
MF 647	4 oz.	20	40	30	30	BCD
Bayleton	2 oz.	40*	40*	20*	33.3	CD
Tersan 1991 + Daconil 2787 Fl.	2 oz. + 8 fl. oz.	50	50	1	33.7	CD
MF 653	3 lbs.	60	20	70	50	DE
MF 653	6 lbs.	70	20	60	50	DE
Control		60	80*	60	66.7	EF
Tersan 1991	2 oz.	90	70	70	76.7	F

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

*Plots showing infection by Fusarium patch (Fusarium nivale) as well as Typhula blight.

Helminthosporium (Melting-Out) Fungicide Studies - 1981

Establishment

The 1981 *Helminthosporium* melting-out (*Helminthosporium vagans*) fungicide study was conducted at the MSU Soils Research Farm on Park Kentucky bluegrass maintained at a 1 1/2" height of cut. Fungicides were applied at various intervals as indicated in the data chart. All treatments were applied with a CO₂ small-plot sprayer at a volume of 40 gal/acre.

The study was divided into two parts, one consisting of the usual three replications of a random block design and the other consisting of four replications of the same experimental plot design. The plots were 3' x 6' in size.

The plots were read on May 29, 1981 (Tables 2 and 3).

A second *Helminthosporium* melting-out (*Helminthosporium vagans*) study was conducted on an irrigated, Baron Kentucky bluegrass fairway at the Hartland Glen Golf Course in Hartland, MI. The study was laid out in three replications of a random block design utilizing a plot size of 6' x 9'. Treatments were applied on April 30, May 18 and May 28, except as noted on the data chart. A CO₂ small plot sprayer was used to apply the treatments at a volume of 40 gal/acre. All granular materials were pre-weighed and applied by hand.

The plots were rated for disease on June 2 (Table 4).

Results

Study A, MSU Crop and Soil Science Field Lab (Table 2). The fungicides giving the best management of *Helminthosporium* melting-out in order of ranking were Chipco 26019 at the 2 oz. rate at both 14- and 28-day intervals, BASF 43600 at 1, 2 and .5 oz ai applied every two weeks, Daconil 2787 fl. 2 oz. every 10 days, Actidione RZ .55 oz. every 21 days, CGA 64251 4 gm ai every 14 days, Daconil 2787 fl. 6 oz. at 10- and 14-day intervals and Actidione RZ .55 oz. applied only once. Chipco 26019 at the 2 oz. rate gave excellent disease control even at a 28-day interval. The 2 oz. rate of Daconil on a 10-day basis gave the same level of management of *Helminthosporium* melting-out as the 6 oz. rate applied on a 14-day schedule, as previously seen in *Sclerotinia* dollar spot fungicide trials. One early treatment of Actidione RZ at the .55 oz. rate in 3 gals of water gave good management of *Helminthosporium* melting-out for the duration of the experiment.

Study B, MSU Crop and Soil Science Field Lab (Table 3). EL 222 appears to have little efficacy against *H. vagans*. It was compatible with Daconil 2787 and could be used in a tank mix for broader disease management.

Table 2. Helminthosporium Melting-Out Fungicide Study - 1981. MSU Crop and Soils Research Farm. Rating 1 (no disease) - 9 (90% or greater infection). 5/29/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
Chipco 26019	2 oz. ⁴	1	1	1	1	A
Chipco 26019	2 oz. ²	1	1	1	1	A
BAS 43600	1 oz. ai. ²	1	1	2	1.3	A
BAS 43600	2 oz. ai. ²	1	1	2	1.3	A
BAS 43600	.5 oz. ai. ²	2	1	2	1.7	AB
Daconil 2787 Fl.	2 fl. oz. ¹	5	1	1	2.3	ABC
Acti-dione RZ	.55 oz. - 2 gal. H ₂ O ³	3	2	3	2.7	ABC
CGA 64251	4 gm. ai. ²	2	5	3	3.3	ABCD
Daconil 2787 Fl.	6 fl. oz. ¹	4	2	5	3.7	ABCD
Daconil 2787 Fl.	6 fl. oz. ²	3	4	4	3.7	ABCD
Acti-dione RZ	.55 oz. - 3 gal. H ₂ O (1 applic. only)	3	3	5	3.7	ABCD
Acti-dione RZ	.55 oz. - 1 gal. H ₂ O ³	3	5	3	3.7	ABCD
Daconil 2787 Fl.	4 fl. oz. ²	3f	4	6	4.3	BCD
Acti-dione RZ	.55 oz. - 1 gal. H ₂ O (1 applic. only)	2	7	4	4.3	BCD
Acti-dione RZ	1.1 oz. - 1 gal. H ₂ O (1 applic. only)	3	7	3	4.3	BCD
Daconil 2787 Fl.	6 fl. oz. ¹ (interval and rate adjustable)	6	4	4	4.7	CD
Acti-dione RZ	1.1 oz. - 3 gal. H ₂ O (1 applic. only)	6	5	3	4.7	CD
Daconil 2787 Fl.	4 fl. oz. ¹	3	5	7	5	CDE
Daconil 2787 Fl.	2 fl. oz. ²	3	5	7	5	CDE
CGA-64251	8 gm. ai. ²	7	2	7	5.3	CDE
Daconil 2787 Fl.	3 fl. oz. ¹ (interval and rate adjustable)	7	7	5	6.3	DE
Control		8	8	7	7.7	E

Treatments followed by the same letter are not significantly different from others at the 5% level of significance.

¹All 10 day interval treatments applied 4/21, 5/1, 5/12, 4/22.

²All 14 day interval treatments applied 4/21, 5/5, 5/19.

³All 21 day interval treatments applied 4/21, 5/12.

⁴All 28 day interval treatments applied 4/21, 5/19.

Table 3. Helminthosporium Melting-Out Fungicide Study - 1981. MSU Crops and Soils Research Farm. Rating 1 (no disease) - 9 (90% infection or greater). 5/29/81.

Treatment	Rate/Acre	Replication				AVE	DMR
		I	II	III	IV		
E1 222 + Daconil 2787 (WP)	.25 lb. ai./A. + 8 lb. ai./A.	3	5	3	3	3.5	A
Daconil 2787 (WP)	8 lb. ai./A.	3	4	6	3	3.8	AB
Daconil 2787 (WP)	4 lb. ai./A.	5	4	4	4	4	ABC
E1 222 + Daconil 2787 (WP)	.125 lb. ai./A. + 8 lb. ai./A.	5	4	7	2	4.3	ABC
E1 222 + Daconil 2787 (WP)	.125 lb. ai./A. + 2 lb. ai./A.	4	5	4	6	4.8	ABCD
E1 222 + Daconil 2787 (WP)	.25 lb. ai./A. + 4 lb. ai./A.	2	6	8	3	4.8	ABCD
E1 222 + Daconil 2787 (WP)	.5 lb. ai./A. + 4 lb. ai./A.	2	6	8	3	4.8	ABCD
E1 222	.125 lb. ai./A.	3	6	7	4	5	ABCD
E1 222 + Daconil 2787 (WP)	.125 lb. ai./A. + 4 lb. ai./A.	4	7	3	6	5	ABCD
E1 222 + Daconil 2787 (WP)	.25 lb. ai./A. + 2 lb. ai./A.	3	7	4	6	5	ABCD
E1 222 + Daconil 2787 (WP)	.5 lb. ai./A. + 8 lb. ai./A.	4	6	3	7	5	ABCD
Daconil 2787 (WP)	2 lb. ai./A.	6	7	5	4	5.5	ABCD
E1 222 + Daconil 2787 (WP)	.5 lb. ai./A. + 2 lb. ai./A.	7	3	8	4	5.5	ABCD
Control	---	7	8	6	5	6.5	BCD
E1 222	.5 lb. ai./A.	7	6	7	7	6.8	CD
E1 222	.25 lb. ai./A.	4	9	8	8	7.3	D

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

Note: All treatments applied 4/21, 5/5, 5/19.

Table 4. Hartland Helminthosporium Melting-Out Fungicide Study - 1981.
 Rating 1 (no disease) - 9 (90% infection or greater). Rated 6/2/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
Chipco 26019 ¹	2 oz.	3	2	2	2.3	A
CGA 55100 ²	28 gm. ai.	2	2	3	2.3	A
Par Ex (18-4-16) + CGA-64251 ³	12 gm. ai.	3	4	2	3	A
CGA 55100 ²	22 gm. ai.	5	2	2	3	A
Par Ex (18-4-6) + CGA-64251 ³	8 gm. ai.	3	5	3	3.7	A
Check	---	6	6	5	5.7	B

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

¹Applied 4/30, 5/18, 5/28.

²Applied 4/30, 5/18.

³Applied 4/30, 5/28.

Results

Hartland Glen Golf Course (Table 4). The CGA 55100 applications at the 22 + 28 gm. ai. rates and CGA 64251 at the 8 + 12 gm. ai. rates applied in combination with a Par Ex fertilizer blend gave excellent management of Helminthosporium melting-out compared to the standard Chipco 26019 and the untreated control. The Par Ex fertilizer was applied at a rate of .8 lb. of actual nitrogen/1000 sq ft/application.

Dollarspot Fungicide Studies - 1981

Establishment

Three dollarspot (*Sclerotinia homeocarpa*) studies were conducted this year. One was established on an annual bluegrass (*Poa annua*) fairway and two were placed on a Toronto creeping bentgrass green. Liquid applications were made with a CO₂ small-plot sprayer at a volume of 40 gal/acre. Granular formulations were laid out in a random block design with two studies containing three replications and one study containing four replications.

Annual Bluegrass Study

The annual bluegrass dollarspot study was conducted at Burroughs Farms Golf Course in Brighton, MI, on an irrigated *Poa annua* fairway maintained at 1/2" height of cut. All treatments were applied preventatively on August 7, and some were re-applied on August 18 or August 28, as indicated on the data chart (Table 5). The ratings were taken on September 8, 1981. The plot size was 6' x 9'.

Toronto Creeping Bentgrass Studies

The Toronto creeping bentgrass dollarspot studies were conducted at the MSU Crops and Soils Field Laboratory on an irrigated putting green. Treatments were applied preventatively on the dates indicated on the data charts. Study #1 (Table 6) contained 3 replications, study #2 (Table 7) contained 4 replications. All ratings were taken on September 18, 1981. Plots were 3' x 6' in size.

Results

There was low disease pressure in the *Sclerotinia* dollar spot study on Burroughs Farm Study on annual bluegrass (Table 5). With the exception of a few treatments, most of the fungicides gave effective management of *Sclerotinia* dollarspot at most rates.

Crops Barn Creeping Bentgrass Dollarspot Fungicide Study #1. All treatments gave significant management of *Sclerotinia* dollarspot compared to the untreated control (Table 6). The 2 oz. rate of Daconil 2787 (500) was as effective as the 6 oz. rate of Daconil 2787 (500) when both were applied on a 14-day schedule. Likewise, Daconil 2787 (500) and WP at the 2 oz. rates at 10-day intervals gave management equivalent to that of the Daconil 2787 6 oz. (500) treatment applied at the 14-day interval. This supports similar findings last season under more severe disease pressure where the 2 oz. rate of Daconil 2787 WP every 10 days gave management comparable to that of the 6 oz. flowable rate every 14 days. This should make the use of Daconil 2787 more economical. Chipco 26019 gave significant management of *Sclerotinia* dollarspot for a 28-day period under moderate disease pressure. Actidione TGF was phytotoxic after repeated applications, causing a browning and thinning of the turf from eye level. Close examination revealed a yellowing of the leaf tissue as well.

All treatments gave significant management of *Sclerotinia* dollarspot in study #2 at the Crop Science Field Laboratory (Table 7). EL-222 was shown to have excellent activity against *Sclerotinia* dollarspot under severe disease pressure. It also is compatible with Daconil 2787.

Table 5. Burroughs Farms Annual Bluegrass Dollarspot Fungicide Study - 1981.
Rating 1 (no disease) - 9 (90% infection or greater). Rated 9/8/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
El 222	.5 lb. ai./A. ¹	1	1	1	1	A
Bayleton + Urea	2 oz. + 1/2 lb. N. ²	1	1	1	1	A
Bayleton + Urea	4 oz. + 1/2 lb. N. ²	1	1	1	1	A
Bayleton	4 oz. ³	1	1	1	1	A
Bayleton	1 oz. ²	1	1	1	1	A
Bayleton	2 oz. ²	1	1	1	1	A
Bayleton	4 oz. ²	1	1	1	1	A
ProTurf DSB	2X ¹	1	1	1	1	A
CGA-64251	1 fl. oz. ¹	1	1	1	1	A
CGA-64250	.16 fl. oz. ¹	1	1	1	1	A
CGA-64250	.32 fl. oz. ¹	1	1	1	1	A
Par Ex + CGA-64251	.8 lbs. N./8 gm. ai. ¹	1	1	1	1	A
Par Ex + CGA-64251	.8 lbs. N./12 gm. ai. ¹	1	1	1	1	A
Par Ex + CGA-64250	.8 lbs. N./8 gm. ai. ¹	1	1	1	1	A
Par Ex + CGA-64250	.8 lbs. N./12 gm. ai. ¹	1	1	1	1	A
Cleary 3336	1 oz. ¹	1	1	1	1	A
Bromosan FL	4 fl. oz. ¹	1	1	1	1	A
BAS 43600	1 oz. ai. ²	1	1	1	1	A
BAS 43600	2 oz. ai. ²	1	1	1	1	A
Bayleton WDG	2 oz. ³	1	1	1	1	A
Bayleton WDG	4 oz. ³	1	1	1	1	A
Bayleton WDG	1 oz. ²	1	1	1	1	A
Bayleton WDG	2 oz. ²	1	1	1	1	A
Bayleton WDG	4 oz. ²	1	1	1	1	A
El 222	.125 lb. ai./A. ¹	2	1	1	1.3	AB
Bayleton + Urea	1 oz. + 1/2 lb. N. ²	1	1	2	1.3	AB
Bayleton + Urea	4 oz. + 1/2 lb. N. ³	1	2	1	1.3	AB
Fungo 50	1 oz. ¹	1	2	1	1.3	AB
Bayleton	1 oz. ³	1	2	1	1.3	AB
Bayleton	2 oz. ³	1	1	2	1.3	AB
Acti-dione TGF	.34 oz. ²	1	1	2	1.3	AB
BAS 43600	.5 oz. ai. ²	1	1	2	1.3	AB
Daconil 2787 FL	3.75 qts./A. ²	1	1	2	1.3	AB
El 222	.25 lbs. ai./A. ¹	1	2	2	1.7	AB
CGA-64251	.5 fl. oz. ¹	1	1	3	1.7	AB
Daconil 2787 WDG	8 lbs./A. ²	3	1	1	1.7	AB
Acti-dione Thiram	2 oz. ²	2	1	2	1.7	AB
Bayleton + Urea	2 oz. + 1/2 lb. N. ³	2	1	3	2	ABC
Acti-dione TGF	.68 oz. ²	1	4	1	2	ABC
Daconil 2787 WP	1.84 oz. ²	3	1	2	2	ABC
Daconil 2787 FL	7 qts./A. ²	1	2	3	2	ABC
OAC 3890	2 oz. ¹	2	2	2	2	ABC
Bayleton WDG	1 ox. ³	1	1	4	2	ABC
Bayleton + Urea	1 oz. + 1/2 lb. N. ³	1	4	3	2.7	ABCD
Daconil 2787 WP	.92 oz. ²	3	2	3	2.7	ABCD
Acti-dione RZ	1.6 oz. ²	2	1	5	2.7	ABCD
Acti-dione RZ + Acti-dione TGF	.55 oz. + .34 oz. ²	3	3	2	2.7	ABCD
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz. ²	4	3	2	3	BCD
OAC 3890	4 oz. ²	3	2	6	3.7	CD
Panasea	1 fl. oz. ²	2	4	6	4	D
Daconil 2787 WDG	4.33 lbs./A. ²	2	5	5	4	D
Check	---	5	1	6	4	D

All treatments followed by the same letter are not significantly different at the 5% level.

¹Treatments applied on 8/7 and 8/28.

²Treatments applied on 8/7 and 8/18.

³Treatments applied 8/7 only.

Table 6. Crops Barn Creeping Bentgrass Dollarspot Fungicide Study #1 - 1981.
Disease Rating - Number of Dollarspots/Plot. Rated 9/18/81.

Treatment	Rate 100 ft ²	Replication			AVE	DMR
		I	II	III		
Chipco 26019	2 oz. ²	0	0	0	0	A
Daconil 2787 (500)	2 oz. ¹	0	0	0	0	A
Daconil 2787 (500)	4 oz. ¹	0	0	0	0	A
Daconil 2787 (500)	6 oz. ¹	0	0	0	0	A
Daconil 2787 (500)	4 oz. ²	0	0	0	0	A
Daconil 2787 (500)	6 oz. ²	0	0	0	0	A
Daconil 2787 (500)	6 oz. ²	0	0	0	0	A
	(rate & interval adjustable)					
Fungo 50	1 oz. ²	0	0	0	0	A
Cleary 3336	1 oz. ²	0	0	0	0	A
Daconil 2787 (500)	3 oz. ²	0	0	2	.7	A
	(rate & interval adjustable)					
Acti-dione TGF + Daconil 2787 (WP)*	1 oz. + 1 oz. ¹	6	0	0	2	AB
Chipco 26019	1 oz. ²	3	5	9	2.7	AB
Daconil 2787 (WP)	2 oz. ¹	5	0	6	3.7	AB
Daconil 2787 (500)	2 oz. ²	0	9	2	3.7	AB
Acti-dione TGF*	2 oz. ¹	0	0	13	4.3	AB
Chipco 26019	2 oz. ³	0	50	1	17	AB
Daconil 2787 (WP)	1 oz. ¹	20	15	18	17.7	AB
Chipco 26019	1 oz. ³	3	45	6	18	AB
Acti-dione TGF*	1 oz. ¹	52	0	41	31	B
Check	---	148	69	59	92	C

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

*Phytotoxicity observed after repeated applications.

¹All 10 day interval treatments applied 6/17, 6/26, 7/7, 7/17, 7/27, 8/6, 8/17, 8/26, 9/9, 9/14.

²All 14 day interval treatments applied 6/17, 7/1, 7/15, 7/30, 8/12, 8/26, 9/9.

³All 28 day interval treatments applied 6/17, 7/15, 8/12, 9/14.

Table 7. Crops Science Field Lab Creeping Bentgrass Dollarspot Fungicide Study #2 - 1981. Number of Dollarspots/Plot. Rated 9/18/81.

Treatment	Rate/Acre	Replication				AVE	DMR
		I	II	III	IV		
EI 222 + Daconil 2787 (WP)	.25 lb. ai. + 8 lb. ai./A.	0	0	0	0	0	A
EI 222 + Daconil 2787 (WP)	.5 lb. ai. + 2 lb. ai./A.	0	0	0	0	0	A
EI 222 + Daconil 2787 (WP)	.5 lb. ai. + 4 lb. ai./A.	0	0	0	0	0	A
EI 222 + Daconil 2787 (WP)	.5 lb. ai. + 8 lb. ai./A.	0	0	0	0	0	A
EI 222 + Daconil 2787 (WP)	.25 lb. ai. + 4 lb. ai./A.	0	0	1	0	.3	A
EI 222	.5 lb. ai./A.	0	2	0	0	.5	A
EI 222 + Daconil 2787 (WP)	.125 lb. ai. + 8 lb. ai./A.	0	0	2	0	.5	A
EI 222 + Daconil 2787 (WP)	.25 lb. ai. + 2 lb. ai./A.	0	1	0	4	1.3	A
Daconil 2787 (WP)	8 lb. ai./A.	2	2	7	0	2.8	A
EI 222 + Daconil 2787 (WP)	.125 lb. ai. + 4 lb. ai./A.	1	8	8	6	5.8	A
EI 222 + Daconil 2787 (WP)	.125 lb. ai. + 2 lb. ai./A.	4	14	25	8	12.8	A
EI 222	.25 lb. ai./A.	3	25	20	21	17.3	A
Daconil 2787 (WP)	4 lb. ai./A.	12	45	27	64	37	AB
EI 222	.125 lb. ai./A.	15	29	33	121	49.5	AB
Daconil 2787 (WP)	2 lb. ai./A.	20	82	121	105	82	B
Check	---	150	300	350	150	237.5	C

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

All treatments applied 6/17, 7/1, 7/15, 7/30, 8/12, 8/26, 9/9.

Burroughs Farms Daconil 2787 WDG - Fairway Dollarspot Study - 1981

Establishment

The 1981 Daconil 2787 WDG study was conducted on an irrigated Poa annua (annual bluegrass) fairway on the Burroughs Farms Golf Course in Brighton, MI. Treatments were applied in three replications of a random block design to an area which already was suffering a severe dollarspot (Sclerotinia homeocarpa) infection. All treatments were applied on August 4, August 19 and September 1 using a CO₂ small-plot sprayer delivering a volume of 40 gal/acre (Table 8). Plot size was 6' x 9'.

Ratings were taken on August 19, September 1, September 8 and September 15, as reported on the following data charts.

Results

All treatments gave significant management of Sclerotinia dollarspot throughout the study (Table 8). The 7 qts/acre rate of Daconil 2787 gave the most effective management, reducing the disease incidence to almost 0% after the third application. The flowable formulation gave better management of the disease when compared to the corresponding wettable dispersable granular formulations.

Table 8. Burroughs Farms Daconil 2787 WDG Dollarspot Study - 1981.
 Dollarspot Rating 1 (no disease) - 9 (90% infection or greater).

Treatment	Rate/Acre	Replication			AVE	DMR
		I	II	III		
<u>Rating of 8/19/81</u>						
Daconil 2787 FL	7 qts.	3	3	4	3.3	A
Daconil 2787 FL	3.75 qts.	5	3	3	3.7	A
Daconil 2787 WDG	8 lbs.	4	5	4	4.3	A
Daconil 2787 WDG	4.33 lbs.	5	4	6	5	A
Control	---	8	8	9	8.3	B
<u>Rating of 9/1/81</u>						
Daconil 2787 FL	7 qts.	2	2	3	2.3	A
Daconil 2787 WDG	8 lbs.	3	3	4	3.3	B
Daconil 2787 FL	3.75 qts.	4	3	4	3.7	B
Daconil 2787 WDG	4.33 lbs.	4	3	5	4	B
Control	---	9	8	9	8.7	C
<u>Rating of 9/9/81</u>						
Daconil 2787 FL	7 qts.	1	1	2	1.3	A
Daconil 2787 WDG	8 lbs.	2	3	3	2.7	B
Daconil 2787 FL	3.75 qts.	3	3	4	3.3	C
Daconil 2787 WDG	4.33 lbs.	4	4	5	4.3	D
Control	---	9	9	9	9	E
<u>Rating of 9/15/81</u>						
Daconil 2787 FL	7 qts.	1	1	2	1.3	A
Daconil 2787 WDG	8 lbs.	3	4	4	3.7	B
Daconil 2787 FL	3.75 qts.	4	3	4	3.7	B
Daconil 2787 WDG	4.33 lbs.	5	5	6	5.3	C
Control	---	9	8	9	8.7	D
<u>Combined average of individual reading dates</u>						
		8/19	9/1	9/8	9/15	
Daconil 2787 FL	7 qts.	3.3	2.3	1.3	1.3	
Daconil 2787 WDG	8 lbs.	3.7	3.3	2.7	3.7	
Daconil 2787 FL	3.75 qts.	4.3	3.7	3.3	3.7	
Daconil 2787 WDG	4.33 lbs.	5	4	4.3	5.3	
Control	---	8.3	8.7	9	8.7	

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

Crop and Soils Field Laboratory Growth Regulator Study - 1981

Establishment

The Elanco growth regulator-disease control interaction studies were conducted on a high maintenance Toronto creeping bentgrass putting green at the Crop and Soils Research Laboratory on the MSU campus in E. Lansing, MI. The area had suffered severe dollarspot (Sclerotinia homeocarpa) pressure in the past. The treatments were applied on April 18, prior to any significant spring green-up and well before the first mowing of the season (Table 9). Applications were made with a CO₂ small-plot sprayer at a volume of 40 gal/acre. The plots were 6' x 6' in size.

Results

Immediately following the early spring treatments, no significant differences in spring green-up were noticed. Within a few weeks of application, however, marked differences began to develop in turf color, density and vigor. The plot area had suffered significant dollarspot (Sclerotinia homeocarpa) and snow mold (Typhula sp., Fusarium nivale) damage during the prior season. Because of the suppressed growth effect of primarily the 2 lb. ai./acre rate of EL 500, all three replications of this treatment showed evidence of previous season snow mold and dollarspot damage well into June. On June 19, differences were noted comparing the appearance of the treated plots to the untreated controls. The following chart summarizes these observations.

As the summer progressed, the growth inhibition effects in the previously mentioned plots subsided, such that by July 21, no noticeable differences in appearance or growth rates were obvious between the treated and the untreated plots. At this point, all plots began to respond predictably to the fertilizer treatments (1 3/4 lb. total nitrogen) and to the irrigation.

By the beginning of August, dollarspot pressure was increasing rapidly over the entire plot area. By August 12, the entire plot area was diseased, making the first disease rating possible (Table 9). As the data shows, differences in disease level from plot to plot were apparent, but the ratings are somewhat erratic. By August 26, disease pressure had increased further and a second dollarspot rating was taken (Table 10). There were no significant differences between treatments. EL 500 may have shown fungicidal properties had the dollarspot appeared in early June, as it normally does, when the growth retardant effects of the EL 500 were still evident. Additional studies should be conducted in this vein.

Table 9. Elanco Growth Regulator - Dollarspot Creeping Bentgrass Study - 1981. Summation of early season plot observations. Rating 1 (no disease) - 9 (90% infection or greater). Rated 8/12/81.

Treatment	Rate/Acre	Replication			AVE	DMR
		I	II	III		
Daconil 2787 WP	8 lbs. ai.	2	2	4	2.7	A
E.L. 500 + Daconil 2787 WP	1 lb. ai. + 4 lb. ai.	3*	3	2	2.7	A
Check	---	2	2	4	2.7	A
E.L. 500	2 lbs. ai.	3*	2*	5*	3.3	A
E.L. 500 + Daconil 2787 WP	1 lb. ai. + 8 lb. ai.	3	3	4	3.3	A
E.L. 500	1 lb. ai.	3	4	4	3.7	A
E.L. 500	.5 lb. ai.	5	2	5	4	A
E.L. 500	1.5 lb. ai.	3	2	7*	4	A

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

No phytotoxicity has been observed up to this point.

*On 6/19/81, these plots showed marked growth inhibition compared to other treated and untreated plots. They were much darker green in color, sunken in appearance in relation to surrounding plots and still very "pock-marked" from the previous seasons dollarspot and snow mold damage. Turf in these plots was less dense, and leaves were wider and more coarse than turf in surrounding plots and controls.

Table 10. Elanco Growth Regulator - Dollarspot Creeping Bentgrass Study - 1981. Rating 1 (no disease) - 9 (90 % infection or greater). Rated 8/26/81.

Treatment	Rate/Acre	Replication			AVE	DMR
		I	II	III		
Daconil 2787 WP	8 lbs. ai.	2	2	5	3	A
E.L. 500 + Daconil 2787 WP	1 lb. ai. + 4 lb. ai.	3	4	3	3.3	A
Check	---	2	3	5	3.3	A
E.L. 500	1 lb. ai.	4	4	4	4	A
E.L. 500 + Daconil 2787 WP	1 lb. ai. + 8 lb. ai.	3	4	5	4	A
E.L. 500	1 lb. ai.	3	3	7	4.3	A
E.L. 500	1.5 lb. ai.	3	3	7	4.3	A
E.L. 500	.5 lb. ai.	6	2	7	5	A

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

Anthracnose Fungicide Studies - 1981

Establishment

The 1981 anthracnose (Colletotrichum graminicola) fungicide studies were established in two locations, one at Glen Gary Country Club in Sylvania, OH (Tables 11 and 12), and the other on the Burroughs Farms Golf Course in Brighton, Michigan (Tables 13 and 14). Both studies were conducted on irrigated Poa annua (annual bluegrass) fairways mowed at 1/2" height of cut. Both studies were laid out in three replications of a random block design, utilizing 6' x 9' plots. All liquid applications were made with a CO₂ small-plot sprayer, while granular formulations were applied by hand. The urea fertilizer was applied as a tank mix with the appropriate fungicide.

The Glen Gary anthracnose study was applied preventatively on July 8, with subsequent treatments being applied as specified on the data chart. The disease rating was taken on August 5, following a severe disease outbreak in the plot area.

The Burroughs Farms anthracnose study was applied curatively on August 7, with subsequent treatments being applied as indicated on the data chart. The ratings were taken on August 28 and September 8.

Results

The Glen Gary study showed many fungicides that give effective management of anthracnose (Tables 11 and 12). Among these are the ergosterol inhibiting fungicides: Bayleton, CGA-64251, CGA-64250, Par Ex 64250, Par Ex 64251, the benzimidazole fungicides: Fungo 50, Cleary 3336, ProTurf Fertilizer + DSB fungicide and the contact fungicide Daconil 2787. The plots which received fungicides in combination with nitrogen fertilizer had better turf quality although there was no difference in disease incidence when compared to similar plots receiving the same fungicide treatment without nitrogen fertilizer.

No conclusions can be made from the curative anthracnose fungicides study at the Burroughs Farms location (Tables 13 and 14). It can be seen in the tables that all treatments began to recover including the untreated check due to environmental conditions.

Table 11. Glen Gary Anthracnose Fungicide Study - 1981.
Disease Rating - % plot area infected. Rated 8/5/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
Bayleton + Urea	4 oz. + 1/2 lb. N ²	0	0	0	0	A
Bayleton + Urea	4 oz. + 1/2 lb. N ¹	0	0	0	0	A
Bayleton	4 oz. ¹	0	0	0	0	A
Bayleton	1 oz. ²	0	0	0	0	A
Bayleton	2 oz. ²	0	0	0	0	A
Bayleton	4 oz. ²	0	0	0	0	A
Bayleton WDG	2 oz. ¹	0	0	0	0	A
Bayleton WDG	4 oz. ¹	0	0	0	0	A
Bayleton WDG	2 oz. ²	0	0	0	0	A
Bayleton WDG	4 oz. ²	0	0	0	0	A
Bayleton + Urea	2 oz. + 1/2 lb. N ¹	0	2	0	.7	A
Bayleton + Urea	2 oz. + 1/2 lb. N ²	2	0	2	1.3	A
Bayleton + Urea	1 oz. + 1/2 lb. N ¹	0	5	2	2.3	AB
Bayleton WDG	1 oz. ²	5	2	0	2.3	AB
Bayleton	2 oz. ¹	0	2	10	4	ABC
CGA-64251	1 fl. oz. ³	0	10	2	4	ABC
Bayleton	1 oz. ¹	5	5	5	5	ABCD
ProTurf DSB	2X ⁴	10	0	10	6.7	ABCDE
CGA-64251	.5 fl. oz. ³	5	10	5	6.7	ABCDE
Par Ex + CGA-64251	.8 lb. N + 12 gm. ai. ³	10	10	0	6.7	ABCDE
CGA-64250	.16 fl. oz. ³	5	0	20	8.3	ABCDE
Par Ex + CGA-64251	.8 lb. N + 8 gm. ai. ³	5	10	10	8.3	ABCDE
Bayleton + Urea	1 oz. + 1/2 lb. N ²	15	5	5	8.3	ABCDE
CGA-64250	.32 fl. oz. ³	0	10	25	11.7	ABCDE
Bromosan FL	4 oz. ³	20	15	5	13.3	ABCDEF
Bayleton WDG	1 oz. ³	25	5	10	13.3	ABCDEF
Par Ex + CGA-64250	.8 lb. N + 12 gm. ai. ³	10	20	15	15	ABCDEF
Cleary 3336	1 oz. ³	15	5	25	15	ABCDEF
Daconil 2787 FL	3.75 qt./A. ²	10	10	35	18.3	BCDEF
BAS 43600	2 oz. ai. ²	25	20	15	20	CDEFGHI
Fungo 50	1 oz. ³	25	20	15	20	CDEFGHI
Duosan	3 oz. ¹	20	15	25	20	CDEFGHI
Daconil 2787 WDG	4.33 lb./A. ²	10	25	30	21.7	DEFGHIJ
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz. ²	30	25	10	21.7	DEFGHIJ
Par Ex + CGA-64250	.8 lb. N + 8 gm. ai. ³	40	5	25	23.3	EFGHIJK
BAS 43600	1 oz. ai. ²	25	25	20	23.3	EFGHIJK
Daconil 2787 WDG	8 lb./A. ²	10	30	30	23.3	EFGHIJK
Daconil 2787 FL	7 qt./A. ²	15	30	45	30	FGHIJK
Acti-dione Thiram	2 oz. ²	20	30	40	30	FGHIJK
Daconil 2787 WP	.92 oz. ²	10	45	35	30	FGHIJK
EL 222	.125 lb. ai./A. ³	3	25	35	30	FGHIJK
EL 222	.25 lb. ai./A. ³	35	20	40	31.7	GHIJK
BAS 43600	.5 oz. ai. ²	30	30	35	31.7	GHIJK
Acti-dione TGF	.34 oz. ²	40	30	30	33.3	HIJKL
AD-RZ + AD-TGF	.55 oz. + .34 oz. ²	25	45	35	35	HIJKL
Acti-dione RZ	1.6 oz. ²	35	40	35	36.7	IJKL
Acti-dione TGF	.68 oz. ²	25	45	40	36.7	IJKL
Daconil 2787 WP	1.84 oz. ²	50	40	25	38.3	JKLM
Panasea	1 fl. oz. ³	50	30	40	40	KLM
EL 222	.5 lb. ai./A. ³	50	30	40	40	KLM
OAC 3890	2 oz. ³	60	50	35	48.3	LM
Check	—	35	50	75	53.3	M
OAC 3890	4 oz. ³	70	80	55	68.3	M

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

¹Treatments applied 7/8 only.

²Treatments applied 7/8 and 7/22.

³Treatments applied 7/8 and 7/29.

⁴Treatments applied 7/22 only.

Table 12. Glen Gary Anthracnose Fungicide Study - 1981.
Disease Rating - % plot area infected. Rated 8/11/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
Bayleton + Urea	4 oz. + 1/2 lb. N ²	0	0	0	0	A
Bayleton + Urea	2 oz. + 1/2 lb. N ¹	0	0	0	0	A
Bayleton + Urea	4 oz. + 1/2 lb. N ¹	0	0	0	0	A
Bayleton	4 oz. ¹	0	0	0	0	A
Bayleton	2 oz. ²	0	0	0	0	A
Bayleton	4 oz. ²	0	0	0	0	A
Bayleton WDG	2 oz. ¹	0	0	0	0	A
Bayleton WDG	4 oz. ¹	0	0	0	0	A
Bayleton WDG	2 oz. ²	0	0	0	0	A
Bayleton WDG	4 oz. ²	0	0	0	0	A
Bayleton WDG	1 oz. ²	0	0	0	0	A
Par Ex + CGA-64251	.8 lb. N + 8 gm. ai. ³	0	0	2	.7	A
Par Ex + CGA-64251	.8 lb. N + 12 gm. ai. ³	2	0	0	.7	A
Bayleton + Urea	1 oz. + 1/2 lb. N ¹	2	0	2	1.3	A
CGA-64251	1 fl. oz. ³	2	2	0	1.3	A
Bayleton	1 oz. ²	0	0	5	1.7	AB
Bayleton + Urea	2 oz. + 1/2 lb. N ²	0	2	5	2.3	AB
Bayleton	2 oz. ¹	10	0	10	6.7	ABC
Bayleton	1 oz. ¹	5	10	0	8.3	ABC
CGA-64250	.16 fl. oz. ³	20	0	10	10	ABC
CGA-64250	.32 fl. oz. ³	2	0	20	10.7	ABC
Cleary 3336	1 oz. ³	0	0	30	10.7	ABC
Bayleton + Urea	1 oz. + 1/2 lb. N ²	10	30	30	13.3	ABCD
ProTurf DSB	2X ⁴	30	10	10	13.3	ABCD
Bromosan FL	4 fl. oz. ³	10	10	0	13.3	ABCD
CGA-64251	.5 fl. oz. ³	30	10	5	15	ABCD
Daconil 2787 FL	3.75 qt./A. ²	10	0	30	16.7	ABCDE
BAS 43600	1 oz. ai. ²	40	10	2	17.3	ABCDE
Par Ex + CGA-64250	.8 lb. N + 8 gm. ai. ³	40	5	15	18.3	ABCDE
Fungo 50	1 oz. ³	30	30	15	18.3	ABCDE
Bayleton WDG	1 oz. ¹	30	5	20	18.3	ABCDE
Daconil 2787 WDG	4.33 lb./A. ²	10	30	20	20	ABCDEF
Daconil 2787 FL	7 qt./A. ²	5	40	20	21.7	ABCDEF
BAS 43600	2 oz. ai. ²	40	10	2	24	ABCDEFG
Par Ex + CGA-64250	.8 lb. N + 12 gm. ai. ³	35	30	5	26.7	BCDEFGH
BAS 43600	.5 oz. ai. ²	40	40	30	26.7	BCDEFGH
Duosan	3 oz. ¹	20	10	40	30	CDEFGHI
Daconil 2787 WDG	8 lb./A. ²	10	10	40	30	CDEFGHI
Panasea	1 fl. oz. ²	70	40	30	36.7	DEFGHIJ
EL 222	.5 lb. ai./A. ²	60	50	50	40	EFGHIJK
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz. ²	50	50	30	40	EFGHIJK
EL 222	.25 lb. ai./A. ³	40	30	40	43.3	FGHIJK
Acti-dione TGF	.34 oz. ²	50	70	40	46.7	GHIJK
EL 222	.125 lb. ai./A. ³	60	60	60	50	HIJKL
Acti-dione TGF	.68 oz. ²	30	70	60	53.3	IJKLM
Daconil 2787 WP	1.84 oz. ²	60	60	40	53.3	IJKLM
Daconil 2787 WP	.92 oz. ²	40	70	60	56.7	JKLM
Acti-dione Thiram	2 oz. ²	60	60	60	60	JKLM
Acti-dione dione RZ	1.6 oz. ²	60	80	50	63.3	KLM
Acti-dione RZ+ Acti-dione TGF	.55 oz. + .34 oz. ²	60	70	60	63.3	KLM
OAC 3890	2 oz. ³	80	80	60	73.3	LM
Check	—	70	80	70	73.3	LM
OAC 3890	4 oz. ³	90	90	50	76.7	M

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

¹Treatments applied 7/8 only.

²Treatments applied 7/8 and 7/22.

³Treatments applied 7/8 and 7/29.

⁴Treatments applied 7/22 only.

Table 13. Burroughs Farms - Anthracnose Fungicide Study - 1981.
Disease Rating - % plot area infected. Rated 8/28/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
ProTurf DSB	2X ²	1	2	2	1.7	A
Bayleton + Urea	1 oz. + 1/2 lb. N ²	1	4	1	2	AB
Bayleton + Urea	1 oz. + 1/2 lb. N ¹	1	4	2	2.3	ABC
Bayleton	4 oz. ¹	2	4	1	2.3	ABC
CGA-64251	.5 fl. oz. ³	1	4	2	2.3	ABC
Bayleton WDG	1 oz. ¹	3	3	1	2.3	ABC
Bayleton + Urea	4 oz. + 1/2 lb. N ²	2	5	1	2.7	ABC
Bayleton + Urea	4 oz. + 1/2 lb. N ¹	2	5	1	2.7	ABC
Bayleton	1 oz. ²	2	4	2	2.7	ABC
EL 222	.5 lb. ai./A. ³	3	5	1	3	ABC
Bayleton + Urea	2 oz. + 1/2 lb. N ²	2	5	2	3	ABC
Bayleton	4 oz. ²	2	5	2	3	ABC
Bromosan FL	4 oz. ³	3	4	2	3	ABC
Bayleton	2 oz. ²	1	6	3	3.3	ABC
CGA-64251	.32 fl. oz. ³	3	4	3	3.3	ABC
Daconil 2787 FL	7 qt./A. ²	2	6	2	3.3	ABC
Daconil 2787 WDG	4.33 lb./A. ²	3	4	3	3.3	ABC
EL 222	.25 lb. ai./A. ³	4	5	2	3.7	ABC
Acti-dione RZ	1.6 oz. ²	3	6	2	3.7	ABC
Bayleton WDG	2 oz. ²	5	3	3	3.7	ABC
EL 222	.125 lb. ai./A. ³	4	6	2	4	ABC
OAC 3890	2 oz. ³	3	8	1	4	ABC
Cleary 3336	1 oz. ³	2	5	5	4	ABC
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz. ²	4	6	2	4	ABC
Bayleton	1 oz. ¹	3	5	5	4.3	ABC
Par Ex + CGA-64251	.8 lbs. N + 8 gm. ai. ³	5	6	2	4.3	ABC
Par Ex + CGA-64251	.8 lbs. N + 12 gm. ai. ³	4	8	1	4.3	ABC
Par Ex + CGA-64250	.8 lbs. N + 8 gm. ai. ³	5	6	2	4.3	ABC
OAC 3890	4 oz. ³	5	5	3	4.3	ABC
Fungo 50	1 oz. ³	2	6	5	4.3	ABC
Daconil 2787 WP	1.84 oz. ²	3	4	6	4.3	ABC
BAS 43600	1 oz. ai. ²	5	5	3	4.3	ABC
Daconil 2787 WDG	8 lbs./A. ²	5	6	2	4.3	ABC
Bayleton WDG	2 oz. ¹	2	5	6	4.3	ABC
Bayleton + Urea	2 oz. + 1/2 lb. N ¹	1	6	7	4.7	ABC
Acti-dione + TGF	.34 oz. ³	5	3	6	4.7	ABC
Acti-dione + TGF	.68 oz. ²	4	6	4	4.7	ABC
Daconil 2787 FL	3.75 qt./A. ²	5	5	4	4.7	ABC
Check	--	7	5	2	4.7	ABC
Bayleton WDG	4 oz. ¹	6	7	1	4.7	ABC
Bayleton WDG	4 oz. ²	3	5	6	4.7	ABC
CGA-64251	1 fl. oz. ³	4	6	5	5	ABC
Par Ex + CGA-64250	.8 lb. N + 12 gm. ai. ³	1	6	8	5	ABC
Daconil 2787 WP	.92 oz. ²	5	3	7	5	ABC
Acti-dione RZ + Acti-dione TGF	.55 oz. + .34 oz. ²	2	7	6	5	ABC
BAS 43600	2 oz. ai. ²	6	7	2	5	ABC
Bayleton	2 oz. ²	3	7	6	5.3	BC
CGA-64250	.16 fl. oz. ²	3	6	7	5.3	BC
Acti-dione Thiram	2 oz. ²	5	4	7	5.3	BC
Bayleton WDG	1 oz. ²	7	4	5	5.3	BC
BAS 43600	.5 oz. ai. ²	5	4	8	5.7	C
Panasea	1 fl. oz. ²	5	9	3	5.7	C

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

¹Treatments applied 8/7 only.

²Treatments applied 8/7 and 8/18.

³Treatments applied 8/7 and 8/28.

Table 14. Burroughs Farms - Anthracnose Fungicide Study - 1981.
Disease Rating - % plot area infected. Rated 9/8/81.

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
Bayleton WDG	1 oz. ¹	1	1	1	1	A
Bayleton	4 oz. ¹	1	1	1	1	A
ProTurf DSB	2X ³	1	1	1	1	A
Cleary 3336	1 oz. ³	1	1	1	1	A
Bayleton WDG	2 oz. ²	1	1	1	1	A
EL 222	.5 lb. ai./A ³	1	2	1	1.3	AB
Bayleton + Urea	1 oz. + 1/2 lb. N ²	1	2	1	1.3	AB
Bayleton + Urea	2 oz. + 1/2 lb. N ²	1	2	1	1.3	AB
Bayleton + Urea	4 oz. + 1/2 lb. N ²	1	2	1	1.3	AB
Bayleton + Urea	1 oz. + 1/2 lb. N ¹	1	2	1	1.3	AB
Bayleton + Urea	4 oz. + 1/2 lb. N ¹	1	2	1	1.3	AB
Bayleton	1 oz. ²	1	2	1	1.3	AB
Bayleton	2 oz. ²	1	2	1	1.3	AB
Bayleton	4 oz. ²	1	2	1	1.3	AB
CGA-64251	.5 fl. oz. ³	1	2	1	1.3	AB
Bromosan FL	4 oz. ³	1	2	1	1.3	AB
Bayleton WDG	2 oz. ¹	1	1	2	1.3	AB
Bayleton + Urea	2 oz. + 1/2 lb. N ¹	1	2	2	1.7	AB
CGA-64250	.32 fl. oz. ³	1	2	2	1.7	AB
Fungo 50	1 oz. ³	1	3	1	1.7	AB
Acti-dione TGF	.68 oz. ²	1	2	2	1.7	AB
Daconil 2787 FL	.92 oz. ²	2	1	2	1.7	AB
BAS 43600	1 oz. ai. ²	2	2	1	1.7	AB
Daconil 2787 FL	3.75 qt./A. ²	2	2	1	1.7	AB
Daconil 2787 WDG	4.33 lb./A. ²	2	2	1	1.7	AB
Daconil 2787 WDG	8 lb./A. ²	2	2	1	1.7	AB
Bayleton WDG	1 oz. ²	3	1	1	1.7	AB
Bayleton WDG	4 oz. ²	1	3	1	1.7	AB
EL 222	.125 lb. ai./A. ³	2	3	1	2	AB
EL 222	.25 lb. ai./A. ³	2	3	1	2	AB
Bayleton	1 oz. ¹	2	2	2	2	AB
CGA-64251	1 fl. oz. ³	1	3	2	2	AB
CGA-64250	.16 fl. oz. ³	2	2	2	2	AB
Par Ex + CGA-64250	.8 lb. N + .8 gm. ai. ³	2	2	2	2	AB
OAC-3890	4 oz. ³	2	3	1	2	AB
Acti-dione TGF	.34 oz. ²	2	2	2	2	AB
Daconil 2787 WP	1.84 oz. ²	2	2	2	2	AB
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz. ²	3	2	1	2	AB
Acti-dione RZ	1.6 oz. ²	1	3	2	2	AB
Acti-dione RZ + Acti-dione TGF	.55 oz. + .34 oz. ²	1	3	2	2	AB
Acti-dione Thiram	2 oz. ²	2	2	2	2	AB
Daconil 2787 FL	7 qt./A. ¹	1	3	2	2	AB
Bayleton WDG	4 oz. ¹	2	3	1	2	AB
Par Ex + CGA-64251	.8 lb. N + 8 gm. ai. ³	2	2	2	2	AB
Bayleton	2 oz. ¹	2	3	2	2.3	AB
Par Ex + CGA-64251	.8 lb. N + 12 gm. ai. ³	2	5	1	2.7	AB
Par Ex + CGA-64250	.8 lb. N + 12 gm. ai. ³	1	4	3	2.7	AB
BAS 43600	.5 oz. ai. ²	2	1	5	2.7	AB
BAS 43600	2 oz. ai. ²	3	4	1	2.7	AB
Check	---	5	2	1	2.7	AB
OAC 3890	2 oz. ³	1	6	2	3	B
Panasea	1 oz. ²	2	6	1	3	B

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

¹Treatments applied 8/7 only.

²Treatments applied 8/7 and 8/18.

³Treatments applied 8/7 and 8/28.

Golf Course Fairway Fungigation Efficacy Study - 1981

Walnut Hills Golf Course, East Lansing, MI

Establishment

The 1981 fairway fungigation study was conducted on two irrigated, annual bluegrass fairways (#14 and #17), mowed at a 5/8" cutting height on the Walnut Hills Golf Course in East Lansing, MI.

Undiluted Daconil 2787 flowable (FL) 500 fungicide was injected at a rate of approximately 11 gal/1 hour, while Cleary 3336 FL and Bromosan FL were injected at the rate 4.1 gal/hr and 8.2 gal/hr, respectively. All materials were injected directly into the irrigation line, using a Hydroflo chem-injector (Hydroflo Corp., 112 Maple Ave., Dublin, PA 18917). Daconil 2787 FL was applied at 7 qts/acre, Cleary 3336 FL at 2 oz/1000 ft² and Bromosan FL at 4 oz/1000 ft² to the fairways, based on an irrigation system with a 900 gal/minute pump with Toro 696 two-speed individual heads set on a 5 minute cycle which delivers 60 gallons of water/minute and 3/10" precipitation/hour.

Daconil 2787 FL fungigation applications were made on June 12, June 30, and August 26. The Cleary 3336 FL and Bromosan FL application was made on July 14, one-half of each fairway being treated with each fungicide. This application was timed to provide preventative control of anthracnose (Colletotrichum graminicola) as well as Sclerotinia dollarspot (Sclerotinia homeocarpa). Two adjacent fairways received similar treatments (using conventional spray equipment) of Daconil 2787 FL on June 11, July 1 and August 25, 1981, and of Cleary 3336 FL and Bromosan FL on July 16, 1981. These treatments were applied at the same rates as the treatments applied through the irrigation system, except the applications were made with a John Bean sprayer with an output of 38 gal/acre.

Results and Discussion

Sclerotinia dollarspot and anthracnose were the only diseases observed on the Walnut Hills course this summer. Daconil 2787 FL, Cleary 3336 FL, and Bromosan FL applied through the irrigation system gave disease control comparable to that achieved with the same fungicides when applied with the conventional ground sprayer application method.

This was a heavy infection year for sclerotinia dollarspot and a moderate infection year for anthracnose. Under these conditions, both methods of application gave satisfactory disease control.

Conclusions:

- 1) Fungigation is an effective means of applying Daconil 2787 FL, Cleary 3336 FL, and Bromosan FL, for the management of Sclerotinia dollarspot and anthracnose.
- 2) Fungigation is a faster method of applying fungicides.
- 3) Fungigation is a cheaper means based on cost of application equipment (sprayer versus a pump).
- 4) Fungigation applications can be made at night when there is no play on the golf course.

Potential Problems:

- 1) Irrigation systems must have uniform coverage, otherwise voids will

exist where the disease will occur. (However, if the irrigation system is not applying the fungicide uniformly, then it is not applying water uniformly. This could be a good method of checking the system and changing to more suitable heads or adding additional heads to the system).

- 2) Future systems should be designed with fungigation capability in mind. Systems should start at point A by the pump and end at point B on the far end of the course with a valve for draining the system. Accurate rate of application will be difficult with systems not designed in a straight line or continuous arrangement. Fungicide residue may also remain in the line causing a possible exposure problem when the irrigation system is turned on again for irrigating or for other purposes, i.e. cleaning equipment.

Fusarium Blight Fungicide Studies - 1981

Establishment

The 1981 Fusarium blight (Fusarium roseum) fungicide studies were conducted on the Hartland Glen Golf Course, Hartland, MI, on an irrigated Baron Kentucky bluegrass fairway which was maintained at a 3/4" height of cut. The studies were placed on areas where the disease had been active in previous years.

Bayleton Study

Treatments were initiated preventatively on May 18 with Bayleton foliar applications of .25 oz., .5 oz., 1 oz. and 2 oz. active ingredient/1000 ft² in 4 replications of a random block design. Subsequent treatments were applied as follows: .25 oz. ai. applied every 10 days, .5 oz. ai. applied every 20 days, 1 oz. ai. applied every 30 days, 1.5 oz. ai. applied every 45 days and 2 oz. ai. applied every 60 days. Also included in this test was Panasea, a liquified Laminaria sea plant extract product. Applications were continued until it was obvious the disease was not going to develop in the plot area.

Fungicide Maintenance Study

This replicated, randomized block design study was applied on July 16, prior to any re-activation of the Fusarium blight disease. Many standard systemic and contact type fungicides were included, along with a number of experimental fungicides and fertilizers.

Results

Disease pressure never developed in either study area, so no data was obtained.

Nitrogen Fertility Timing and Carrier Disease Studies

Burroughs Farms Golf Course, Brighton, MI

Establishment

The long-term disease-fertility plots were established on an irrigated annual bluegrass (Poa annua) fairway mowed to 5/8". The plots were laid out in either three replications or four replications of a randomized block design. The fertilizers were pre-weighed and applied by hand while the fungicide was applied with a CO₂ small-plot sprayer at a volume of 40 gal/acre. All fertilizer and fungicide applications were made as indicated on the data charts. Disease ratings were made on September 1, 1981.

Results

IBDU-Urea Anthracnose Fairway Fertility Study

Plots receiving no fungicides showed no significant differences among treatments for anthracnose management regardless of nitrogen carrier (Table 15). The nitrogen treated plots were not significantly different from the untreated control or from plots receiving Panasea. Plots receiving fungicide treatment did show significant differences among treatments for anthracnose management with the 1 lb. IBDU (coarse) and the 1/2 lb. (fine) treatments giving significant management of anthracnose compared to plots which received no nitrogen.

Nitroform-Urea Fairway Disease Fertility Study

The significant differences occurred between the fungicide treated compared to the non-fungicide treated plots regardless of nitrogen fertility schedule in the anthracnose study (Table 16).

In the Sclerotinia dollarspot study there were significant differences between fungicide treated and non-treated plots as well as among nitrogen fertility timing treatments with Treatment 2 (plots receiving nitrogen primarily in the summer and fall) giving better management of dollarspot than the spring-fall nitrogen treatment (Treatment 1).

Table 15. Burroughs Farms - IBDU Anthracnose Study - 1981.
 Rating scale - 1 (no disease) - 9 (90% infection or greater) caused
 by anthracnose (Colletotrichum graminicola). Rated 9/1/81.

<u>Treatment**</u>	<u>Rate/1000 ft²</u>	<u>No fungicide applied</u>			AVE	DMR
		<u>Replication</u>				
		I	II	III		
Control	---	3	3	3	3	A
IBDU (Fine)	1/2 lb. N	3	4	3	3.3	A
Panasea	2 oz.	2	4	2	3.7	A
Urea	1/2 lb. N	2	9	2*	4.3	A
IBDU (Coarse)	1/2 lb. N	6	8	1*	5	A
IBDU (Coarse)	1 lb. N	3	8	5	5.3	A
IBDU (Fine)	1 lb. N	6	8	2*	5.3	A
Urea	1 lb. N	4	6	7	5.7	A

1 oz/1000 ft² Tersan 1991 applied curatively August 4, 1981

<u>Treatment**</u>	<u>Rate/1000 ft²</u>	<u>Replication</u>			AVE	DMR
		I	II	III		
IBDU (Coarse) + Tersan 1991	1 lb. N + 1 oz.	1	3	1	1.7	A
IBDU (Fine) + Tersan 1991	1/2 lb. N + 1 oz.	2	2	1	1.7	A
Urea + Tersan 1991	1/2 lb. N + 1 oz.	3	2	1	2	AB
Urea + Tersan 1991	1 lb. N + 1 oz.	2	2	2	2	AB
IBDU (Coarse) + Tersan 1991	1/2 lb. N + 1 oz.	2	3	2	2.3	AB
IBDU (Fine) + Tersan 1991	1 lb. N + 1 oz.	3	3	1*	2.3	AB
Control	---	3	3	3	3	B

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

*Plots primarily clover.

**Treatments applied November '80, June '81, July '81, August '81, September '81.
 Panasea applied only during 1981 treatments.

Table 16. Burroughs Farms - Nitroform-Urea Annual Bluegrass Fairway Fertility Study - 1981. Rating scale - 1 (no disease) - 9 (90% infection or greater) caused by anthracnose (Colletotrichum graminicola). 9/1/81.

Treatment No.	Replication				AVE	DMR
	I	II	III	IV		
2A	1	1	1	1	1	A
1A	1	2	1	1	1.3	A
3A	2	1	1	1	1.3	A
3	3	2	3	2	2.5	B
1	5	3	4	2	2.5	B
2	3	5	4	2	3.5	B

Disease caused by Sclerotinia homeocarpa

Treatment No.	Replication				AVE	DMR
	I	II	III	IV		
1A	1	1	1	1	1	A
2A	1	1	1	1	1	A
3A	1	1	1	1	1	A
2	3	2	2	3	2.5	B
1	4	3	2	4	3.3	BC
3	3	3	4	5	3.8	C

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

Treatment 1: May '81 - 1 lb. N (1/2 lb. powder blue (nitroform), 1/2 lb. urea)
 June '81 - 1 lb. N (3/4 lb. powder blue (nitroform), 1/4 lb. urea)
 Sept '81 - 2 lbs. N (1 lb. powder blue (nitroform), 1 lb. urea)

Treatment 2: Nov '80 - 1 lb. N (urea)
 June '81 - 1/2 lb. N (1/4 lb. powder blue (nitroform), 1/4 lb. urea)
 July '81 - 1/2 lb. N (1/4 lb. powder blue (nitroform), 1/4 lb. urea)
 Aug '81 - 1/2 lb. N (1/4 lb. powder blue (nitroform), 1/4 lb. urea)
 Sept '81 - 1 lb. N (1/2 lb. powder blue (nitroform), 1/2 lb. urea)

Treatment 3: No nitrogen

Treatment A: Tersan 1991 at 1 oz./1000 ft² applied August 4 and 27.