

1975 RESEARCH PROGRAM REPORT

DEPARTMENT OF PLANT PATHOLOGY
UNIVERSITY OF MINNESOTA
ST. PAUL, MINNESOTA 55108

EVALUATION OF SNOW MOLD FUNGICIDES-'75

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Snow mold in Minnesota is truly a complex problem. While snow mold is often classed as gray or pink, we now know that two species of *Typhula* are definitely present in the entire state and *Sclerotinia borealis* in the northern sections as well as previous report of *Fusarium nivale*. The *Typhula* species are LST-*Typhula incarnata* (itoana) and SST *Typhula ishihariensis*.

The testing of standard and experimental compounds at the St. Paul location and in test plots throughout the state was begun in cooperation with the Minnesota Golf Course Superintendents Association as mercury compounds may be placed on the restricted list and thus be unavailable for snow mold disease control. Also, information on the performance of presently available alternate fungicides under Minnesota conditions was desired by the Minnesota Golf Course Superintendents Association.

Appreciation is expressed to the Department of Horticulture for maintenance of the St. Paul plot and those Superintendents who have provided test plot areas. The following companies have also assisted this research effort: W. A. Cleary Corporation, E. I. duPont de Nemours and Co., Inc., *Associate Professor & Extension Specialist Turf Pathology, Mallinckrodt Chemical Works, Rhodia Chemical Company and The Upjohn Company.

Appreciation is also expressed to the Minnesota Golf Course Superintendents Association for its continued support and encouragement in these projects. Alexandria, Joe Smith; Bemidji, Jeff Buettner; Duluth, Eino Maki; Mendota, Jerry Murphy; Redwood Falls, Quentin Castle; Rochester, Kurt Erdmann; Roseau, Lloyd Rice; St. Paul Campus, Ward Stienstra.

TABLE: SNOW MOLD - FUNGICIDES EVALUATION - '75

	Duluth		Bemidji		Rochester	Mendota	X of Greens
	Green 1 Rep	30	Fairway 3 Reps	24	43	5 (5)	
Check (Range)	29 (5-60)	30	24 (10-50)	43	5 (5)	27	
Tersan SP+PCNB 4oz+4oz	99	100	80	100	97	99	
Tersan SP+Caloclor 4oz+3oz	95	99	93	100	99	98	
Caloclor+PCNB 3oz+4oz	94	100	96	100	98	98	
Tersan SP+Thiram 4oz+4oz	93	100	57	99	95	97	
Caloclor 5oz (D)	85	90	87	100	100	94	
Tersan SP 4oz	93	100	43	100	83	94 Percent	
Tersan SP 9oz	98	99	42	100	78	94 Disease	
Tersan SP 6oz	95	100	63	99	78	93 Control	
PCNB 8oz	90	100	75	93	79	91	
Tersan SP+Fungo 4oz+2oz	95	99	78	100	65	90	
MF 582 12oz	90	99	73	96	73	90	

	Duluth	Bemidji Green 1 Rep	Fairway 3 Reps	Rochester	Mendota	X of Greens
PCNB+Thiram 4oz+4oz	68	100	78	97	91	89
MF 582 6oz	83	99	53	99	70	88
MF 582 9oz	92	99	67	89	73	88
Cleary 4222 8lbs	78	95	65	100	79	88
MF 594 5lbs	64	95	67	83	30	85
PCNB 4oz	78	98	47	92	68	84
Actidione RZ 8oz	88	99	93	91	45	81
PCNB+Fungo 4oz+2oz	82	98	73	95	45	80
Actidione RZ 4oz	85	100	87	91	45	80
MF 594 10lbs	71	98	72	93	56	80
Caloclor 3oz (D)	75	50	83	98	94	79
Cadminate 4oz	58	90	63	83	80	78Percent
Caloclor+Thiram 3oz+4oz (A)	61	80	73	91	81	78Disease
RP 26019 4oz	43	80	37	100	83	77Control
RP 26019 8oz	63	60	53	100	80	76
Calogran 8lbs	74	30	83	100	100	76
MF 594 7lbs	64	75	57	92	58	72
Thiram 8oz	46	50	20	95	75	67
Caloclor+Fungo 3oz+2oz (A)	50	40	82	98	68	64
Cadminate 6oz	34	80	67	--(C)	--(C)	57
Tersan 1991 2oz	14	70	38	74	20	45
Thiram 4oz	23	60	53	64	25	43
Fungo 2oz	21	30	37	71	0	31

- A. Mercury not compatible with thiram or Fungo.
- B. Snow mold was irregular and some plots may reflect lack of disease.
- C. No treatment applied.
- D. Two-5 mm tip burn.

Snow mold disease at Alexandria, Redwood Falls and St. Paul Campus was too light to report the results. The snow mold plot at Roseau was damaged by fertilizer phytotoxicity and disease observation was masked.

SUMMARY OF SNOW MOLDS 1974-75

Snow mold pressure was so light at Alexandria, Redwood Falls and the St. Paul campus that no significant disease readings were made. The plot at Roseau was severely damaged by snow mold but excessive fertilizer burn prevented meaningful data acquisition. In general, most materials performed at Roseau as they did at the Duluth plot, however, the level of control was less. Snow mold pressure was lightest at Rochester, nearly the same at Duluth and Bemidji and most uniformly damaging at Mendota. In any case, disease damage ran from 95% to 71% much of which lasted through June.

It's important to note that Caloclor and Tersan SP do not control Sclerotinia borealis while PCNB (pentachloronitrobenzene) does. Cadminate appears to control Sclerotinia borealis better than Caloclor, however, does not control Typhula sp. as well. The systemics Tersan 1991 and Fungo also appear to check Sclerotinia borealis but are overrun by Typhula sp. Control of Sclerotinia borealis by systemics is not very significant as it appears that Typhula sp. simply out-compete Sclerotinia borealis.

Mixing of Caloclor with Fungo or thiram is not recommended as the mercury of Caloclor and the sulfur of Fungo and thiram react chemically in the spray tank reducing

effectiveness. Mixing Tersan SP with PCNB or Tersan SP with Caloclor or Caloclor with PCNB did improve disease control at most locations.

Increasing concentrations of PCNB (see Actidione RZ and MF582) did not increase disease control. Thus, it appears that 4 ounces of PCNB and maybe less provide all the disease control that material can give. It also appears that PCNB is partially effective against LST but not SST. Tersan SP performed well at Duluth and Rochester but again provided only 80% control at Mendota and even poorer control on the fairway turf at Bemidji. The overall average of Tersan SP was similar to 5 ounces of Caloclor, certainly a good showing. Tersan SP does not produce tip burn. In general LST, Typhula incarnata is present all over the state while SST, Typhula ishkariensis is more common as you go north from Rochester and Sclerotinia borealis is most common north of the Twin Cities to the Canadian border. LST is relatively easy to control while SST was present and not controlled in the plots treated with Caloclor (3 ounce rate only) Cadminate and Tersan SP and PCNB.

The Minnesota Golf Course Superintendent should think back to the paper presented at our last annual meeting and then look at the top treatments in the table. The snow mold problem in Minnesota is a complex of low temperature organisms, not one or two. Second, no single material performed as well as the combination of two of these three materials: Caloclor 3oz, PCNB 4oz and Tersan SP 4oz. Third, each one should examine his turf areas testing these materials where he can (nursery, practice green) and observe the results and what organisms are present.



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