

Golf Turf Snow Molds

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Snow Mold trials over the last 24 years in Minnesota have shown several interesting trends. First, one can not predict the level of damage from snow mold in the fall when the application must be made. The damage can occur either in the fall/early winter or more often in the spring period. Sometimes one can determine that about half of the damage was done early in the season and the remaining damage was done as the snow melted at the end of the winter season. Open, cold dry falls usually have little early season damage and in these years the superintendent may be tempted to reduce the application rates of winter products, expecting less snow mold. A dry, frozen, well-hardened turf does not suffer much snow mold damage in the fall, but spring disease damage can still result in serious turf loss. If the winter delivers less snow and it melts quickly in the spring, one can nearly escape snow mold damage, but no long-term weather predictions have been able to describe this condition in the fall when the decision to treat must be made.

Even in those years when one makes predictions in December knowing what the weather has been like for the first portion of the disease season, you are not able to predict with any confidence what the disease damage will be. I know because I have tried to project disease damage levels and mostly have failed. The best one can do is to consider the long-term disease levels recorded/experienced at a location and plan for the same.

Snow mold treatment is a preventative program in Minnesota and seldom in the past have spring applications produced positive results. Fungicide programs of the past with products like mercury, chloroneb and PCNB have given season long control well into the spring. Additional applications after the snow melted were not needed as the persistence of these products was good and most often the conditions for extended cold/wet periods was limited. Spring developed rapidly and turf seldom was exposed to cycles of repeated freeze/thawing. Some would say we had no spring and moved quickly from winter into summer. Most golf turf managers had very little spring leaf spot problems either.

The second trend is the development of spring/water disease problems associated with the reduction in mercury use. Two factors are possible explanations, less persistent products have been applied or the spring season is

developing differently. One can not clearly separate these factors. As the rates of mercury and PCNB products have been either reduced or eliminated, so also our spring season has become longer — with more periods of wet and cold temperatures. I believe the environment in central Minnesota has clearly become more favorable for spring winter disease development and even if the old product lines and rates were used we would have more reports of spring/winter disease. Therefore an early spring season application of products for management of Pink Patch (Pink Snow Mold) has become necessary for some people. Good results are reported with DMI products.

The third trend is much wider distribution of *Typhula ishikariensis*. The fungus most commonly reported in the past was *T. incarnata* and I believe it was easier to control than this species. Fungicide control of snow molds in the 1995-96 test plot in Duluth, Minn., show that a three way mix — Chipco 26019F at 4 Fl. Oz. with Pennstar 4 Oz. and Daconil 2787F at 8 Fl. Oz. resulted in 1.5% disease while the check plots averaged 87% disease. This treatment and other products were applied October 26 with a delivery system providing two gallons of water at 35 PSI per 1,000 Sq. Ft. April 23, the first evaluation period was due to a very late snow melt off; therefore no spring disease problems were seen. The last several years evaluation dates were late March, which did allow for disease development in the spring period.

The last trend I'm concerned about is the low water volume application of fungicide products. In past years I applied products in 5 or 4 gallons of water per 1,000 Sq. Ft. This may have been excessive but it did cover up several application errors. For winter disease control I believe one gallon per 1,000 Sq. Ft. is not adequate. At two gallons per 1,000 Sq. Ft. coverage and penetration are better. Fungicide dose is determined by the amount of product that is taken up by the plant at the initial wetting. When one uses higher pressure to cover the area with less water volume, the droplet size is reduced and canopy penetration is also reduced. High pressure and high travel speeds increase the opportunity for drift. Product not at the site of action is product wasted. If your spray system produces a mist of materials that tend to float, I believe it is set up wrong.

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1995-96 Snow Mold Treatments — Duluth

			% Disease	Confidence Level
1	Chipco 26019F + Ultrex	4.0 Fl. oz. 4.8 oz.	63.0	1
2	Chipco 26019F + Dac 2787F	4.0 Fl. oz. 8.0 Fl. oz.	54.0	1
3	Chipco 26019F + Dac 2787F	8.0 Fl. oz. 8.0 Fl. oz.	73.0	1
4	Chipco 26019F + Pennstar	4.0 Fl. oz. 8.0 oz.	18.0	3
5	Chipco 26019F + Pennstar + Dac 2787F	4.0 Fl. oz. 4.0 oz. 8.0 Fl. oz.	1.5	1
6	Chipco 26019F + Prostar	4.0 Fl. oz. 6.0 oz.	30.0	3
7	Chipco 26019F + Pennstar + Dac 2787F	2.0 Fl. oz. 2.0 oz. 4.0 Fl. oz.	3.3	2
8	Dac 2787F + Turfcide 400	4.0 Fl. oz. 8.0 Fl. oz.	15.0	2
9	Prostar + Turfcide 400	6.0 oz. 8.0 Fl. oz.	0.3	1
10	Prostar + Dac 2787F	6.0 oz. 8.0 Fl. oz.	3.2	2
11	ICI 5504 + PCNB 75	0.4 oz. 4.0 oz.	4.1	2
12	ICI 5504 + PCNB 75	0.7 oz. 4.0 oz.	20.0	1
13	ICI 5504	0.7 oz.	78.0	1
14	ICI 5504 + Chipco 26019 + Dac 2787F	0.7 oz. 4.0 Fl. oz. 8.0 Fl. oz.	34.0	3
15	Dac 2787F + Turfcide 400	8.0 Fl. oz. 12.0 Fl. oz.	28.0	2
16	Dac 2787F	8.0 Fl. oz.	61.0	3
17	Turfcide 400	12.0 Fl. oz.	6.5	2
18	Chipco 26019 + Pennstar + Dac 2787F	2 Fl. oz. 2 oz. 4 Fl. oz.	2.0	2
19	Chipco 26019F + Pennstar + Dac 2787F	2 Fl. oz. 2 oz. 4 Fl. oz.	3.7	2
20	Sentinel	0.33 oz.	14.0	3
21	Check		87.0	3

*Percent disease is area damaged. Confidence level is estimate of variation, 1 - less than 5%, 2 = 6-20% and 3 - more than 21%.

Snow Mold—

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The 1995-96 Minnesota Snow Mold trial is over. It was a long winter and a slow spring season. Treatments were applied October 26 at Duluth and the snow melted off just before April 23. Final readings were made May 8 and the results are to the left on this page. Treatments were applied at 35 PSI to four replicates, each 4 x 10 feet. The dilution rate was 2 gal./1,000 sf. The results are presented as Percent Disease or damaged turf. I usually wait more than two weeks to make the second evaluation, but given the late season and the need to begin other projects, the period for recover was shortened this year.

Snow molds this year were mostly *Typhula* species, while some Pink/*Fusarium* damage was observed. The most common species present was *Typhula ishihariensis*. The fall application date was followed by one day of 40, then 24 and 25 with a total rainfall of 1+1/4 inch rain/sleet. Snow cover on November 9 was 20 inches.

The present standard is a combination of three products: Chipco 26019F at 4.0 Fl. oz. and PCNB at 4.0 oz., and Daconil 2787F at 8 Fl. oz. per 1,000 square feet. The disease level in that treatment averaged 1.5% and ranged from 0 to 5% with a Confidence Level of 1 (less than 5% variation).

This fall product combination has performed well at many test locations in the last 4 years. Spring disease — snow molds can be a much greater problem without the use of persistent products, especially Caloclor. Therefore, after spring snow melt, an application of products to control pink snow mold may be needed.

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