SNOW MOLD OF TURFGRASS IN SASKATCHEWAN IN 1971[1]

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Abstract

Approximately 1200 domestic lawns at seven locations in Saskatchewan were surveyed for snow mold in early spring 1971. At Moose Jaw, Prince Albert, and Rosetown the percentage of lawns without disease was highest and the severity lowest. Swift Current had a higher incidence of snow mold and it was more severe there than anywhere else. Fusarium nivale was the pathogen commonly isolated at Saskatoon, and it was found on golf green turf at Prince Albert, Regina, and Moose Jaw. The low-temperature basidiomycete was not common. Sclerotinia borealis caused severe snow mold damage on Agrostis turf on golf courses at Prince Albert, Saskatoon, and Swift Current and on Festuca rubra turf on a bowling green at Saskatoon. F. nivale and S. borealis are new records for turf grasses in Saskatchewan. An unidentified fungus with hyphal clamp connections and brown or black microsclerotia was found closely associated with some snow mold cases at Saskatoon. Another unidentified fungus with Typhula-like, orange-colored sclerotia was closely related to snow mold damage on a putting green at Regina. In tests at Saskatoon, several fungicides showed promise in controlling snow mold.

Disease survey

In late April and early May 1971 surveys were made of snow mold on approximately 1200 domestic front lawns in several centers in Saskatchewan (Table 1). An estimate was made of the percentage area affected by snow mold on lawns in the course of transects of the cities and towns. It was found possible to speed up the surveys by using portable radio equipment to report disease estimates to a recorder in an automobile.

The percentage of lawns without disease was highest at Moose Jaw, Prince Albert, and Rosetown and the severity was lowest at those locations. Swift Current had a higher incidence of snow mold and it was more severe there than anywhere else. Snow mold was slightly less severe at Saskatoon in 1971 than in 1969 (8).

Fungal pathogens isolated

Isolations were made from lawns at Saskatoon as soon as disease patches were uncovered at snow melt (from 9 April).

Table 1. Incidence of snow mold on lawns in Saskatchewan, 1971

City or town	Date of survey	Number of lawns surveyed	Percentage of lawns in each rating category*: None	Slight	Mod.	Mod.-severe	Very severe
Maple Creek	4 May	84	15.6	30.9	30.9	20.2	2.4
Moose Jaw	4 May	94	30.9	37.2	21.3	10.6	0.0
Prince Albert	13 May	125	31.2	33.6	22.4	12.0	0.8
Regina	5 May	212	9.4	41.0	29.2	19.8	0.6
Rosetown	3 May	63	34.9	39.7	14.3	9.5	1.6
Saskatoon	27-28 April	556	15.8	25.2	28.4	27.0	3.6
Swift Current	4 May	57	8.8	33.3	17.5	29.8	10.5

* Rating scale: Slight = 0-10% of lawn area affected; Mod. = 11-25%; Mod.-severe = 26-50%; Very severe = 51-100%.

Fusarium nivale (Fr.) Ces. was common (5) but the low-temperature basidiomycete (LTB) (2, 3, 8) was not found. F. nivale and the LTB were isolated from Poa annua L. in golf greens at Moose Jaw and F. nivale from the same grass species on golf greens at Prince

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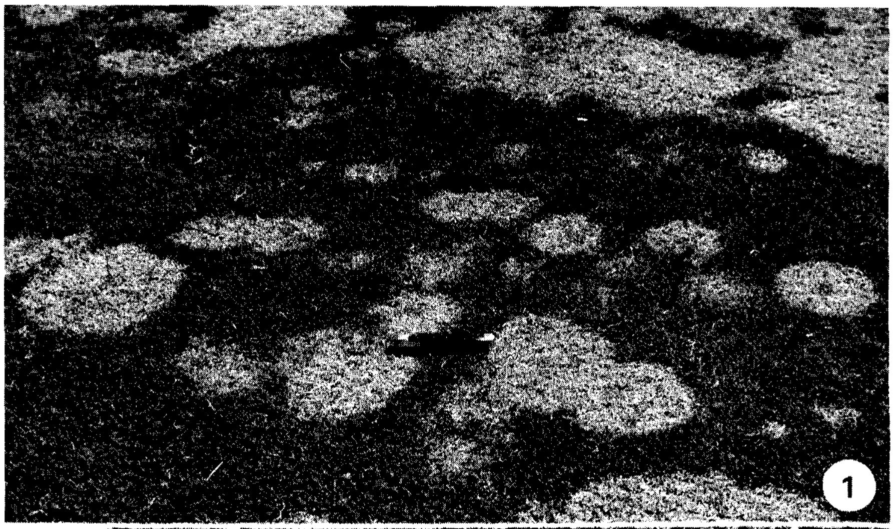

Figure 1. Snow mold on Agrostis turf, caused by Sclerotinio borealis.

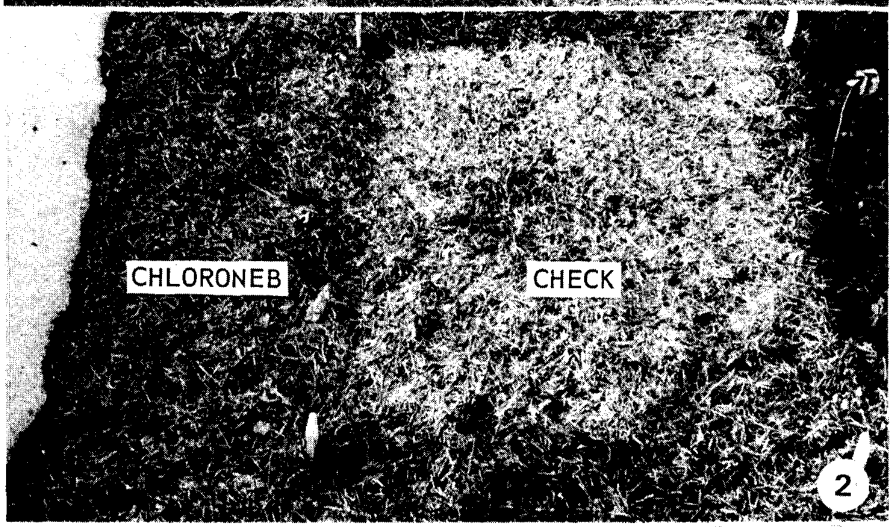

Figure 2. Fusarium snow mold on untreated check plot in domestic lawn

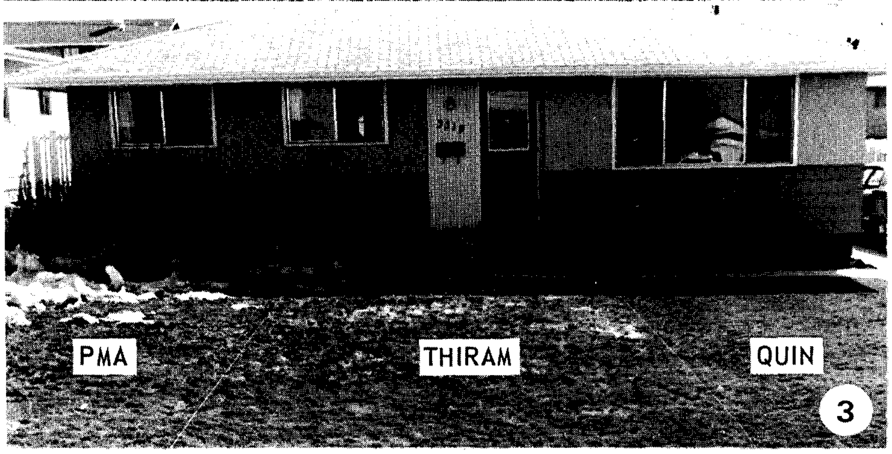

Figure 3. Effective control of snow mold with phenyl mercuric acetate ond quintozene; ineffective control with thiram.

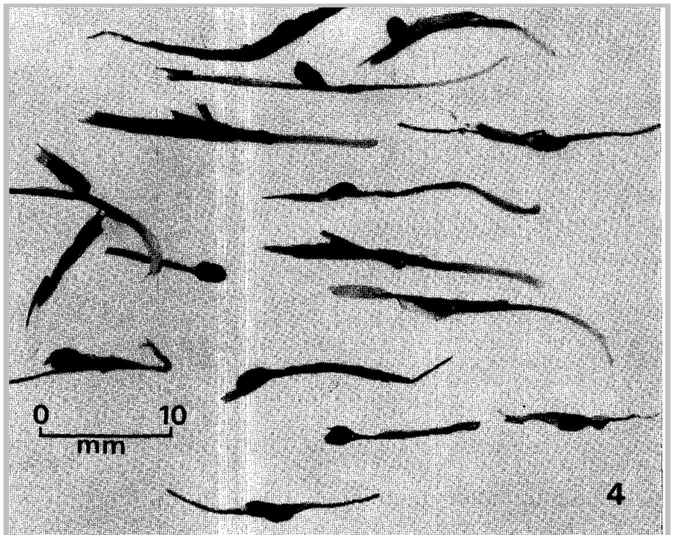

Figure 4. Sclerotia of *Sclerotinia borealis* on *Agrostis* leaves.

Figure 5. *Typhula*-like sclerotia of an unidentified fungus on leaves of *Poa annua*.

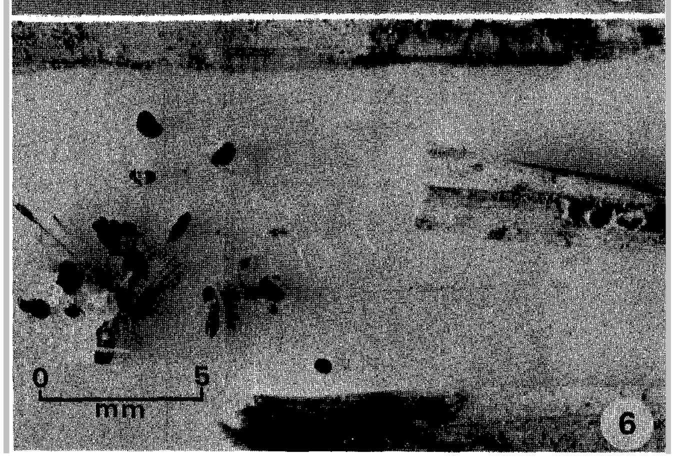

Figure 6. Microsclerotia of an unnamed fungus from leaves of *Poa pratensis*.

Table 2. Fungicides used in snow mold tests

Active ingredient	Product name	% active ingredient	Formulation*	Source†
Chloroneb (WP)	Tersan SP	65	WP	Du Pont
Chloroneb (granular)	Demosan	7.5	Granular	Du Pont
Benomyl	Benlate	50	WP	Du Pont
Thiram	Tersan 75	75	WP	Du Pont
Quintozene	Terraclor	75	WP	Olin
** see footnote	Vitavax	75	WP	Uniroyal
Phenylmercuric acetate	PMAS	10	Solution	Cleary

* WP = wettable powder.

† Du Pont of Canada Ltd., Toronto, Ont.; Olin Corp., Little Rock, Arkansas; Uniroyal (1966) Ltd., Elmira, Ont.; W.A. Cleary Corp. (Canada) Ltd., Belleville, Ont.

** 5,6 dihydro-2 methyl-1, 4 oxathiin-3-carboxanilide.

Albert and Regina. F. nivale was the common snow mold pathogen of bluegrass (Poa pratensis L.) and fescue (Festuca rubra lawns in Saskatoon. The F. nivale records are new ones for the province.

Sclerotinia borealis Bub. & Vleug. was the cause of severe snow mold damage to Agrostis turf on golf greens at Prince Albert, Saskatoon, and Swift Current (Figs. 1, 4) and to a bowling green turf of Festuca rubra L. at Saskatoon. S. borealis is also a new record for the province (3, 9).

An unidentified fungus associated with disease symptoms like those caused by the LTB was often associated with snow mold patches on domestic lawns and golf fairways and occurred on a bowling green at Saskatoon. Like the LTB it had hyphal clamp connections, but unlike the latter fungus it produced microsclerotia on disease patches and in culture (2). In nature the sclerotia were often formed on leaf and twig fragments in the turf (Fig. 6). Attempts to germinate the sclerotia have so far been unsuccessful, A fungus with small, flattened, light-orange colored, Typhula-like sclerotia was found in patches of snow mold on Poa annua on a golf course putting green at Regina (Fig. 5). The sclerotia did not germinate. They did not fit the description for Typhula idahoensis Remsberg or T. incarnata Lasch ex. Fr., which have been reported as the cause of snow mold of turf grasses in Alberta (6, 9). Cladosporium herbarum Fr. was consistently isolated from the gray mycelial mats or crusts found on turf immediately after snow melt at Saskatoon. This fungus did not apparently cause disease (1). The crusts dried up leaving normal-looking turf below.

Control of snow mold with fungicides

Inorganic mercury fungicides (mixtures of mercurous and mercuric chlorides) have been recognized for many years as the most reliable preventatives for snow mold diseases

Table 3. Control of snow mold on domestic lawns with fungicides

Fungicide	Dosage of active ingredient (oz/1000 ft^2)	Number of plots	Average % area affected by snow mold		
			Treated	Untreated	Reduction
Quintozene	6.3	4	7.5	27.5	20.0
Chloroneb (WP)	6.0	8	11.3	30.3	19.0
Phenylmercuric acetate	0.2	13	4.5	21.2	16.1
Vitavax	3.0	3	1.6	16.6	15.0
Benomyl	1.5	8	3.2	11.6	8.4
Thiram	6.0	6	26.0	27.5	1.5
Chloroneb (granular)	3.0	4	2.5	2.5	0.0

in Canada and elsewhere (4, 7). Previous large plot tests on domestic lawns in Saskatoon (unpublished) have shown the effectiveness of these materials against snow mold caused mainly by the LTB fungus. Fungicides containing methyl mercury dicyandiamide or phenyl-mercuric acetate have also been found effective against this pathogen. In an attempt to find less toxic materials, further tests were started in late October and early November, 1970. Since specially developed turf plot facilities were not available at that time, the cooperation of domestic lawn owners was obtained. This precluded the conventional types of randomized plot layouts. Instead, from two to five plots of approximately 500 sq ft, each with a different fungicide treatment, were established at each location. An unsprayed check plot of 6 sq ft was provided within each fungicide plot by covering the grass with a piece of plywood while spraying (Fig. 2). Fungicides (Table 2) were applied with a tractor-mounted sprayer and lance at 60 psi in 5 gal of water per 1000 sq ft except for chloroneb granular which was broadcast. The percentage area of turf affected by patches of snow mold was estimated following snow melt in 1971 (Table 3).

All the fungicides in the domestic lawn tests except the granular formulation of chloroneb gave some control of snow mold. The efficacy of quintozene, chloroneb wettable powder, and Vitavax was similar to that of phenylmercuric acetate which was used as a standard of comparison. Thiram appeared to be an inefficient fungicide (Fig. 3). The predominant pathogen in these tests was F. nivale, but on some sites the microsclerotial *fungus* was found.

In another test on the Saskatoon campus of the University of Saskatchewan, the same fungicides (Table 2), except for chloroneb granular, were applied to duplicate plots of Kentucky bluegrass turf. Check plots without fungicide and treated plots were 250 sq ft in size. At snow melt the average percentage area affected by snow mold patches was: untreated check, 38; phenylmercuric acetate, 5; benomyl, 8; Vitavax, 10; thiram, 20; quintozene, 20; and chloroneb, wettable powder 25. The predominant pathogen was the microsclerotial fungus.

These test results suggest that effectiveness of the different fungicides in snow mold control depends on which pathogen is dominant. The surveys point to the need for more taxonomic studies on fungi which cause snow mold. Tests with a wider range of materials and under conditions where the cause of disease is known seem necessary. Such conditions may be achieved by the use of turf areas inoculated with the appropriate pathogen.

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