

New Fungicides for Anthracnose Control, Fungigation, Fairway Yellowing,  
and Chemical Control of *Typhula* blight, *Helminthosporium* melting-out,  
and *Sclerotinia* dollarspot.

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Snow Mold Fungicide Trials - 1979-1980

The 1979-80 snow mold fungicide trials were conducted at the Boyne Highlands Resort on Penncross creeping bentgrass mowed at 1/2 inch. Treatments were applied to 6 feet x 9 feet plots in three replications of a random block design on October 31, 1979. The wettable powders and flowables were applied with a small-plot CO<sub>2</sub> sprayer at a volume of 40 gal/acre. The granular applications were made with a 3 foot Scott's drop-type spreader. The plot ratings were taken on April 8, 1980 (Tables 1, 2 and 3).

Results

Temperatures were moderate up through mid-December, 1979. This was followed by freezing temperatures before the snow fell in mid-January. Therefore, when the snow fell it was on frozen ground. Under these conditions, the two prevalent snow molds were *Typhula* blight caused by *Typhula ishikarensis*, and *Fusarium* patch caused by *Fusarium nivale*. The majority of the *Typhula* blight in the Harbor Springs area has been due to *Typhula incarnata* over the past 12 years. Perhaps the frozen ground prior to snow fall caused the population shift. There was also more *Fusarium* patch than in previous years.

The PCNB products (Pro Turf F+FII, Acti-dione RZ, and Terraclor 75W), the mercury fungicides (Calo-clor, Calo-gran), and the Daconil 2787 combination products (Daconil 2787 plus Tersan 1991 or Chipco 26019) were the highest ranking fungicides of those that gave significant total snow mold reduction compared to the untreated control.

In tables 2 and 3 when the specific snow molds are factored-out, Daconil 2787 and CGA-64251 are seen to have activity against *Typhula* blight but not *Fusarium* patch.

Table 1. Percent Area Infected With All Snow Molds. *Typhula* Blight (*Typhula ishikarensis*) and Fusarium Patch (*Fusarium nivale*) in Boyne Highlands Snow Mold Fungicide Trials 1979-80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Pro Turf F+FII	2X	0	0	2	.7	A
Acti-dione RZ	8 oz.	0	1	1	.7	A
Calo-clor	3 oz.	1	2	2	1.7	A
Calo-gran	6 lbs.	5	1	7	4.3	A
Daconil 2787 (500) + Tersan 1991	11 fl. oz. + 2 oz.	10	2	10	7.3	AB
Daconil 2787 (WP) + Tersan 1991	8 oz. + 2 oz.	15	2	5	7.3	AB
Terraclor 75W	8 oz.	2	1	25	9.3	ABC
Daconil 2787 (WP) + Tersan 1991	4 oz. + 2 oz.	10	5	20	11.7	ABC
Daconil 2787 (500)	6 fl. oz.	20	10	15	15	ABCD
Daconil 2787 (WP) + Chipco 26019	4 oz. + 4 oz.	15	15	15	15	ABCD
Daconil 2787 (500) + Tersan 1991	9 fl. oz. + 2 oz.	20	15	15	16.7	ABCD
Daconil 2787 (500) + Chipco 26019	6 fl. oz. + 6 oz.	5	15	30	16.7	ABCD
Daconil 2787 (WP)	8 oz.	30	10	10	16.7	ABCD
BFN 8099	25 fl. oz.	10	5	40	18.3	ABCD
Daconil 2787 (500)	11 fl. oz.	15	20	30	21.7	ABCD
CGA-64251	10 gm. ai.	5	40	25	23.3	ABCD
Daconil 2787 (500)	9 fl. oz.	60	5	10	25	ABCD
Tersan SP	9 oz.	45	15	20	26.7	ABCD
Pro Turf Broad Spectrum	2X	40	0	40	26.7	ABCD
Chipco 26019	4 oz.	15	30	40	28.3	ABCD
Daconil 2787 (500) + Tersan 1991	6 fl. oz. + 2 oz.	25	5	15	30	ABCD
BFN 8099	12.5 fl. oz.	15	15	60	30	ABCD
Bayleton + Dyrene	1 oz. + 6 oz.	40	20	30	30	ABCD
Bayleton	1 oz.	50	25	20	31.7	ABCD
CGA-64251	20 gm. ai.	1	10	90	33.7	ABCD
Bayleton	6 oz.	35	30	60	41.7	BCDE
Chipco 26019	6 oz.	30	30	70	43.3	CDE
Bayleton	20 oz.	40	70	25	45	CDE
Bayleton	12 oz.	90	15	40	48.3	DE
Daconil 2787 (WP)	4 oz.	40	40	70	50	DE
Check	-	90	40	80	70	E

Note: All treatments followed by the same letter are not significantly different from each other at the 5% level of significance.

Table 2. Percent Area Infected With Typhula Blight (*Typhula ishikarensis*) in Boyne Highlands Snow Mold Fungicide Trials 1979-80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Daconil 2787 (500)	6 fl. oz.	0	0	0	0	A
Daconil 2787 (500)	9 fl. oz.	0	0	0	0	A
Calo-clor	3 oz.	0	0	0	0	A
CGA-64251	10 gm. ai.	0	0	0	0	A
Calo-Gran	6 lbs.	0	1	0	.3	A
Acti-dione RZ	8 oz.	0	0	1	.3	A
Pro Turf F+FII	2X	0	0	2	.7	A
Daconil 2787 (WP)	8 oz.	10	0	0	3.3	AB
Daconil 2787 (WP) + Tersan 1991	8 oz. + 2 oz.	15	2	0	5.7	AB
Daconil 2787 (500) + Tersan 1991	11 fl. oz. + 2 oz.	10	0	10	6.7	AB
Bayleton	20 oz.	0	0	25	8.3	AB
Terraclor	8 oz.	2	0	25	9	AB
CGA-64251	20 gm. ai.	0	0	30	10	AB
Bayleton	12 oz.	20	10	0	10	AB
Bayleton + Dyrene	1 oz. + 6 oz.	10	10	10	10	AB
Daconil 2787 (500) + Tersan 1991	6 fl. oz. + 2 oz.	25	5	5	11.7	AB
Daconil 2787 (WP) + Tersan 1991	4 oz. + 2 oz.	10	5	20	11.7	AB
Daconil 2787 (500)	11 fl. oz.	15	20	5	13.3	AB
Daconil 2787 (500) + Chipco 26019	6 fl. oz. + 6 oz.	0	15	30	15	AB
Daconil 2787 (WP) + Chipco 26019	4 oz. + 4 oz.	15	15	15	15	AB
Daconil 2787 (500) + Tersan 1991	9 fl. oz. + 2 oz.	20	15	15	16.7	AB
Daconil 2787 (WP)	4 oz.	0	40	10	16.7	AB
BFN 8099	25 fl. oz.	10	5	40	18.3	AB
Chipco 26019	4 oz.	0	30	40	23.3	ABC
Chipco 26019	6 oz.	0	0	70	23.3	ABC
Bayleton	1 oz.	25	25	20	23.3	ABC
Bayleton	6 oz.	30	30	10	23.3	ABC
Tersan SP	9 oz.	45	15	20	26.7	ABC
Pro Turf Broad Spectrum	2X	40	0	40	26.7	ABC
BFN 8099	12.5 fl. oz.	15	15	60	30	BC
Check	-	80	20	40	46.7	C

Note: All treatments followed by the same letter are not significantly different from each other at the 5% level of significance.

Table 3. Percent Area Infected With Fusarium Patch (*Fusarium nivale*) in Boyne Highlands Snow Mold Fungicide Trials 1979-80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Daconil 2787 (500) + Tersan 1991	9 fl. oz. + 2 oz.	0	0	0	0	A
Daconil 2787 (WP) + Tersan 1991	4 oz. + 2 oz.	0	0	0	0	A
BFN 8099	12.5 fl. oz.	0	0	0	0	A
BFN 8099	25 fl. oz.	0	0	0	0	A
Daconil 2787 (WP) + Chipco 26019	4 oz. + 4 oz.	0	0	0	0	A
Tersan SP	9 oz.	0	0	0	0	A
Pro Turf F+FII	2X	0	0	0	0	A
Pro Turf Broad Spectrum	2X	0	0	0	0	A
Acti-dione RZ	8 oz.	0	1	0	.3	A
Terraclor	8 oz.	0	1	0	.3	A
Daconil 2787 (500) + Tersan 1991	11 fl. oz. + 2 oz.	0	2	0	.7	AB
Daconil 2787 (WP) + Tersan 1991	8 fl. oz. + 2 oz.	5	0	0	1.7	AB
Calo-clor	3 oz.	2	2	1	1.7	AB
Daconil 2787 (500) + Chipco 26019	6 fl. oz. + 6 oz.	0	0	5	1.7	AB
Daconil 2787 (500) + Tersan 1991	6 fl. oz. + 2 oz.	10	0	0	3.3	AB
Calo-Gran	6 lbs.	7	0	5	4	AB
Chipco 26019	4 oz.	0	0	15	5	ABC
Daconil 2787 (500)	11 fl. oz.	0	0	25	8.3	ABCD
Bayleton	1 oz.	25	0	0	8.3	ABCD
Daconil 2787 (500)	6 fl. oz.	20	10	5	11.7	ABCD
Daconil 2787 (WP)	8 oz.	20	10	10	13.3	ABCD
Bayleton	6 oz.	50	0	5	18.3	ABCD
Bayleton + Dyrene	1 oz. + 6 oz.	30	10	20	20	ABCD
Chipco 26019	6 oz.	30	30	0	20	ABCD
Check	-	10	20	40	23.3	ABCD
CGA-64251	10 gm. ai.	5	40	25	23.3	ABCD
CGA-64251	20 gm. ai.	1	10	60	23.7	ABCD
Daconil 2787 (500)	9 fl. oz.	60	5	10	25	ABCD
Daconil 2787 (WP)	4 oz.	40	0	60	33.3	BCD
Bayleton	20 oz.	40	70	0	36.7	CD
Bayleton	12 oz.	90	5	20	38.3	D

Note: All treatments followed by the same letter are not significantly different from each other at the 5% level of significance.

## Helminthosporium (Melting-Out) Fungicide Study - 1980

The 1980 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 inch height of cut. Fungicide treatments were applied on a bi-weekly schedule on May 6, May 19 and June 4, except as noted on the data charts. All materials were applied with a CO<sub>2</sub> small-plot sprayer at a volume of 40 gal/acre.

The plots were 3 feet x 6 feet and were replicated three times in a randomized block design. The plots were rated on June 10.

### Results and Conclusions

There was severe Helminthosporium melting-out disease pressure during the spring of 1980. Many fungicides which normally have ratings of 1 and 2 had much higher ratings. Only four chemicals under this severe pressure gave significant control compared to the untreated check: Chipco 26019 at the 2 oz rate, CGA-64251 at the 12 and 8 gm ai (active ingredient) rate and Acti-dione RZ at the .55 oz rate.

Table 4. MSU Soils Farm Helminthosporium Melting-Out - Fungicide Study Disease Infection Rating - Scale 1-9 (1, no disease; 9, severe disease).  
Rating Taken - 6/10/80

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR
		I	II	III		
Chipco 26019	2 oz.	3	2	4	3	A
CGA 64251	8 gm. ai.	2	3	4	3	A
CGA 64251	12 gm. ai.	4	4	2	3.3	A
Acti-dione RZ	.55 oz.	3	4	4	3.7	AB
Daconil 500	6 fl. oz.	5	4	3	4	ABC
Daconil 500	3 fl. oz.	5	3	6	4.7	ABC
KL 589-05-80 + Biofilm*	7.6 gm. + 7 fl. oz./100 gal.	2	8	4	4.7	ABC
KL 591-05-80* Biofilm*	7.6 gm. 7 fl. oz./100 gal.	3	8	6	5.7	ABC
Acti-dione TGF	.69 oz.	8	3	7	6	ABC
Hydrated Lime + Powder Blue	1 lb. + 2 lb.	8	7	3	6	ABC
KL 589-05-80*	7.6 gm.	8	8	4	6.7	ABC
KL 591-05-80 + Biofilm*	7.6 gm. + 7 fl. oz./100 gal.	9	8	5	7.3	BC
Check	-	9	8	6	7.7	C

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

\*Received only 2 treatments, on May 19 and June 4.

Helminthosporium Melting-Out Acti-Dione Fungicide Study 1980  
Hartland Glen Golf Course, Hartland, MI

The 1980 Up-John Acti-dione melting-out study was conducted on a Baron Kentucky bluegrass fairway at Hartland Glen Golf Course in Hartland, MI.

On May 2, the entire plot area, except for the check plots, was treated with a tank mix combination of Acti-dione RZ (12 oz/A) and Acti-dione TGF (15 oz/A).

In subsequent weeks, Acti-dione RZ (24 oz/A) was applied at weekly, bi-weekly, tri-weekly and monthly intervals in 3 replications each. These applications continued through June 4, at which time the weekly plots had received 5 Acti-dione RZ treatments, the bi-weekly plots had received 2 treatments, the tri-weekly plots had received 1 treatment, and the monthly plots had received 1 treatment. The three remaining Acti-dione RZ + Acti-dione TGF treated plots received no additional treatments after May 2. All treatments were applied with a CO<sub>2</sub> small-plot sprayer at a volume of 40 gal/A.

The plots were rated on June 13 (Table 5).

#### Results and Conclusions

The acti-dione RZ treatments all gave significant control over the untreated check except the Acti-dione monthly application which received one additional treatment after the initial Acti-dione RZ and Acti-dione TGF treatment on May 2. There appears to be merit in further investigation of this program on a more susceptible Kentucky bluegrass cultivar to see if there are greater differences among treatments.

Table 5. Hartland Glen Helminthosporium Melting-Out - Fungicide Study 1980  
Disease Infection Rating - Scale 1-9 (1, no disease; 9, severe disease).  
Rating Taken - 6/13/80

Treatment	Rate/acre	Replication			AVE	DMR
		I	II	III		
Acti-dione RZ (weekly)	24 oz./A	2	3	2	2.3	A
Acti-dione RZ (biweekly)	24 oz./A	3	3	5	3.7	AB
Acti-dione RZ + Acti-dione TGF (once only)	12 oz./A + 15 oz./A	3	3	6	4	AB
Acti-dione RZ (triweekly)	24 oz./A	4	6	3	4.3	AB
Acti-dione RZ (monthly)	24 oz./A	5	7	5	5.7	BC
Control	-	7	7	7	7	C

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

## Dollarspot Fungicide Studies - 1980

Two Sclerotinia dollarspot (Sclerotinia homeocarpa) studies were conducted, one on an annual bluegrass fairway and the other on a Toronto creeping bentgrass green. Liquid applications were made with a CO<sub>2</sub> small-plot sprayer at a volume of 40 gal/acre. Granular formulations were applied with a Scotts 3 foot drop-type spreader. Both studies were laid out in three replications of a random block design.

The annual bluegrass Sclerotinia dollarspot study was conducted at Burroughs Farms Golf Course in Brighton, MI, on an irrigated Poa annua fairway maintained at 1/2 inch height of cut. Treatments were applied preventatively to 6 feet x 9 feet plots on July 1, July 15, August 15, and September 4, except as noted on the data charts. The Sclerotinia dollarspot ratings were taken on September 11.

The Toronto creeping bentgrass dollarspot study was conducted at the MSU Crops and Soils Field Laboratory on an irrigated putting green which was infected prior to treatment. Treatments were applied curatively on September 10 and September 22. The dollarspot ratings were made on September 30.

### Results and Conclusions

#### Toronto Creeping Bentgrass Sclerotinia Dollarspot Study

Table 6 shows the most effective fungicides following two fungicide applications at a 12 day interval. The dollar spot infestation was exceptionally heavy this season. The entire plot areas in the untreated check and ineffective fungicide plots became almost completely covered by the disease. The systemic fungicides and combination (systemic and contact) fungicides gave the best control under the severe disease pressure. Those treatments giving significant control over the untreated check were: F-7498, F-7458, F-9177, F-7888, Bromosan 4 oz, Cleary 3336 1 and 2 oz, Fungo 50 1 and 2 oz, Tersan 1991 1 and 2 oz, IBDU + Bayleton .25 and .50 oz ai, Bayleton 2 oz and .125 oz ai, Chipco 26019 2 oz, Bayleton and Acti-dione TGF .125 oz ai + .34 oz, CGA-64251 8 and 4 gm ai, Duosan 3.3 and 6.6 oz, Ronilan 2 oz, Daconil 2787 F1 6 fl oz and 3 fl oz, Acti-dione TGF .69 oz, Daconil 2787 WP 1.84 oz, Acti-dione TGF + Daconil 2787 WP .34 oz + .92 oz.

#### Annual Bluegrass Sclerotinia Dollarspot Study

The Sclerotinia dollar spot infection was also heavy in the preventive study at Burroughs Farms. CGA-64251 at 8 and 4 gm ai, IBDU + Bayleton at .25 and .50 oz ai, F-7458, F-7594, F-9177, Bayleton 2 oz and .125 oz ai, Ronilan 2 oz, Bromosan 4 oz, Duosan 6.6 oz, Daconil 2787 GR 13.5 oz, and 3.3 oz, Fungo 50 1 and 2 oz, Tersan 1991 1 and 2 oz, Bayleton + Acti-dione TGF .125 oz ai + .34 oz, Chipco 2 oz, Cleary 3336 1 and 2 oz, Acti-dione TGF + Daconil 2787 WP .34 oz + .92 oz all gave significant control compared to the untreated check (Table 7). The applications were made on 14 day and greater intervals which may have favored the systemic fungicides over the contact fungicides.

Table 6. 1980 Dollarspot Fungicide Study - Creeping Bentgrass  
 Crop and Soils Field Laboratory, East Lansing, MI  
 Disease Rating - 1, no disease; 9, severe disease.  
 9/30/80

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
F-7498	2X	1	1	1	1	A
F-7458	2X	1	1	1	1	A
Bromosan	4 oz.	2	1	1	1.3	AB
Cleary 3336	2 oz.	1	2	1	1.3	AB
Cleary 3336	1 oz.	1	2	1	1.3	AB
Fungo 50	2 oz.	2	1	1	1.3	AB
Tersan 1991	2 oz.	2	2	1	1.7	AB
Bayleton + IBDU	.5 oz. ai./5 lbs.	2	2	1	1.7	AB
Bayleton	2 oz.	3	2	1	2	AB
Tersan 1991	1 oz.	3	2	1	2	AB
Chipco 26019	2 oz.	2	3	1	2	AB
Fungo 50	1 oz.	4	1	2	2.3	AB
Bayleton + IBDU	.25 oz. ai./5 lbs.	3	2	2	2.3	AB
Bayleton + Acti-dione TGF	.125 oz. ai. + .34 oz.					
CGA-64251	4 gm. ai.	3	4	1	2.7	ABC
Duosan	3.3 oz.	4	3	1	2.7	ABC
Duosan	6.6 oz.	5	2	1	2.7	ABC
Ronilan	2 oz.	3	3	2	2.7	ABC
CGA-64251	8 gm. ai.	2	4	3	3	ABC
F-9177	2X	3	3	4	3.3	BCD
Daconil 2787 FL	6 fl. oz.	3	4	3	3.3	BCD
Daconil 2787 FL	3 fl. oz.	6	4	3	4.3	CDE
Bayleton	.125 oz. ai.	6	4	5	5	DEF
Acti-dione TGF	.69 oz.	7	4	5	5.3	EF
Daconil 2787 WP	1.84 oz.	5	5	6	5.3	EF
F-7888	2X	4	7	5	5.3	EF
F-9177	1X	9	5	4	6	EF
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz.	8	5	5	6	EF
Acti-dione TGF	.34 oz.	8	6	6	6.7	FG
Daconil 2787 WP	.92 oz.	8	6	6	6.7	FG
Kalo 591-05-80	7.6 gm.	9	6	9	8	GH
Check	-	9	9	7	8.3	GH
Biofilm	7 fl. oz./100 gal.	9	8	9	8.7	H
Powder Blue + Hyd. Lime	2 lbs. + 1 lb.	9	9	8	8.7	H
Kalo 589-05-80	7.6 gm.	9	9	8	8.7	H
Kalo 589 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	9	9	9	9	H
Kalo 591 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	9	9	9	9	H

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



Table 7. 1980 Dollarspot Fungicide Study - Poa annua  
 Burroughs Farms Golf Course, Brighton, MI  
 Disease Rating - 1, no disease; 9, severe disease. 9/11/80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
CGA-64251	8 gm. ai.	1	1	1	1	A
Bayleton + IBDU	.25 oz. ai./4.76 lbs.	1	1	1	1	A
Tersan 1991	2 oz.	1	1	1	1	A
Bayleton + IBDU	.5 oz. ai./4.76 lbs.	1	1	1	1	A
F-7458	2X	1	1	1	1	A
Bayleton	2 oz.	1	1	1	1	A
Ronilan	2 oz.	1	1	1	1	A
Bromosan	4 oz.	2	1	1	1.3	A
Duosan	6.6 oz.	2	1	1	1.3	A
F-9177	2X	2	1	1	1.3	A
Daconil 2787 GR	13.3 oz.	2	1	1	1.3	A
F-9594*	2X	2	1	1	1.3	A
Fungo 50	2 oz.	2	1	2	1.7	AB
Duosan	3.3 oz.	2	2	1	1.7	AB
Fungo 50	1 oz.	2	3	1	2	ABC
Bayleton + Acti-dione TGF	.125 oz. ai. + .34 oz.	3	1	2	2	ABC
Chipco 26019	2 oz.	2	2	2	2	ABC
Cleary 3336	1 oz.	2	1	3	2	ABC
F-9594*	1X	3	2	2	2.3	ABCD
Daconil 2787 GR	3.3 oz.	5	2	1	2.7	ABCDE
F-9177	1X	2	4	2	2.7	ABCDE
Tersan 1991	1 oz.	1	6	1	2.7	ABCDE
Bayleton	.125 oz. ai.	2	3	3	2.7	ABCDE
CGA-64251	4 gm. ai.	4	2	2	2.7	ABCDE
Acti-dione TG + Daconil 2787 WP	.34 oz. + .92 oz.	2	4	4	3.3	ABCDEF
Cleary 3336	2 oz.	2	1	7	3.3	ABCDEF
F-7888	2X	3	7	3	4.3	BCDEFG
Daconil 2787 FL	6 fl. oz.	4	6	3	4.3	BCDEFG
Kalo 591-05-80	7.6 gm.	7	3	3	4.3	BCDEFG
Daconil 2787 GR	1.67 oz.	6	4	4	4.7	CDEFGH
Daconil 2787 FL	3 fl. oz.	5	6	4	5	DEFGH
Kalo 591 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	7	8	1	5.3	EFGHI
F-7498	2X	4	5	8	5.7	FGHIJ
Acti-dione TGF	.34 oz.	7	7	4	6	FGHIJ
Acti-dione TGF	.69 oz.	8	5	5	6	FGHIJ
alo 589-05-80	7.6 gm.	8	6	4	6	FGHIJ
Daconil 2787 WP	1.84 oz.	5	7	7	6.3	GHIJ
Check	-	8	7	4	6.3	GHIJ
Powder Blue + Hyd. Lime	2 lb. + 1 lb.	9	7	4	6.7	GHIJ
Bioflim	7 fl. oz./100 gal.	9	8	5	7.3	HIJ
Kalo 589 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	8	8	8	8	IJ
Daconil 2787 WP	.92 oz.	9	8	8	8.3	J

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

\* - was not applied on September 4.

## Acti-dione TGF - Daconil 2787 WP Combination Dollarspot Study - 1980

This efficacy, phytotoxicity and compatibility study was conducted on a dollarspot (Sclerotinia homoeocarpa) infected Toronto creeping bentgrass green on the Crops and Soils Field Laboratory, Michigan State University, East Lansing, MI. The green received 1/2 lb. nitrogen/1000 sq. ft. for the season 2 weeks from the initiation of the study. The green was mowed at a 1/4 inch height three times a week and irrigated on an as needed basis.

The study was replicated three times in a random block design with treatments being applied curatively on September 3, September 12, September 19 and September 29. The treatments were applied to 3 feet x 6 feet plots with a CO<sub>2</sub> small-plot sprayer at a volume of 40 gal./acre. Disease pressure was moderately heavy throughout the duration of the study. The plots were rated on September 16, following the second application and on October 8, following the fourth application.

### Results and Conclusions

The results in Table 8 show that after 2 applications (9 days apart) all treatments gave significant control over the untreated check although not complete control. Table 9 shows that after four fungicide applications, with the longest application interval being 10 days, all treatments again gave significant control over the untreated check with Acti-dione TGF 1 oz, Acti-dione TGF 2 oz, Daconil 2787 WP 2 oz, and Bayleton .125 oz ai, all completely eliminating the disease.

Table 8. Acti-dione TGF - Daconil 2787 WP Combination Dollarspot Study  
 MSU Crops and Soils Field Laboratory  
 Disease Rating - 1, no disease; 9, severe disease. 9/16/80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Acti-dione TGF*	1 oz.	2	2	2	2	A
Bayleton	.125 oz. ai.	2	2	2	2	A
Acti-dione TGF + Daconil 2787 WP*	1 oz. + 1 oz.	2	3	2	2.3	AB
Daconil 2787 WP	2 oz.	2	3	3	2.7	AB
Acti-dione TGF*	2 oz.	2	3	3	2.7	AB
Daconil 2787 WP	1 oz.	3	3	3	3	B
Acti-dione TGF + Bayleton	1 oz. + .125 oz. ai.	3	3	3	3	B
Check	-	8	9	7	8	C

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

\*Phytotoxicity observed on Acti-dione TFG plots at 1 oz. and 2 oz. rates, as well as in combination with Daconil 2787 WP. No phytotoxicity observed in combination with Bayleton.

No compatibility problems were encountered.

Table 9. Acti-dione TGF - Daconil 2787 WP Combination Dollarspot Study  
 MSU Crops and Soils Field Laboratory  
 Disease Rating - 1, no disease; 9, severe disease. 10/8/80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Acti-dione TGF*	1 oz.	1	1	1	1	A
Acti-dione TGF*	2 oz.	1	1	1	1	A
Daconil 2787	2 oz.	1	1	1	1	A
Bayleton	.125 oz. ai.	1	1	1	1	A
Acti-dione TGF + Bayleton	1 oz. + .125 oz. ai.	1	2	2	1.7	AB
Acti-dione TFG + Daconil 2787 WP*	1 oz. + 1 oz.	1	2	2	1.7	AB
Daconil 2787 WP	1 oz.	1	2	3	2	B
Check	1	7	6	7	6.7	C

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

\*Phytotoxicity observed on Acti-dione TFG plots at 1 oz. and 2 oz. rates, as well as in combination with Daconil 2787 WP. No phytotoxicity observed in combination with Bayleton.

No compatibility problems were encountered.

## Daconil-Ronilan Combination Dollarspot Study - 1980

The Daconil 2787 FL - Ronilan combination dollarspot (Sclerotinia homeocarpa) study was conducted at the Crops and Soils Field Laboratory in East Lansing, MI, on an irrigated Toronto creeping bentgrass putting green. The plot was laid out in three replications of a random block design. The entire plot area was uniformly infected with dollarspot at the time of treatment. Treatments were applied curatively to 3 feet x 6 feet plots on August 18, September 3, September 15 and September 29. All treatments were applied with a CO<sub>2</sub> small-plot sprayer at a volume of 40 gal./acre.

The ratings were taken on October 8 (Table 10).

### Results and Conclusions

All treatments gave significant control compared to the untreated check. Ronilan alone or in combination with Daconil 2787 ranked higher than Daconil 2787 alone. The 15, 12, and 14 day spray intervals under the severe disease pressure probably accounted for Ronilan's higher ranking.

## Daconil 2787 FL Gallonage Study - 1980

The Daconil 2787 FL gallonage study was conducted on an irrigated Toronto creeping bentgrass putting green at the MSU Crops and Soils Field Laboratory in East Lansing, MI. The plot area was uniformly infected with dollarspot (Sclerotinia homeocarpa) prior to treatment. Treatments were applied curatively to 3 feet x 6 feet plots in three replications of a random block design. Treatments were made on August 14, August 28, September 13 and September 24 using a CO<sub>2</sub> small-plot sprayer.

The ratings were taken on September 30 (Table 11).

### Results and Conclusions

All rate and gallonages gave significant control compared to the untreated control. The 6 oz/1000 sq ft rate gave better, if not always significant, control at the 5% level than the 3 oz/1000 sq ft rates. The only treatment giving significant control over all of the 3 oz Daconil 2787 rates was Daconil 2787 6 oz/1000 sq ft rate in 1 gal of water. Approximately 2 week intervals were used in this study which pushed Daconil 2787 to its limits under the severe dollar spot pressure, but under such stress there is a trend that indicates Daconil 2787 at the 6 oz/1000 sq ft rate is more effective when applied with lower water gallonage. All treatments gave significant control compared to the untreated check.

This study was initiated earlier than the Acti-dione - Daconil - Bayleton study (Table 9) and received the same number of treatments, the major difference being the longer interval between application in this study (16, 12 and 11 days) versus the shorter (9, 7 and 10 days) intervals in the Acti-dione - Bayleton - Daconil study. Daconil 2787 gave control at the 1 + 2 oz/1000 sq ft rate at shorter intervals (Table 9) comparable to the 3 and 6 oz/1000 sq ft at longer intervals (Table 11). The longer intervals in the Daconil - Ronilan study show similar results with Daconil 2787 (Table 10). All studies were conducted on the same green.

Table 10. Daconil 2787 FL - Ronilan Combination Dollarspot Study  
 MSU Crops and Soils Field Laboratory  
 Disease Rating - 1, no disease; 9, severe disease.  
 10/8/80

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Ronilan	2 oz.	1	1	1	1	A
Ronilan + Daconil 2787 FL	1 oz. + 2 fl. oz.	1	1	1	1	A
Ronilan	1 oz.	1	1	2	1.3	AB
Ronilan + Daconil 2787 FL	1 oz. + 3 fl. oz.	1	1	2	1.3	AB
Daconil 2787 FL	6 fl. oz.	2	1	3	2	B
Daconil 2787 FL	3 fl. oz.	3	4	4	3.7	C
Check	-	9	9	8	8.7	D

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

Table 11. Daconil 2787 FL Gallonage Dollarspot Study  
 MSU Crops and Soils Field Laboratory  
 Disease Rating - 1, no disease; 9, severe disease.  
 9/30/80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
Daconil 2787 FL	6 fl. oz./1 gal.	1	1	1	1	A
Tersan 1991	1 oz./1 gal.	1	1	1	1	A
Daconil 2787 FL	6 fl. oz./2 gal.	1	1	2	1.3	AB
Daconil 2787 FL	6 fl. oz./4 gal.	1	2	2	1.7	AB
Daconil 2787 FL	6 fl. oz./6 gal.	2	1	2	1.7	AB
Daconil 2787 FL	6 fl. oz./8 gal.	2	1	3	2	ABC
Daconil 2787 FL	3 fl. oz./2 gal.	1	4	5	3.3	BCD
Daconil 2787 FL	3 fl. oz./4 gal.	3	3	4	3.3	BCD
Daconil 2787 FL	3 fl. oz./6 gal.	5	3	4	4	CD
Daconil 2787 FL	3 fl. oz./1 gal.	2	7	7	5.3	DE
Daconil 2787 FL	3 fl. oz./8 gal.	5	8	8	7	E
Check	-	9	9	9	9	F

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

## Anthracnose - Fungicide Studies - 1980

The 1980 anthracnose (Colletotrichum graminicola) fungicide studies were conducted on the Bay Pointe Golf Club in West Bloomfield, MI, and on the El Dorado Golf Course in Mason, MI, on irrigated annual bluegrass fairways maintained at a 1/2 inch height of cut. The studies were laid out in three replications of a randomized block design.

The liquid applications were made with a CO<sub>2</sub> small-plot sprayer at a volume of 40 gal./acre while the granular formulations were applied with a Scotts 3 foot drop-type spreader. The plot size was 6 feet x 9 feet.

Treatments were applied curatively at El Dorado also, on August 19 and August 29. The ratings were taken on September 11.

### Results and Conclusions

#### Bay Pointe Golf Club Anthracnose Study

The July 10 fungicide applications were made prior to the presence of any observable disease symptoms. No additional treatment was made until August 12. The next scheduled treatment was for July 23, but was not applied because no evidence of the disease was present. Anthracnose did develop the week of August 3 and all treatments were applied on August 12, with selected contact fungicides (as indicated on chart) applied a week later on August 19. Ratings were taken on August 27 and September 3 (Tables 12 and 13). It can be seen that effective fungicides which control anthracnose will allow annual bluegrass survival during heat stress periods of the summer.

#### El Dorado Golf Course, Mason, MI

Ratings were based on % improvement since fungicide treatments were applied after disease outbreak. Those treatments receiving minuses indicate how much the disease increased in those treatments. For example, the check which received no treatment had a 22% increase in the amount of disease from the start of the experiment on August 19 to September 11 when the readings were taken. The plot area was predominately annual bluegrass with 10-20% Kentucky bluegrass interspersed as patches. This affected the uniformity of turf and of infection. Only annual bluegrass areas in the plots were evaluated. The statistics reflect the variation among treatments by showing no significant difference between 96.7% improvement in turf recovery and 15% improvement. The data show that fungicide treatment can control an anthracnose epidemic and allow annual bluegrass recovery whereas the untreated annual bluegrass control continued to deteriorate. Those products which were most effective in stopping the anthracnose epidemic were: the benzimidazole systemic fungicides (Bromosan, Duosan, Fungo 50, Tersan 1991, Cleary's 3336), products containing the systemic fungicide Bayleton (F-numbered compounds except F-7888, which contained only fertilizer, IBDU fertilizer + Bayleton, Bayleton + Acti-dione TGF and Bayleton alone), the systemic fungicide CGA-64251, or certain rates of Daconil 2787 (Table 14). Similar trends can be seen in the anthracnose data taken at Bay Pointe Golf Club (Tables 12 and 13) except that Ronilan, which had one preventive treatment, also ranked among the top treatments.

Table 12. Anthracnose - Fungicide Study - 1980.  
 Bay Pointe Golf Course, Union Lake, MI.  
 % Area Infected - 8/27/82

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
F-9177	2X	1	2	1	1.3	A
F-9177	1X	2	8	0	3.3	AB
Bayleton	2 oz.	1	8	1	3.3	AB
Bayleton + IBDU (.25 oz. ai.)	4.76 lbs.	10	1	1	4	ABC
Bayleton + IBDU (.5 oz. ai.)	4.76 lbs.	3	0	10	4.3	ABC
CGA-64251	8 gm. ai.	15	1	2	6	ABCD
F-7458	2X	5	10	4	6.3	ABCD
F-9594	1X	15	7	0	7.3	ABCD
F-9594	2X	20	1	3	8	ABCD
CGA-64251	4 gm. ai.	25	2	0	9	ABCD
Ronilan	2 oz.	10	5	15	10	ABCDE
Fungo 50	2 oz.	15	0	20	11.7	ABCDE
Tersan 1991	2 oz.	25	0	15	13.3	ABCDE
Daconil 2787 GR	13.3 oz.	8	10	25	14.3	ABCDEF
F-7498	2X	1	15	30	15.3	ABCDEF
Bayleton + Acti-dione TGF	.125 oz. ai. + .34 oz.	30	2	15	15.7	ABCDEF
Duosan	6.6 oz.	30	5	15	16.7	ABCDEF
Tersan 1991	1 oz.	15	5	30	16.7	ABCDEF
Cleary 3336	2 oz.	40	4	7	17	ABCDEF
Daconil 2787 GR	1.7 oz.	8	5	40	17.7	ABCDEFG
Cleary 3336	1 oz.	30	10	15	18.3	ABCDEFG
Fungo 50	1 oz.	15	35	8	19.3	ABCDEFG
Duosan	3.3 oz.	30	20	10	20	ABCDEFG
Daconil 2787 GR	3.3 oz.	20	10	30	20	ABCDEFG
Bayleton	.125 oz. ai.	15	40	10	21.7	ABCDEFG
Bromosan	4 oz.	45	4	20	23	ABCDEFG
Acti-dione TGF	.69 oz.	50	7	15	24	ABCDEFGH
Daconil 2787 FL	3 fl. oz.	30	30	20	26.7	ABCDEFGH
Daconil 2787 FL	6 fl. oz.	25	30	25	26.7	ABCDEFGHI
F-7888	2X	30	10	40	26.7	ABCDEFGHI
Daconil 2787 WP	.92 oz.	45	1	35	27	ABCDEFGHI
KL 589-05-80	7.6 gm.	40	30	50	28	ABCDEFGHI
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz.	25	8	60	31	CDEFGHI
Kalo 591 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	60	8	40	36	DEFGHI
Acti-dione TGF	.34 oz.	50	40	30	40	EFGHI
Powder Blue + Hyd. Lime	2 lbs. + 1 lb.	60	30	40	43.3	FGHI
KL 589 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	30	60	40	43.3	GHI
Check	-	50	45	50	48.3	HI
Biofilm	7 fl. oz./100 gal.	50	40	60	50	I

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

Table 13. Anthracnose - Fungicide Study.  
 Bay Pointe Golf Course, West Bloomfield, MI.  
 % Area Infected - 9/3/80

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
F-9177	1X	1	0	0	.3	A
F-9177	2X	1	0	0	.3	A
Bayleton	2 oz.	1	1	0	.7	AB
Bayleton + IBDU (.25 oz. ai.)	4.76 lbs.	2	0	5	2.3	AB
Bayleton + IBDU (.25 oz. ai.)	4.76 lbs.	7	0	0	2.3	ABC
CGA-64251	8 gm. ai.	10	0	0	3.3	ABCD
F-7458	2X	5	7	2	4.7	ABCD
F-9594	2X	15	0	0	5	ABCD
F-9594	1X	15	1	0	5.3	ABCD
CGA-64251	4 gm. ai.	20	5	0	8.3	ABCDE
Duosan	6.6 oz.	20	2	7	9.7	ABCDE
Tersan 1991	2 oz.	20	0	10	10	ABCDE
Cleary 3336	2 oz.	30	0	5	11.7	ABCDEF
F-7498	2X	1	5	30	12	ABCDEF
Ronilan	2 oz.	15	5	20	13.3	ABCDEFG
Bayleton + Acti-dione TGF	.125 oz. ai. + .34 oz.	30	0	10	13.3	ABCDEFG
Bromosan	4 oz.	30	1	10	13.7	ABCDEFG
Duosan	3.3 oz.	30	7	5	14	ABCDEFG
Daconil 2787 GR*	13.3 oz.	7	5	30	14	ABCDEFG
Tersan 1991	1 oz.	5	2	40	15.7	ABCDEFG
Fungo 50	2 oz.	30	0	20	16.7	ABCDEFGH
Daconil 2787 GR*	1.7 oz.	5	5	40	16.7	ABCDEFGH
Daconil 2787 GR*	3.3 oz.	10	10	30	16.7	ABCDEFGH
Acti-dione TGF*	.69 oz.	40	1	10	17	ABCDEFGH
Cleary 3336	1 oz.	30	5	17	17.3	ABCDEFGH
Bayleton	.125 oz. ai.	2	40	10	17.3	ABCDEFGH
Daconil 2787 FL*	3 fl. oz.	30	15	10	18.3	ABCDEFGH
Daconil 2787 FL*	6 fl. oz.	10	30	15	18.3	ABCDEFGH
Fungo 50	1 oz.	20	30	10	20	ABCDEFGH
Daconil 2787 WP	.92 oz.	40	0	40	26.7	BCDEFGHI
F-7888	2X	30	10	40	26.7	BCDEFGHI
Acti-dione TGF + Daconil 2787 WP*	.34 oz. + .92 oz.	30	5	50	28.3	CDEFGHI
Daconil 2787 WP	1.84 oz.	60	10	20	30	DEFGHI
Chipco 26019	2 oz.	35	30	30	31.7	EFGHI
Kalo 591-05-80	7.6 gm.	40	30	30	33.3	EFGHIJ
Kalo 591 + Biofilm	7.6 gm. + 7 fl. oz./100 gal.	55	5	40	33.3	EFGHIJ
Kalo 589 + Biofilm	7.7 gm. + 7 fl. oz./100 gal.	20	40	50	36.7	FGHIJ
Check	-	50	25	40	38.3	GHIJ
Powder Blue + Hyd. Lime	2 lbs. + 1 lb.	60	15	50	41.7	HIJ
Acti-dione TGF*	.34 oz.	40	35	50	41.7	HIJ
Kalo 589-05-80	7.6 gm.	40	40	60	46.7	IJ
Biofilm	7 fl. oz./100 gal.	40	50	80	56.7	J

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

\*Plots receiving an additional treatment on August 19.



Table 14. Anthracnose - Fungicide Study.  
 El Dorado Golf Course, Mason MI.  
 Percent improvement following treatment - 9/11/80

Treatment	Rate/1000 ft <sup>2</sup>	Replication			AVE	DMR (5%)
		I	II	III		
F-9177	2X	100	100	90	96.7	A
Bromosan	4 oz.	90	100	100	96.7	A
Duosan	3.3 oz.	75	100	100	91.7	AB
Fungo 50	1 oz.	83.3	100	80	87.7	ABC
Tersan 1991	2 oz.	80	100	80	86.7	ABC
F-7458	2X	100	70	87.5	85.8	ABCD
F-4594*	2X	100	83.3	60	81.1	ABCD
Bayleton	.125 oz. ai.	62.5	100	75	79.2	ABCDE
CGA-64251	8 gm. ai.	50	100	83.3	77.8	ABCDE
Tersan 1991	1 oz.	87.5	50	93.3	76.9	ABCDE
F-7498	2X	100	50	75	75	ABCDE
Bayleton	2 oz.	90	100	33.3	74.4	ABCDE
Cleary 3336	2 oz.	80	66.7	75	73.9	ABCDE
Bayleton + AD-TGF	.125 oz. ai. + .34 oz.	100	90	25	71.7	ABCDE
Daconil 2787 FL	6 fl. oz.	80	25	100	68.3	ABCDEF
Daconil 2787 GR	3.3 oz.	50	100	50	66.7	ABCDEF
Duosan	6.6 oz.	100	50	50	66.7	ABCDEF
Bayleton + IBDU (.25 oz. ai.)	4.76 lbs.	50	95	50	65	ABCDEF
Fungo 50	2 oz.	60	66.7	66.7	64.5	ABCDEF
Cleary 3336	1 oz.	80	33.3	70	61.1	ABCDEF
Daconil 2787 GR	1.7 oz.	50	87.5	37.5	58.3	ABCDEF
F-9594*	1X	50	90	33.3	57.8	ABCDEF
CGA-64251	4 gm. ai.	16.7	100	41.7	52.8	ABCDEF
F-9177	1X	0	80	60	46.7	ABCDEF
Daconil 2787 FL	3 fl. oz.	62.5	37.5	37.5	45.8	ABCDEF
Acti-dione TGF	.34 oz.	0	75	60	45	ABCDEF
Chipco 26019	2 oz.	0	100	30	43.3	ABCDEF
Daconil 2787 GR	13.3 oz.	95.3	50	-33.3	37.3	ABCDEF
Bayleton + IBDU (.5 oz. ai.)	4.76 lbs.	0	58.3	40	32.8	ABCDEF
Ronilan	2 oz.	50	40	0	30	ABCDEF
Daconil 2787 WP	.92 oz.	-50	75	62.5	29.2	ABCDEF
Acti-dione TGF + Daconil 2787 WP	.34 oz. + .92 oz.	0	30	50	26.7	ABCDEF
Acti-dione TGF	.69 oz.	-50	50	75	25	ABCDEF
F-7888	2X	33.3	-25	62.5	23.6	ABCDEF
KL-589-05-80	7.6 gm.	-33.3	16.7	66.7	19.5	ABCDEF
Powder Blue + Hyd. Lime	2 lbs. + 1 lb.	-75	40	80	15	ABCDEF
KL-591 + Biofilm	7.6 gm. + 7 oz./100 gal.	0	0	33.3	11.1	BCDEF
Daconil 2787 WP	1.84 oz.	-50	0	83.3	11.1	CDEF
KL-591-05-80	7.6 gm.	-20	33.3	16.7	10	DEFG
Biofilm	7 oz./100 gal.	-50	0	62.5	4.2	EFG
KL 589 + Biofilm	7.6 gm. + 7 oz./100 gal.	-100	20	66.7	-4.4	FG
Check	-	0	33.3	-100	-22.2	FG

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

\*Received only one treatment.

## Anthracnose - Nitrogen Fertility Timing and Carrier Study - 1980

Burroughs Farms Golf Course, Brighton, MI

The long term disease-fertility plots were established on an irrigated 5/8 inch mowed annual bluegrass fairway. All fertilizer applications were made as indicated in Tables 15 and 16. The anthracnose (Colletotrichum graminicola) ratings were taken on the same plots on September 23, 1980. No fungicides were applied on these plots.

### Results and Conclusions

#### Sulfur Coated Urea Timing - Anthracnose Study

There were no significant differences among treatments. The no nitrogen control plots unfortunately received a 1-1/2 lb/1000 sq ft application of Milorganite on June 11, 1980.

#### Nitroform - Urea - Anthracnose Study

The plots receiving most of their nitrogen in the early spring and late summer treatment had more anthracnose than those receiving their nitrogen primarily in the summer and dormantly.

Table 15. Sulfur Coated Urea Timing - Anthracnose Study - 1980.  
 Burroughs Farms Golf Course, Brighton, MI  
 Percent area infected with anthracnose - 9/23/80

Treatment	Replication			AVE	DMR (5%)
	I	II	III		
1. Sulfur Coated Urea (Special)	2	20	5	9	A
5. Check	20	4	20	15	A
4. Sulfur Coated Urea	20	20	8	16	A
3. Sulfur Coated Urea	25	10	20	18.3	A
2. Sulfur Coated Urea	25	25	25	25	A

Notes:

Treatments 1 & 2: June '80 1/2 lb. N.  
 July '80 1/2 lb. N.  
 Aug. '80 1/2 lb. N.  
 Sept. '80 1 lb. N.  
 Nov. '79 1 lb. N.

Treatment 3: April '80 1/2 lb. N.  
 May '80 1/2 lb. N.  
 June '80 1/2 lb. N.  
 Sept. '80 1/2 lb. N.

Treatment 4: April '80 1 lb. N.  
 May '80 1 lb. N.  
 June '80 1 lb. N.  
 Sept. '80 1 lb. N.

Treatment 5: No nitrogen (Mistakenly treated with 1-1/2 lb. Milorganite/1000 ft<sup>2</sup> on June 11, 1980).

Table 16. Nitroform - Urea - Anthracnose Study 1980.  
 Burroughs Farms Golf Course, Brighton, MI  
 Percent area infected with anthracnose - 9/23/80.  
 No fungicides applied.

Treatment No.	Replication				AVE	DMR*
	I	II	III	IV		
2	20	25	10	5	15	A
3	30	20	30	20	25	AB
1	30	35	35	15	28.8	B

Treatment 1: May '80 - 1 lb. nitrogen (1/2 lb. powder blue (nitroform), 1/2 lb. urea).  
 June '80 - 1 lb. nitrogen (3/4 lb. powder blue (nitroform), 1/4 lb. urea).  
 Sept. '80 - 2 lbs. nitrogen (1 lb. powder blue (nitroform), 1 lb. urea).

Treatment 2: Nov. '79 - 1 lb. nitrogen (Urea).  
 June '80 - 1/2 lb. nitrogen (1/4 lb. powder blue (nitroform), 1/4 lb. urea).  
 Aug. '80 - 1/2 lb. nitrogen (1/4 lb. powder blue (nitroform), 1/4 lb. urea).  
 Sept. '80 - 1 lb. nitrogen (1/2 lb. powder blue (nitroform), 1/2 lb. urea).

Treatment 3: No nitrogen.

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

## Fusarium Blight Study - 1980

The 1980 Fusarium blight (Fusarium roseum) study was conducted on the Hartland Glen Golf Course, Hartland, MI, on an irrigated Baron Kentucky bluegrass fairway maintained at approximately 3/4 inch height of cut (Tables 17 and 18). The study was placed on an area that had the disease the year before and on which old Fusarium blight scars were still present.

Treatments were applied on July 3 and July 23. The development of new rings was observed shortly after the first application. Some plots, including the experimental fertilizer-fungicide combinations, were rated on July 23 just prior to the second application. The general fungicide study was not rated because of non-uniform infection and an overall lack of recovery in treated plots. However, the entire area had recovered by mid-August, including the control plots. The recovery from Fusarium blight was attributed to the wet weather in late July and August.

### Results and Conclusions

There were no significant differences among treatments due to recovery of initial Fusarium blight symptoms. This recovery was believed to be due to the frequent rains which occurred in late July and August.

Table 17. Hartland Glen Fusarium Blight Study - 1980.  
 Experimental Ratings - Rating taken 7/23/80.  
 Number of rings/plot.

Treatment	Rate Setting	Replication				AVE	DMR (5%)
		I	II	III	IV		
F-9594	2X	1.5	0	0	0	.4	A
F-9594	4X	.5	0	0	1	.4	A
Check	-	0	0	1.5	0	.4	A
F-9616	1X	0	0	2	1.5	.9	A
F-9617	1X	0	1	0	3.5	1.1	A
F-7888	1X	1	4	0	0	1.3	A
F-9615	1X	2.5	2	0	1.5	1.5	A

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

Table 18. Bayleton + IBDU Fusarium Blight Study - 1980.  
 Analysis 21-0-20, applied 4.75 lbs/1000 ft<sup>2</sup>.  
 Percent recovery after one application - 7/23/80.

Treatment	Rate/1000 ft <sup>2</sup>	Replication				AVE	DMR (5%)
		I	II	III	IV		
Bayleton + IBDU	.5 oz. ai.	50	100	80	37.5	67	A
Check	-	50	75	60	66	63	A
Bayleton + IBDU	.25 oz. ai.	33	50	60	37.5	45	A

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

## Hartland Fusarium Blight - Fertility Study - 1979-80

The Hartland Fusarium Blight - Fertility study was conducted on an irrigated Earon Kentucky bluegrass fairway mowed to a 3/4 inch mowing height in an area that had Fusarium blight the previous year. Established in November 1979, this study is a long term investigation of the effectiveness of various nitrogen carriers and application sequences for the control of Fusarium blight. The plots were read on July 17 when new symptoms began to appear. The wet weather that followed caused symptom development to cease and all plots recovered by late August.

### Results and Conclusions

These data are inconclusive since all treatments recovered before severe infection occurred. Also, at the time infection occurred, no plots had received one full year of nitrogen treatments.

Table 19. Fusarium Blight - Fertility Study - 1979-80.  
Hartland Golf Course, Hartland, MI.

Treatment	Month/lbs. N. per application						
	N	A	M	J	J	A	S
1. IBDU (coarse)	1	-	-	1/2	1/2	1/2	1
2. IBDU (fine)	1	-	-	1/2	1/2	1/2	1
3. Sulfur Coated Urea	1	-	-	1/2	1/2	1/2	1
4. Sulfur Coated Urea (Special)	1	-	-	1/2	1/2	1/2	1
5. Powder Blue (Nitroform) + Urea	1/2 + 1/2	-	-	1/4 + 1/4	1/4 + 1/4	1/4 + 1/4	1/2 + 1/2
6. Powder Blue (Nitroform) + Urea	-	-	1/2 + 1/2	3/4 PB 1/4 Urea	-	-	1 + 1
7. Urea	1	-	-	1/2	1/2	1/2	1
8. Control	-	-	-	-	-	-	-
9. Urea	-	1	1	1	-	-	1
10. IBDU (coarse)	-	1	1	1	-	-	1
11. Sulfur Coated Urea	-	1	1	1	-	-	1
12. Powder Blue (Nitroform) + Urea	-	1/2 + 1/2	1/2 + 1/2	3/4 + 1/2	-	-	1 + 1
13. Urea	-	1	1	-	-	1	1

Table 20. Fusarium Blight - Fertility Study - 1980.  
 Hartland Glen Golf Course, Hartland, MI.  
 Number of Fusarium rings/plot - 7/17/80.

Treatment #	Replication				AVE.	DMR
	I	II	III	IV		
11	0	0	0	0	0	A
10	0	0	0	1	.25	AB
6	0	0	0	1	.25	AB
3	0	0	2	0	.5	AB
13	0	0	2	0	.5	AB
4	0	0	2	1	.75	ABC
5	0	2	0	1	.75	ABC
9	0	0	2	1	.75	ABC
8	2	1	0	2	1.25	ABCD
12	1	1	2	1	1.25	ABCD
1	0	2.5	4	1	1.88	BCD
7	1	5	2	2	2.5	CD
2	4	1	5	1	2.75	D

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



Golf Course Fairway Fungigation Efficacy Study - 1980  
Walnut Hills Golf Course, East Lansing, Michigan

The 1980 fairway fungigation study was conducted on two irrigated, annual bluegrass fairways (14 & 17) mowed at a 5/8 inch cutting height on the Walnut Hills Golf Course in East Lansing, Michigan.

Undiluted Daconil 2787 flowable (F1) 500 fungicide was injected at a rate of approximately 11 gallons/hour directly into the irrigation line using a Hydroflo chem-injector (Hydroflo Corp., 112 Maple Ave., Dublin PA 18917). Daconil 2787 F1 was applied at a 7 qts/acre rate to the fairways based on the irrigation system with a 900 gallon/minute pump with Toro 696 two speed individual irrigation heads set on a 5 minute cycle which delivers 60 gallons of water/minute and 3/10 inch precipitation/hour.

Daconil 2787 F1 fungigation applications were made on May 9, June 9, June 26, July 18, August 12 and August 29. Treatments were applied on an as needed basis with the mid-summer spray intervals being shortened due to Sclerotinia dollarspot (Sclerotinia homeocarpa) and Anthrachnose (Colletotrichum graminicola) pressure. Two adjacent fairways received a similar treatment, 7 qts/acre rate of Daconil 2787 F1 on May 12, June 27, July 18, August 13 and August 29 applied with a John Bean sprayer at the 7 qts/acre rate with an output of 38 gallons/acre.

#### Results and Discussion

Sclerotinia dollarspot and anthrachnose were the only two diseases observed on the Poa annua fairways during the summer period. A mild outbreak of Fusarium patch (Fusarium nivale) occurred in May. Daconil 2787 F1 applied through the irrigation system gave disease control comparable to Daconil 2787 F1 applied the more conventional ground sprayer application method.