

Turfgrass Pathology Research Report: Annual bluegrass culture update, Fungicide control of snow mold, dollarspot, anthracnose, melting out, and Fusarium blight; Nitrogen Fertility disease interactions.

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Snow Mold Fungicide - Fertility Trials - 1978-79

Establishment:

The 1978-79 snow mold fungicide - fertility trials were conducted at the Boyne Highlands Resort on Penncross creeping bentgrass mowed at 1/2 inch. Treatments were applied to 6' x 9' plots in three repetitions of a random block design on November 8, 1978. The wettable powder and flowables were applied with a small-plot CO₂ sprayer at a volume of 40 gal/acre. The granular fungicide and fertilizer applications were made with a 3 ft Scotts drop-type spreader. The plot ratings were taken on April 16, 1979.

Results:

The data in Table 1 are for all snow molds. There were 2 snow molds present in the plots caused by three different species. Typhula blight (gray snow mold) was caused by two different species, Typhula incarnata and Typhula ishkariensis. The Fusarium patch pink snow mold was caused by Fusarium nivale. The total percent area infected with snow mold for each treatment and the check is given in Table 1 without regard to species involved. The percent area infected with snow mold attributable to each is factored out in Tables 2 & 3 & 4.

Fungicides which gave significant control of all snow molds compared to the untreated checks in Table 1 were: Acti-dione RZ 8 oz; Terraclor 75 8 oz; Tersan 1991 and Daconil 2787 (500) 1 + 8 oz; Pro Turf F + F II 2x; Calo Gran 6 lbs; Chipco 26019 + Daconil 2787 (500) 8 + 8 oz, 4 + 4 oz, 2 + 2 oz, Daconil 2787 (500) 16, 12, 8 oz; Daconil 2787 WP 10.6, 8, 5.2 oz; Calo Clor 3 oz, Pro Turf Broad Spectrum Fungicide 2x, 1x; Tersan 1991 + Tersan SP 3 + 6 oz, 3 + 9 oz; BFN 8077 20; 10 oz; Caddy + Bromosan 2 + 6 oz; Bayleton (50 WP) 20, 12 oz; BFN 7789 20 oz; BFN 8090 10 oz; Tersan SP 9 oz; CGA-64251 20 gm ai. Tables 2, 3, and 4 reflect fungicide efficacy of each product on the individual snow mold fungi. It can be seen that Daconil 2787 and Bayleton were very effective against the two species of Typhula, and most of the snow mold in these treatments was due to Fusarium nivale. Whereas, most of the snow mold in the BFN 7789 and Tersan 1991 treatments was due to Typhula and the treatments were relatively free of Fusarium patch.

Table 1. % Area Infected With All Snow Molds, Typhula Blight (*Typhula incarnata*, *Typhula ishikarensis*) and Fusarium Patch, In Boyne Highlands Snow Mold Fungicide Trials 1978-79.

Treatment	Rate/1000 ft ²	I	II	III	Average	
Acti-dione-RZ	8 oz	0	0	0	0	A
Terraclor 75	8 oz	2	2	0	1.3	AB
Tersan 1991 +						
Daconil 2787 (500)	1 oz + 8 fl. oz	2	0	2	1.3	AB
Pro Turf F & F II	2 x rate	0	0	5	1.7	AB
Calo Gran	6 lbs	2	2	2	2.0	AB
Chipco 26019 +						
Daconil 2787 (500)	8 oz + 8 fl. oz	2	2	5	3.0	AB
Daconil 2787 (500)	16 fl. oz	10	0	2	4.0	ABC
Calo Clor	3 oz	5	2	7	4.7	ABC
Pro Turf Bd. Spect.	2 x	15	10	10	11.7	ABCD
Tersan 1991 +						
Tersan SP	3 oz + 6 oz	15	14	20	16.3	ABCDE
BFN 8077	20 fl. oz	20	20	10	16.7	ABCDE
Chipco 26019 +						
Daconil 2787 (500)	4 oz + 4 fl. oz	7	3	40	16.7	ABCDE
Caddy + Brom. fl.	2 fl. oz + 6 fl. oz	35	5	15	18.3	ABCDEF
Daconil 2787 (500)	8 fl. oz	10	5	50	21.7	ABCDEFG
Daconil 2787-(WP)	5.2 oz	20	40	10	23.3	ABCDEFG
Daconil 2787-(WP)	10.6 oz	10	10	50	23.3	ABCDEFG
Bayleton 25WP	20 oz	40	20	10	23.3	ABCDEFG
Pro Turf Bd. Spect.	1 x	5	10	60	25.0	ABCDEFGH
Bayleton 50 WP	6 oz	40	7	30	25.7	ABCDEFGH
Chipco 26019 +						
Daconil 2787 (500)	2 oz + 2 fl. oz	40	20	30	30.0	BCDEFGHI
Daconil 2787 (500)	12 fl. oz	20	10	60	30.0	BCDEFGHI
Chipco 26019	8 oz	40	30	30	33.3	CDEFGHI
Daconil 2787 (WP)	8 oz	45	15	40	33.3	CDEFGHI
Bayleton 50 (WP)	10 oz	40	30	30	33.3	CDEFGHI
Tersan 1991 +						
Tersan SP	3 oz + 9 oz	40	40	25	35.0	DEFGHI
BFN 8077	10 fl. oz	40	30	40	36.7	DEFGHIJ
BFN 7789	20 fl. oz	50	2	60	37.3	DEFGHIJ
Bayleton 25 WP	12 oz	60	15	40	38.3	DEFGHIJ
BFN 8090	10 oz	60	20	40	40	DEFGHIJ
Tersan SP	9 oz	60	20	50	43.3	EFGHIJK
CGA-64251	20 gm af	40	30	70	46.7	FGHIJK
Bayleton 50 WP	3 oz	30	30	80	46.7	FGHIJK
Chipco 26019	4 oz	30	40	80	50.0	GHIJKL
BFN 8090	20 oz	70	60	30	53.3	HIJKLM
Bayleton 25 WP	6 oz	40	30	90	53.3	HIJKLM
BFN 7789	10 fl. oz	70	40	60	56.7	IJKLM
CGA-64251	10 gm af	60	50	60	56.7	IJKLM
IBDU (F)	1 lb N	70	30	95	65.0	JKLMN
Tersan SP	6 oz	70	60	80	70.0	KLMN
Tersan 1991	3 oz	70	50	90	70.0	KLMN
Check	-	80	60	90	76.7	LMN
Chipco 26019	2 oz	90	50	90	76.7	LMN
Urea	1/2 lb N	90	50	95	78.3	LMN
Sulfur coated Urea	1 lb N	90	60	90	80.0	MN
Sulfur coated Urea	1/2 lb N	95	50	95	80.0	MN
IBDU (F)	1/2 lb N	95	80	95	90.0	N
Urea	1 lb N	95	90	95	93.3	N

Table 2. % Area Infected with Typhula Blight (*Typhula Incarnata*) in Boyne Highlands Snow Mold Fungicide Trial - 1978-79

Treatment	Rate/1000 ft ²	I	II	III	Average	
Acti-dione RZ	8 oz	0	0	0	0	A
Tersan 1991 + Tersan SP	3 oz + 9 oz	0	0	0	0	A
Tersan 1991 + Tersan SP	3 oz + 6 oz	0	0	0	0	A
Daconil 2787 (500)	8 fl oz	0	0	0	0	A
CGA-64251	20 gm ai	0	0	0	0	A
CGA-64251	10 gm ai	0	0	0	0	A
Daconil 2787-(WP)	5.2 oz	0	0	0	0	A
Daconil 2787 (500)	16 fl oz	0	0	0	0	A
Daconil 2787 (500)	12 fl oz	0	0	0	0	A
Bayleton 50 WP	3 oz	0	0	0	0	A
Chipco 26019 + Daconil 2787 (500)	8 oz + 8 fl oz	0	0	0	0	A
Chipco 2609 + Daconil 2787 (500)	4 oz + 4 fl oz	0	0	0	0	A
Chipco 26019	8 oz	0	0	0	0	A
Chipco 26019	4 oz	0	0	0	0	A
Daconil 2787-(WP)	10.6 oz	0	0	0	0	A
Daconil 2787-(WP)	8 oz	0	0	0	0	A
Bayleton 25 WP	20 oz	0	0	0	0	A
Bayleton 25 WP	12 oz	0	0	0	0	A
Bayleton 25 WP	6 oz	0	0	0	0	A
Bayleton 50 WP	10 oz	0	0	0	0	A
Bayleton 50 WP	6 oz	0	0	0	0	A
Sulfur coated Urea	1 lb N	0	0	0	0	A
Chipco 26019 + Daconil 2787 (500)	2 oz + 2 fl oz	0	0	0	0	A
Pro Turf F & F II	2 x rate	0	0	0	0	A
Calo Gran	6 lbs	2	0	0	.7	A
Tersan 1991 + Daconil 2787 (500)	1 oz + 8 fl oz	0	0	2	.7	A
Terraclor	8 oz	2	2	0	1.3	AB
Calo Clor	3 oz	5	0	0	1.7	AB
BFN 8077	20 fl oz	0	0	10	3.3	AB
Caddy + Brom. fl	2 fl oz + 6 fl oz	0	5	15	6.7	ABC
Pro Turf Bd. Spect.	2 x	15	0	5	6.7	ABC
Urea	1/2 lb N	0	0	30	10.0	ABC
Chipco 26019	2 oz	40	0	0	13.3	ABC
BFN 8077	10 fl oz	0	0	40	13.3	ABC
BFN 8090	10 oz	0	0	40	13.3	ABC
Check	-	40	0	0	13.3	ABC
BFN 7789	20 fl oz	40	2	0	14.0	ABC
Urea	1 lb N	0	45	0	15.0	ABC
Pro Turf Bd. Spect.	1 x	0	10	40	16.7	ABC
IBDU (F)	1 lb N	0	10	45	18.3	ABC
Sulfur coated Urea	1/2 lb N	0	0	60	20.0	ABC
Tersan SP	9 oz	30	0	30	20.0	ABC
IBDU (F)	1/2 lb N	0	80	0	26.7	ABC
BFN 8090	20 oz	70	0	30	33.3	BC
Tersan SP	6 oz	50	50	0	33.3	BC
Tersan 1991	3 oz	60	25	15	33.3	BC
BFN 7789	10 fl oz	70	40	0	36.7	C

Table 3. % Typhula Blight due to Typhula ishikarensis in Boyne Highlands
Snow Mold Fungicide Trial - 1978-79.

Treatment	Rate/1000 ft ²	I	II	III	Average	
Acti-dione RZ	8 oz	0	0	0	0	A
Tersan 1991 + Daconil 2737 (500)	1 oz + 8 fl oz	0	0	0	0	A
Daconil 2787 (500)	16 fl oz	0	0	0	0	A
Daconil 2787 (500)	12 fl oz	0	0	0	0	A
Chipco 26019 + Daconil 2787 (500)	8 oz + 8 fl oz	0	0	0	0	A
Chipco 26019 + Daconil 2787 (500)	4 oz + 4 fl oz	0	0	0	0	A
Daconil 2787 (WP)	10.6 oz	0	0	0	0	A
Daconil 2787 (WP)	8 oz	0	0	0	0	A
Calo Clor	3 oz	0	0	0	0	A
Calo Gran	6 lbs	0	0	0	0	A
Bayleton 25 WP	20 oz	0	0	0	0	A
Terraclor	8 oz	0	0	0	0	A
Pro Turf Bd. Spectrum	2 x	0	0	0	0	A
Pro Turf F & F II	2 x rate	0	0	0	0	A
Bayleton 50 WP	10 oz	0	10	0	3.3	AB
Bayleton 50 WP	6 oz	10	0	0	3.3	AB
IBDU (F)	1 lb N	10	0	0	3.3	AB
BFN 8077	20 fl oz	0	10	0	3.3	AB
Daconil 2787 (500)	8 fl oz	0	0	10	3.3	AB
Chipco 26019	8 oz	0	15	0	5.0	ABC
Bayleton 25 WP	12 oz	0	15	0	5.0	ABC
IBDU (F)	1 lb N	0	0	20	6.7	ABCD
Chipco 26019 + Daconil 2787 (500)	2 oz + 2 fl oz	0	20	0	6.7	ABCD
Pro Turf Bd. Spectrum	1 x	0	0	20	6.7	ABCD
Daconil 2787-(WP)	5.2 oz	0	20	0	6.7	ABCD
Tersan SP	6 oz	20	0	0	6.7	ABCD
Tersan 1991 + Tersan SP	3 oz + 6 oz	15	7	0	7.3	ABCD
BFN 8090	20 oz	0	30	0	10.0	ABCD
BFN 8090	10 oz	30	0	0	10.0	ABCD
Bayleton 50 WP	3 oz	0	10	20	10.0	ABCD
Bayleton 25 WP	6 oz	0	30	0	10.0	ABCD
Caddy + Brom. fl.	2 fl oz + 6 fl oz	35	0	0	11.7	ABCD
Tersan SP	9 oz	30	0	20	16.7	ABCD
BFN 8077	10 fl oz	40	15	0	18.3	ABCD
BFN 7789	10 fl oz	0	0	60	20.0	ABCD
Sulfur coated Urea	1/2 lb N	20	10	30	20.0	ABCD
Urea	1/2 lb N	20	50	0	23.3	ABCD
BFN 7789	20 fl oz	10	0	60	23.3	ABCD
CGA-64251	10 gm ai	20	0	60	26.7	ABCD
Chipco 26019	4 oz	0	40	40	26.7	ABCD
Sulfur coated Urea	1 lb N	30	60	0	30.0	ABCD
Chipco 26019	2 oz	0	50	45	31.7	ABCD
CGA-64251	20 gm ai	35	0	60	31.7	ABCD
Tersan 1991 + Tersan SP	3 oz + 9 oz	40	40	25	35.0	BCD
Tersan 1991	3 oz	10	25	75	36.7	BCD
Urea	1 lb N	10	45	60	38.3	CD
Check	-	40	0	80	40.0	D

Table 4. % Area infected With Fusarium Patch (*Fusarium nivale*) in Boyne Highlands Snow Mold Fungicide Trial - 1978-79

Treatment	Rate/1000 ft ²	I	II	III	Average	
BFN 7789	20 fl oz	0	0	0	0	A
BFN 7789	10 fl oz	0	0	0	0	A
Acti-dione RZ	8 oz	0	0	0	0	A
Tersan 1991 +						
Tersan SP	3 oz + 9 oz	0	0	0	0	A
Caddy + Brom. fl.	2 fl oz + 6 fl oz	0	0	0	0	A
Tersan 1991	3 oz	0	0	0	0	A
Terraclor (WP)	8 oz	0	0	0	0	A
Tersan 1991 +						
Daconil 2787 (500)	1 oz + 8 fl oz	2	0	0	.7	A
Calo Gran	6 lbs	0	2	2	1.3	A
Pro Turf Bd. Spect.	1 x	5	0	0	1.7	AB
Pro Turf F + F II	2 x rate	0	0	5	1.7	AB
Calo Clor	3 oz	0	2	7	3.0	AB
Chipco 26019 +						
Daconil 2787 (500)	8 oz + 8 fl oz	2	2	5	3.0	AB
Daconil 2787 (500)	16 fl oz	10	0	2	4.0	ABC
BFN 8077	10 fl oz	0	15	0	5.0	ABC
Pro Turf Bd. Spect.	2 x	0	10	5	5.0	ABC
Tersan SP	9 oz	0	20	0	6.7	ABC
Tersan 1991 +						
Tersan SP	3 oz + 6 oz	0	7	20	9.0	ABCD
BFN 8090	20 oz	0	30	0	10.0	ABCD
BFN 8077	20 fl oz	20	10	0	10.0	ABCD
CGA-64251	20 gm ai	5	30	10	15.0	ABCD
BFN 8090	10 oz	30	20	10	16.7	ABCD
Daconil 2787 (WP)	5.2 oz	20	20	10	16.7	ABCD
Chipco 26019 +						
Daconil 2787 (500)	4 oz + 4 fl oz	7	3	40	16.7	ABCD
Daconil 2787 (500)	8 fl oz	10	5	40	18.3	ABCDE
Bayleton 50 WP	6 oz	30	7	30	22.3	ABCDE
Bayleton 25 WP	20 oz	40	20	10	23.3	ABCDE
Chipco 26019 +						
Daconil 2787 (500)	2 oz + 2 fl oz	40	0	30	23.3	ABCDE
Check	-	0	60	10	23.3	ABCDE
Chipco 26019	4 oz	30	0	40	23.3	ABCDE
Daconil 2787 (WP)	10.6 oz	10	10	50	23.3	ABCDE
Chipco 26019	8 oz	40	15	30	28.3	ABCDE
Daconil 2787 (500)	12 fl oz	20	10	60	30.0	ABCDE
CGA-64251	10 gm ai	40	50	0	30.0	ABCDE
Bayleton 50 WP	10 oz	40	20	30	30.0	ABCDE
Tersan SP	6 oz	0	10	80	30.0	ABCDE
Chipco 26019	2 oz	50	0	45	31.7	ABCDE
Bayleton 25 WP	12 oz	60	0	40	33.3	ABCDE
Daconil 2787 (WP)	8 oz	45	15	40	33.3	ABCDE
Bayleton 50 WP	3 oz	30	20	60	36.7	ABCDE

Helminthosporium (Melting-Out) Study - 1979

The 1979 Helminthosporium melting-out (Helminthosporium vagans) fungicide trials were conducted at the MSU soils research farm on Park Kentucky bluegrass maintained at a 1 1/2" height of cut. Fungicide treatments were applied on a bi-weekly schedule on April 27, May 10 and May 31, except as noted on the data charts. All materials were applied with a CO₂ small plot sprayer at a volume of 40 gal/acre.

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

DPX 4424 plus Tersan 75 (1 + 3 oz), CGA 64251 (EC) (12 and 16 gm ai), Dyrene (6 oz), Bayleton (25 WP) + Dyrene (.5 oz ai + 6 oz), DPX 4424 (4, 2, 1 oz), Chipco 26019 (2 oz), BFN 8099 (.63 oz) and DPX 770-2 (7 oz) all gave significant control compared to the untreated check. Other fungicides which gave comparable control to these fungicides but were not significantly different from the untreated check were Acti-dione TGF plus iron sulfate (.69 + 2 oz), Tersan 1991 + Bayleton (25 WP) (1 oz + .5 oz ai), CGA-64251 (EC) (4 & 8 gm ai), Acti-dione RZ (.55 oz), Caddy + Bromosan FL (1 + 4 fl oz), Maneb/Zineb (3 fl oz), Daconil 2787 (wp) (6 oz), BFN 8099 (2.5 fl oz), Bromosan (4 fl oz) and BFN 8099 (6.3 fl oz).

In general the fungicides which gave the best disease control also had the best quality rating indicating that much of the turfgrass quality reduction was due to the H. vagans infection. It was also evident based on the quality reading that those fungicides which gave the best control were not phytotoxic.

Table 5.

M.S.U. Soils Farm Helminthosporium melting-out - Fungicide Study - 1979
 Disease Infection rating - Scale 1-9 (1, best - 9, worst)
 Rating taken - 6/7/79

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
DPX 4424 + Tersan 75	1 oz + 3 oz	1	2	1	1.3	A
CGA-64251 (EC)	12 gm ai	1	1	2	1.3	A
Dyrene	6 oz	2	3	1	2	AB
Bayleton (25 WP) + Dyrene	.5 oz ai + 6 oz	1	4	2	2.3	ABC
DPX 4424	4 oz	2	2	3	2.3	ABC
Chipco 26019	2 oz	2	3	2	2.3	ABC
BFN 8099	.63 oz	2	2	4	2.7	ABCD
DPX 4424	1 oz	4	2	2	2.7	ABCD
CGA-64251 (EC)	16 gm ai	3	3	2	2.7	ABCD
DPX 770-2	7 oz	1	3	5	3	ABCDE
DPX 4424	2 oz	3	3	3	3	ABCDE
Acti-dione TGF + Fe. Sulf.	.69 oz + 2 oz	4	3	5	4	ABCDEF
Tersan 1991 + Bayleton (25 WP)	1 oz + .5 oz ai	3	3	7	4.3	ABCDEFG
CGA-64251 (EC)	8 gm ai	9	2	2	4.3	ABCDEFG
Acti-dione RZ	.55 oz	3	3	8	4.7	ABCDEFG
Caddy + Bromosan FL* Maneb/Zineb*	1 fl oz + 4 fl oz	8	2	4	4.7	ABCDEFG
Daconil 2787 (WP)	6 oz	3	3	9	5	ABCDEFG
BFN 8099	2.5 fl oz	5	6	4	5	ABCDEFG
CGA-64251 (EC)	4 gm ai	9	6	1	5.3	ABCDEFG
Bromosan (fl)*	4 fl oz	8	6	2	5.3	ABCDEFG
BFN 8099	6.3 fl oz	5	2	9	5.3	ABCDEFG
BFN 8099	6.3 fl oz	8	2	7	5.7	ABCDEFG
Acti-dione TGF + Acti-dione RZ	.34 oz + .55 oz	4	7	6	5.7	ABCDEFG
Caddy	1 fl oz	7	2	8	5.7	ABCDEFG
Acti-dione RZ + Fer. Sulf.	.55 oz + 2 oz	8	7	4	6.3	BCDEFG
Bayleton (25 WP)	1 oz ai	4	7	8	6.3	BCDEFG
Tersan 1991 + Bayleton (25 WP)	1 oz + 1 oz ai	9	2	8	6.3	BCDEFG
Tersan 1991	1 oz	8	5	7	6.7	CDEFG
AD-TGF + AD-RZ + Fer. Sulf.	.34 oz + .55 oz + 2 oz	6	7	7	6.7	CDEFG
Daconil 2787-500	6 fl oz	9	7	5	7	DEFG
Acti-dione TGF	.69 oz	8	9	4	7	DEFG
Maneb/Zineb*	6 fl oz	5	9	8	7.3	EFG
Tersan 75	3 oz	9	7	7	7.7	FG
Bayleton (25 WP)	.5 oz ai	8	9	7	8	FG
Ferrous Sulfate	2 oz	9	8	9	8.7	G
Check	--	9	9	8	8.7	G

*Received only 1 treatment prior to rating

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

Table 6.

MSU Soils Farm Leafspot-Fungicide Study
Turf Quality Rating - Scale 1 (best) - 9 (worst)
Rating taken 6/7/79

Treatment	Rate/1000 ft ²	Replication			AVE	DMR
		I	II	III		
Bayleton (25 WP) +						
Dyrene	.5 oz ai + 6 oz	3	2	3	2.7	A
Dyrene	6 oz	3	3	2	2.7	A
Chipco 26019	2 oz	3	2	3	2.7	A
CGA-64251 (EC)	12 gm ai	4	3	2	3	AB
DPX 4424	2 oz	4	3	2	3	AB
DPX 770-2	7 oz	2	3	4	3	AB
BFN 8099	.63 fl oz	3	3	3	3	AB
DPX 4424	4 oz	3	4	3	3.3	ABC
DPX 4424 + Tersan 75	1 oz + 3 oz	3	4	3	3.3	ABC
BFN 8099	6.3 fl oz	4	3	4	3.7	ABCD
Tersan 1991 +						
Bayleton (25 WP)	1 oz + .5 oz ai	2	2	8	4	ABCDE
CGA-64251 (EC)	8 gm ai	7	2	3	4	ABCDE
BFN 8099	2.5 fl oz	8	4	2	4.7	ABCDEF
Acti-dione TGF +						
Fer. Sulf.	.69 oz + 2 oz	6	3	5	4.7	ABCDEF
Acti-dione RZ	.55 oz	6	3	5	4.7	ABCDEF
Caddy + Bromosan fl*	1 fl oz + 4 fl oz	9	3	2	4.7	ABCDEF
Bromosan fl*	4 fl oz	3	3	8	4.7	ABCDEF
Tersan 1991 +						
Bayleton (25 WP)	1 oz + 1 oz ai	6	2	8	5.3	ABCDEF
DPX 4424	1 oz	6	4	6	5.3	ABCDEF
CGA-64251 (EC)	4 gm ai	7	7	2	5.3	ABCDEF
CGA-64251 (EC)	16 gm ai	5	6	5	5.3	ABCDEF
AD-TGF +						
RZ + Fer. Sulf.	.34 oz + .55 oz + 2 oz	8	5	4	5.7	ABCDEF
Bayleton (25 WP)	1 oz ai	3	6	8	5.7	ABCDEF
Daconil 2787 WP	6 oz	4	6	8	6	ABCDEF
Caddy	1 fl oz	8	2	9	6.3	ABCDEF
Maneb/Zineb*	3 fl oz	2	8	9	6.3	ABCDEF
Daconil 2787-500 FL	6 fl oz	7	6	7	6.7	BCDEF
Acti-dione TGF	.69 oz	8	6	6	6.7	BCDEF
Acti-dione TGF +						
Acti-dione RZ	.34 oz + .55 oz	6	8	6	6.7	BCDEF
Acti-dione RZ +						
Fer. Sulf.	.55 oz + 2 oz	6	6	8	6.7	BCDEF
Ferrous Sulfate	2 oz	9	4	8	7	CDEF
Bayleton (25 WP)	.5 oz ai	4	9	9	7.3	DEF
Tersan 1991	1 oz	7	7	8	7.3	DEF
Check	--	7	8	8	7.7	EF
Maneb/Zineb*	6 fl oz	8	9	8	8.3	F
Tersan 75	3 oz	7	9	9	8.3	F

*Received only one treatment prior to rating

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

Common Dollar Spot Fungicide Study - 1979

The 1979 common (benzimidazole-sensitive) dollar spot (Sclerotinia homoeocarpa) study was conducted on a Poa annua fairway on the Burroughs Farms Golf Course in Brighton, MI. The 3' x 6' plots were laid out in three replications in a randomized block design. All applications were made with a CO₂ small-plot sprayer at a volume of 40 gal/acre. Data are presented in Table 7.

There was a uniform dollar spot infestation over the entire area prior to application of the first treatments on July 2. A second treatment was applied on July 17 with the ratings being taken on July 30.

All of the fungicides gave significant control of benzimidazole sensitive Sclerotinia dollar spot. Only iron sulfate (FeSO₄), which is not a fungicide, failed to reduce the disease compared to the untreated check.

Benzimidazole-Resistant Dollar Spot Study - 1979

The benzimidazole-resistant dollar spot (Sclerotinia homoeocarpa) study was conducted on an irrigated Poa annua fairway at Maple Lanes Golf Course in Warren, MI. The 3' x 6' plots were laid out in three replications of a randomized block design. All treatments were applied with a small-plot CO₂ sprayer at a volume of 40 gal/acre. Treatments were applied on July 24 and August 6. The ratings were taken on August 22.

All fungicides gave significant control of benzimidazole resistant Sclerotinia dollar spot (BRSD) including iron sulfate and the benzimidazole fungicides, Tersan 1991, Fungo 50, and Cleary's 3336 (Table 8). BRSD was identified on these fairways two seasons previous. Since that time they have received no benzimidazole fungicide treatments. The data would suggest that a mixed population of benzimidazole sensitive and resistant strains now exists.

Table 7.

Common Dollarspot Fungicide Study - 1979
Disease rating scale - 1 (no disease) - 9 (severe disease)

<u>Treatment</u>	<u>Rate/1000 ft²</u>	<u>Plot disease ratings</u>				
		I	II	III	AVE	DMR
Tersan 1991	1 oz	1	1	1	1	A
Fungo 50	1 oz	1	1	1	1	A
Cleary 3336 FL	1 fl oz	1	1	1	1	A
Daconil 2787 FL	3 fl oz	1	1	1	1	A
Daconil 2787 FL	6 fl oz	1	1	1	1	A
Daconil 2787 WP	4 oz	1	1	1	1	A
DPX 4424	1 oz	1	1	1	1	A
DPX 4424	2 oz	1	1	1	1	A
DPX 4424	4 oz	1	1	1	1	A
Bayleton 25 WP	1 oz	1	1	1	1	A
Bayleton 25 WP	2 oz	1	1	1	1	A
Bayleton 25 WP	4 oz	1	1	1	1	A
CGA-64251	4 gm ai	1	1	1	1	A
Acti-dione TGF + FESO ₄	.69 oz + 2 oz	1	1	1	1	A
Chipco 26019	1 oz	1	1	1	1	A
Chipco 26019	2 oz	1	1	1	1	A
DPX 4424 + Tersan 75	1 oz + 3 oz	1	1	1	1	A
DPX 4424 + Tersan 75	2 oz + 3 oz	1	1	1	1	A
BFN 8099	6.3 fl oz	1	1	1	1	A
Bromosan FL	4 fl oz	1	1	1	1	A
Caddy	1 fl oz	1	1	1	1	A
Baycor 25 WP	1 oz ai	1	1	1	1	A
Caddy + Bromosan FL	1 fl oz + 4 fl oz	1	1	1	1	A
CGA-64251	2 gm ai	2	1	1	1.3	AB
BFN 8099	2.5 fl oz	1	1	2	1.3	AB
BFN 8099	.63 fl oz	2	1	1	1.3	AB
MF 598	4 oz	1	1	2	1.3	AB
Acti-dione TGF*	.69 oz	2	2	1	1.7	AB
AD-RZ + AD-TGF + FeSO ₄	.55 oz + .34 oz + 2 oz	3	1	1	1.7	AB
AD-RZ + AD-TG	.55 oz + .34 oz	3	1	1	1.7	AB
Acti-dione RZ + FeSO ₄	.55 oz + 2 oz	4	1	1	2	AB
Daconil 2787 WP	2 oz	1	3	2	2	AB
Acti-dione RZ	.55 oz	3	2	2	2.3	B
Maneb/Zineb	6 fl oz	1	2	4	2.3	B
Check	-	3	3	4	3.3	C
FeSO ₄	2 oz	4	4	5	4.3	D

*Received only one treatment

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

Table 8.

Benzimidazole-Resistant Dollar Spot Study - 1979
Number dollar spots/plot

Treatment	Rate/1000 ft ²	No. of spots/ plot				
		I	II	III	AVE	DMR
Daconil 2787-FL	6 fl oz	0	0	0	0	A
Chipco 26019	1 oz	0	0	0	0	A
Chipco 26019	2 oz	0	0	0	0	A
CGA-64251	4 gm ai	0	0	0	0	A
Bayleton 25 WP	1 oz	0	0	0	0	A
Bayleton 25 WP	2 oz	0	0	0	0	A
Bayleton 25 WP	4 oz	0	0	0	0	A
Acti-dione TGF + FeSO ₄	.69 oz + 2 oz	0	0	0	0	A
AD-RZ + AD-TGF + FeSO ₄	.55 oz + .34 oz + 2 oz	0	0	0	0	A
Acti-dione RZ + Acti-dione TGF	.55 oz + .34 oz	0	0	0	0	A
DPX 4424	1 oz	0	0	0	0	A
DPX 4424	2 oz	0	0	0	0	A
DPX 4424	4 oz	0	0	0	0	A
DPX 4424 + Tersan 75	1 oz + 3 oz	0	0	0	0	A
DPX 4424 + Tersan 75	2 oz + 3 oz	0	0	0	0	A
BFN 8099	6.3 fl oz	0	0	0	0	A
Baycor 25 WP	1 oz ai	0	0	0	0	A
Acti-dione TGF	.69 oz	0	1	0	.3	A
Daconil 2787 WP	4 oz	1	0	0	.3	A
Caddy + Bromosan fl	1 fl oz + 4 fl oz	1	0	0	.3	A
Bromosan FL	4 fl oz	0	0	2	.7	A
Acti-dione RZ + FeSO ₄	.55 oz + 2 oz	0	3	0	1	A
CGA-64251	2 gm ai	0	3	1	1.3	A
Caddy	1 fl oz	0	2	3	1.7	A
Daconil 2787 WP	2 oz	3	2	0	1.7	A
Daconil 2787 FL	3 fl oz	3	3	0	2	AB
MF 598	4 oz	5	2	0	2.3	AB
BFN 8099	2.5 fl oz	4	2	2	2.7	AB
Acti-dione RZ	.55 oz	3	13	0	5.3	ABC
Fungo 50	1 oz	10	4	3	5.7	ABC
BFN 8099	.63 fl oz	10	3	5	6	ABC
Cleary 3336 FL	1 fl oz	10	8	7	8.3	CD
FeSO ₄	2 oz	4	17	13	11.3	CD
Tersan 1991	1 oz	8	3	27	12.6	DE
Maneb/Zineb	6 fl oz	24	21	9	18	E
Check	-	32	25	19	25.3	F

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

Anthracnose-Fungicide Study - 1979

The 1979 anthracnose (Colletotrichum graninicola) fungicide study was conducted on the Bay Pointe Golf Club in West Bloomfield, MI, on an irrigated annual bluegrass fairway maintained at a 1/2" height of cut. The plot was laid out in a randomized block design.

The liquid applications were made with a CO₂ small plot sprayer at a volume of 40 gal/acre while the granular formulations were applied with a Scotts 3 ft drop-type spreader. A number of treatments, as indicated on the data chart, were applied on a one-time basis on June 27. These treatments were never re-applied. The rest of the treatments were applied three times, on July 2, July 17 and July 30. Due to lack of significant summer anthracnose pressure, the plot ratings were delayed until September 20 when differences became visible (Table 9).

The warm nights necessary for severe anthracnose outbreaks did not occur in July and August of 1979. A mild anthracnose outbreak did occur in September but the infection was not uniform. Also, the control span of most of the fungicides applied in July had long since passed.

Table 9.

Anthracnose - Fungicide Study
Bay Pointe Golf Course, Union Lake, MI
% Area Diseased

Treatment	Rate/1000 ft ²	Replication				
		I	II	III	AVE	DMR
F. 8178	1 oz	0	0	0	0	A
F. 9178	.25 oz	0	0	0	0	A
F. base	.9 lbs	0	0	0	0	A
AD-TGF + AD-RZ + FeSO ₄	.69 oz + .55 oz + 2 oz	0	0	0	0	A
Bayleton 25 + Dyrene	2 oz + 4 oz	0	0	0	0	A
CGA 64251	4 gm ai	0	0	0	0	A
Dyrene	4 oz	0	4	0	1.3	A
F. 7498	1 oz	5	0	0	1.7	A
F. 9177	.25 oz	0	5	0	1.7	A
Bromosan FL	4 fl oz	0	5	0	1.7	A
Tersan 1991 + Bayleton 50	2 oz + 2 oz	0	5	0	1.7	A
Bayleton 25	4 oz	0	5	0	1.7	A
Fungo 50	1 oz	0	5	0	1.7	A
Tersan 1991	1 oz	5	0	0	1.7	A
Caddy + Bromosan FL	1 oz + 4 fl oz	0	5	0	1.7	A
Bayleton 25 (1 applic. only)	8 oz	10	0	0	3.3	A
F. 7161	1 oz	0	10	0	3.3	A
Cleary 3336 FL	1 fl oz	10	0	0	3.3	A
BFN 8099	2.5 fl oz	10	0	0	3.3	A
Tersan 1991 + Bayleton 50	1 oz + .5 oz	10	0	0	3.3	A
Tersan 1991 + Bayleton 50	1 oz + 1 oz	0	10	0	3.3	A
DPX 4424	1 oz	0	0	10	3.3	A
Daconil 2787 WP	4 oz	10	0	0	3.3	A
AD-TGF + AD-RZ	.34 oz + .55 oz	10	0	0	3.3	A
MF 598	4 oz	5	0	5	3.3	A
Acti-dione TGF	.69 oz	10	5	0	5	A
CGA-64251	8 gm ai	10	0	5	5	A
Acti-dione RZ + FeSO ₄	.55 oz + 2 oz	10	5	2	5.7	A
CGA-64251 (1 applic. only)	20 gm	20	0	0	6.7	A
BFN 8099	6.3 fl oz	10	0	10	6.7	A
DPX 4424	4 oz	10	10	0	6.7	A
Daconil 2787 FL	6 fl oz	20	0	0	6.7	A
Acti-dione TGF + FeSO ₄	.69 oz + 2 oz	15	5	0	6.7	A
Baycor 25	8 oz	0	20	0	6.7	A
DPX 770-2	7 oz	0	20	0	6.7	A
BFN 8099	.63 fl oz	20	5	0	8.3	A
Daconil 2787 FL	3 fl oz	20	5	0	8.3	A
Fungo (1 applic. only)	8 oz	10	20	0	10	A
Maneb/Zineb	6 fl oz	5	5	20	10	A
Caddy	1 fl oz	10	10	10	10	A
Daconil 2787 WP	2 oz	30	5	0	11.7	A
Chip - 26019 (1 appl. only)	8 oz	30	10	0	13.3	AB
Chipco 26019	2 oz	40	0	0	13.3	AB
Acti-dione RZ	.55 oz	20	20	0	13.3	AB
Check	--	30	10	0	13.3	AB
FeSO ₄	2 oz	10	4	30	14.7	AB
DPX 4424	2 oz	20	20	40	26.7	B

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

Fusarium Blight Study - 1979

The 1979 Fusarium blight (Fusarium roseum) study was conducted on a commercial lawn area at the Riviera Tool and Die Company in Grand Rapids, MI on an irrigated Merion Kentucky bluegrass turf which had severe Fusarium blight attacks in previous years. The plots were 6 ft x 9 ft and were replicated three times in a randomized block design. The turf was maintained at a two-inch height of cut.

The study consisted of fungicides and nematicides, as well as a number of experimental combination materials. The treatments were applied on July 3 and July 23, except as noted on the data charts. The non-granular materials were applied as drenches, using sprinkling cans, while the granular materials were applied with a Scotts 3 ft drop-type spreader. The entire area was irrigated prior to the applications and all treatments were drenched into the root zone except where noted. The ratings were taken on August 23 (Table 10).

Only F. 9262, DPX 4424, F. 9178, F. base, F. 8178 and F. 7161 gave significant control when compared to the untreated check. The area in general remained in poor condition all season long. A 1/2 lb of nitrogen per 1000 sq ft was added on August 24 to try and encourage growth, but this did little to improve turfgrass quality. The poor condition of the turf would account for the low rankings of many of the fungicides. Without good recuperative potential the previously infected spots would not have filled in, even though the fungicides may have eradicated the disease or prevented new infections from occurring.

Table 10.

Fusarium Blight Study - 1979
Number of rings/plot

Treatment	Rate/1000 ft ²	Replication				
		I	II	III	AVE	DMR
F. 9262	1 oz	0	0	0	0	A
DPX 4424	4 oz	0	0	.5	.2	AB
F. 9178	.25 oz	0	.5	0	.2	ABC
F. base	.9 lbs	0	0	1	.3	ABC
F. 8178	1 oz	1	.5	0	.5	ABC
F. 7161	1 oz	0	0	1.5	.5	ABC
F. 9262	.5 oz	1	1.5	0	.8	ABCD
Vydate FL	12 fl oz	1.5	1	0	.8	ABCD
BFN 8099	6.3 fl oz	3	0	0	1	ABCD
F. 8411	.5 oz	1.5	0	3	1.5	ABCDE
Tersan 1991 + Bayleton 50 WP	2 oz + 2 oz	.5	1.5	3	1.7	ABCDE
Baycor 25 WP	4 oz ai	1	4	0	1.7	ABCDE
BFN 8099	.63 fl oz	2	0	3	1.7	ABCDE
F. 8411	.75 oz	2.5	2	1	1.8	ABCDE
Tersan 1991	4 oz	0	4.5	2	2.2	ABCDE
F. 9177	.25 oz	2.5	.5	3.5	2.2	ABCDE
Tersan 1991 + Bayleton 50 WP	1 oz + .5 oz	2	2	3	2.3	ABCDE
Bayleton 25 WP	1/2 oz ai	2	1.5	3.5	2.3	ABCDE
Chipco 26019	2 oz ai (foliarly)	5	0	2	2.3	ABCDE
CGA-64251	8 gm ai	0	3	4.5	2.5	ABCDE
F. 7498	1 oz	1	1.5	5	2.5	ABCDE
F. 84 12	1.5 oz	0	4	3.5	2.5	ABCDE
Tersan 1991	8 oz	3	.5	4.5	2.7	ABCDE
F. 8412	1 oz	1	4	3	2.7	ABCDE
BFN 8099	2.5 fl oz	3.5	5	0	2.8	ABCDE
DPX 4424	2 oz	3	1	4.5	2.8	ABCDE
CGA 64251	16 gm ai	1	3	5	3	ABCDE
Chipco 26019	4 oz ai (foliarly)	5	4	0	3	ABCDE
Fungo 50	8 oz	4	1	4	3	ABCDE
U.C. 21865	10 lbs ai	0	7	2.5	3.2	ABCDE
Chipco 26019*	2 oz ai (foliarly)	1	3	6	3.3	ABCDE
Bayleton 25 WP	1 oz ai	3	3	4	3.3	ABCDE
Fungo 50	4 oz	2	4.5	4	3.5	ABCDE
DPX 4424	1 oz	3	6	2	3.7	BCDE
Cleary 3336 FL	8 fl oz	5	1.5	4.5	3.7	BCDE
Chipco 26019	3 oz ai (foliarly)	7	1	3.5	3.8	CDE
Check	-	3	4	6	4.3	DE
Tersan 1991 + Bayleton 50 WP	1 oz + 1 oz	5	4	5	4.7	E
Cleary 3336 FL	4 fl oz	3.5	4	7	4.8	E

*Received 3 applications, 7/3, 7/23 and 8/15.

Spring Green-Up Fertility Study - 1979

This study was initiated on June 2, 1978 to investigate nitrogen fertility interactions on an irrigated Poa annua fairway mowed at 3/4" height of cut on the Burroughs Farms Golf Course in Brighton, MI. The fertilizer treatments shown on the data chart were applied on June 2, July 6, August 8, and September 8, 1978. A final dormant fertilizer application was made on November 6, 1978.

The spring green-up ratings which follow were taken on May 9, 1979, prior to the application of any 1979 fertility (Table 11).

The IBDU coarse and fine 1 lb N/1000 sq ft nitrogen rates gave significantly better spring green up compared to the untreated check and to all other treatments except the 1 lbs/1000 sq ft water soluble treatment.

Table 11. Dormant Fertilization - Spring Green-Up Study
Burroughs Farms Golf Course, Brighton, MI
Rating Scale: 1-10 (1 best - 10 worst)

Treatment	Rate/1000 ft ²	I	II	III	AVE	DMR*
IBDU (Coarse)	1 lb. N.	1	1	2	1.3	A
IBDU (Fine)	1 lb. N.	3	2	1	2.0	A
Urea	1 lb. N.	3	2	4	3.0	AB
IBDU (Fine)	1/2 lb. N.	4	4	5	4.3	B
Urea	1/2 lb. N.	5	3	6	4.7	B
IBDU (Coarse)	1/2 lb. N.	4	4	6	4.7	B
Check	-	6	6	3	5.0	B

Dormant fertilizer application made Nov. 16, 1978
Green-up rating taken May 9, 1979

*Treatments followed by the same letter re not significantly different from each other.

Nitroform-Urea Fertility-Anthracnose Study - 1979

This study was established in May, 1979 as part of an on-going investigation to determine the effect of the nitrogen fertility on anthracnose (Colletotrichum graminicola) development. The study was conducted on a 3/4" irrigated Poa annua fairway at the Burroughs Farms Golf Course in Brighton, MI.

Nitroform fertilizer (Powder-Blue) and urea combinations were applied on May 9, June 7, July 2, July 30, and September 19 (Tables 12 and 13).

On August 3, one-half of the plot area received a 2 oz/1000 ft² application of Tersan 1991. Anthracnose pressure was moderately severe at the time the application was made.

The anthracnose ratings which follow were taken on August 21.

Results: Nitroform-Urea Fertility-Anthracnose Study

There were no significant differences among treatments within each study. However, all treatments that received one application of Tersan 1991 had less disease than the corresponding plots which received no fungicide. This shows the importance of a good nitrogen-fertility fungicide combination program and the importance of nitrogen fertility during the summer months. A season with greater anthracnose pressure will be required before significant differences among treatments can be seen.

Table 12.

Nitroform-Urea-Anthracnose Study - 1979
 Burroughs Farms Golf Course, Brighton, MI
 % Area Infected With Anthracnose
 Tersan 1991 Applied on August 8

Treatment No.	Replication				AVE	DMR*
	I	II	III	IV		
1	0	5	0	0	1.3	A
2	10	10	0	2	5.5	A
3	10	5	2	5	5.5	A

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

Treatment 2: June - 1/2 lb nitrogen (Urea)
 July - 1/2 lb nitrogen (Urea)
 Aug. - 1/2 lb nitrogen (Urea)
 Sept. - 1 lb nitrogen (Urea)

Treatment 3: No nitrogen

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

Table 13.

Nitroform-Urea-Anthraco-nose Study - 1979
 Burroughs Farms Golf Course, Brighton, MI
 % Area Infected With Anthracnose
 No Fungicides Applied

Treatment No.	Repetition				AVE	DMR*
	I	II	III	IV		
2	20	15	25	10	17.5	A
1	5	30	30	10	18.8	A
3	15	30	40	15	25.0	A

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

Treatment 2: June - 1/2 lb nitrogen (Urea)
 July - 1/2 lb nitrogen (Urea)
 Aug. - 1/2 lb nitrogen (Urea)
 Sept. - 1 lb nitrogen (Urea)

Treatment 3: No nitrogen

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

Investigation of Aqua-Gro in Disease Reduction

Objective: To determine if Aqua-Gro can reduce disease incidence and the mechanism involved.

Materials:

- a) 36 - 4" clay pots containing 6-month-old stands of Pennlawn red fescue maintained at a 3" height of cut.
- b) 1 liter hand pump spray bottle
- c) "Bell jar"-type plastic enclosure constructed to allow light penetration and humidity build-up, without exposing plants to exterior mist.
- d) Mist chamber in greenhouse
- e) Pathogen: Helminthosporium sorokinianum
- f) CO₂ small plot sprayer (1 liter capacity)

Procedure: On October 30, 18 pots of Pennlawn red fescue were treated with Aqua-Gro at the rate of 16 fl oz/1000 ft², the application being made with a CO₂ small plot sprayer. The Aqua-Gro was immediately drenched into the soil with 1/4" of water. The other 18 fescue pots were left untreated. All pots were then placed in the greenhouse and given normal maintenance for the next two weeks.

On November 13 (2 weeks after treatment) six of the treated pots and six untreated controls were inoculated with a Helminthosporium sorokinianum spore suspension. This suspension was created by washing the fungal spores from the agar plate surfaces with water. Spore concentration was determined with a hemacytometer. The spore suspension was diluted 1:1 with a 1% Potato Dextrose Agar slurry to provide a final concentration of approximately 30,000 spores/ml suspension. This spore suspension was applied at a precise volume of 10 ml/pot with a hand sprayer to insure that equal inoculum pressure would be exerted on each pot.

Immediately following inoculation, 6 inoculated pots (3 treated, 3 untreated) were placed in a bell jar apparatus within the mist chamber and 6 inoculated pots (3 treated, 3 untreated) were placed within the mist chamber proper. All pots were held at room temperature (about 70°F) and were exposed to an approximate 12 hr daylight-darkness cycle.

After 48 hours, all pots were removed from the mist chamber and the bell jar. The 6 pots exposed to the mist showed heavy, large droplets of free water, interspersed with small droplets, extending the entire length of the leaves. The bell jar pots, however, showed large guttation droplets with much smaller droplets extending up and down the leaves .

Results: All 12 pots were placed in the greenhouse for 2 days to allow the disease to incubate. Disease ratings were then made for each pot on a scale of 1-9 (1, no disease - 9, severe disease). These ratings are as follows:

Table 14. Mist Chamber

<u>Treatment</u>	<u>Replication</u>				
	I	II	III	AVE	DMR (5%)
Aqua-Gro	9	8	9	8.7	A
Control	9	8	8	8.3	A

Table 15. Bell Jar

<u>Treatment</u>	<u>Replication</u>				
	I	II	III	AVE	DMR (5%)
Aqua-Gro	8	8	8	8	A
Control	9	9	8	8.7	A

On November 27, the above inoculum procedure was repeated with Pennlawn red fescue pots which had now gone almost 4 weeks without an Aqua-Gro treatment. Once again, observations were made regarding water droplet formation as the plants were removed from the mist chamber (November 29). The bell jar group showed no differences in droplet size or formation between the Aqua-Gro treated pots and the untreated pots. Many small droplets lined the leaves with large guttation droplets on the leaf tips. Within the mist chamber group, the leaves were lined with droplets of various sizes. In no instance were any obvious differences in droplet size or frequency noted between the Aqua-Gro pots and the untreated control pots.

After an incubation period (48 hrs) in the greenhouse, ratings were again taken (December 1). This data appears below:

Table 16. Mist Chamber

<u>Treatment</u>	<u>Replication</u>				
	I	II	III	AVE	DMR (5%)
Aqua-Gro	6	7	6	6.3	A
Control	6	5	7	6	A

Table 17. Bell Jar

<u>Treatment</u>	<u>Replication</u>				
	I	II	III	AVE	DMR (5%)
Aqua-Gro	7	8	7	7.3	A
Control	7	7	7	7	A

On November 27, all previously treated Aqua-Gro pots were given a second treatment at the rate of 16 fl oz/1000 ft², using the same procedure employed on October 30.

On December 11, the remaining pots (6 Aqua-Gro treated, 6 controls) were inoculated using the previously explained procedure. the "treated" pots had now received two Aqua-Gro treatments during the 6 week period.

Upon removal of the plants from the mist chamber and the bell jar apparatus on December 13, infection levels appeared to be uniform throughout. Droplet formation for each group was similar to previous descriptions. Similarly, there were no obvious differences in leaf wetness or disease level between the "treated" and the check plants.

On December 15, the plants were rated for disease incidence as previously described. The disease levels were as follows:

Table 18. Mist Chamber

<u>Treatment</u>	<u>Replication</u>			AVE	DMR (5%)
	I	II	III		
Aqua-Gro	8	7	8	7.7	A
Control	8	9	8	8.3	A

Table 19. Bell Jar

<u>Treatment</u>	<u>Replication</u>			AVE	DMR (5%)
	I	II	III		
Aqua-Gro	6	7	8	7	A
Control	6	7	8	7	A

Results and Discussion

Aqua-Gro under the above conditions failed to reduce the incidence of *Helminthosporium* leaf spot on Pennlawn red fescue caused by *Helminthosporium sorokinianum*. This is not to imply that Aqua-Gro may not reduce the severity of other diseases or *Helminthosporium* leaf spot under field conditions. Perhaps Aqua-Gro would be more effective in reducing diseases such as *Sclerotinia* dollar spot where "dew" or guttation water plays a greater role in disease development.