
A modern mother and her young son were shopping in a supermarket. The child, trying to help, picked up a package and brought it to her. "No, no, honey", protested the mother, "go put it back. You have to cook that."

ARE YOU READY FOR WINTER?

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It's that time of the year when most of you are preparing to shut down your courses for the long winter ahead. Your major concern at this time is to insure that your turf survives the long winter months. Winterkilling of turfgrasses presents an important problem in the maintenance of fine turf, particularly in the northern states. Winterkilling is a general term that has been used in referring to injuries to turf caused by poor drainage, drying of grass by cold dry winds, late freezes after the grass has begun to grow in the spring, and to fungus disease.

Snow mold is the name commonly given to this group of diseases, which occur during the winter and early spring. They are caused by one or more of the several psychrophilic fungi. Snow molds occur on practically all of the commonly cultivated turfgrass species. The pathogens which cause snow mold grow best during cool, wet weather. Although there are probably many organisms which cause winterkill of turf, to date we recognize about five genera of fungi which are problem winter pathogens. This article will deal with the two major pathogens which cause snow mold in Pennsylvania and the rest of the northeast.

PINK SNOW MOLD or FUSARIUM PATCH

Fusarium nivale is the major snow mold pathogen active in Pennsylvania. When disease develops in the absence of snow, it is called Fusarium patch; the damage produced under snow or at the margins of melting snowbanks is referred to as pink snow mold. These diseases are most common in the wet, cool months of autumn and spring with reduced activity during winter and summer. The temperature range for optimum disease development is 32 to 40° F. Development is slower at higher temperatures, and ceases at about 60° F.

Usually, only leaves are attacked, but under very favorable conditions, the fungus may kill the crowns and roots as well. When the disease is not serious enough to kill the grass, it can cause enough damage that the area will require a long time to recover. Weeds and annual bluegrass are likely to develop in the weakened patches because of the absence of competition from the grass.

In the absence of snow, Fusarium patch usually occurs as irregular circular patches varying from less than an inch to several inches in diameter. In severe cases, the patches may run together to form large diseased areas. The diseased areas are whitish gray, the leaves have a bleached appearance and, when wet, feel slimy. Mycelium of the causal fungus is not readily apparent on these leaves except at low temperature and with abundant moisture.

Under snow, the disease develops when temperatures are high enough to melt the snow. A snow cover over unfrozen soil commonly melts from the bottom upward, forming ideal conditions for disease development. Infected areas under these conditions are irregular circular patches, which vary from a few inches to a foot or more in diameter. During maximum fungus activity, the grass is covered with a profuse growth of white aerial mycelium. When the conditions remain favorable for disease development, the aerial mycelium may be so abundant that the leaves are matted together. If the patches are exposed to sunlight, a pinkish cast often becomes apparent on the leaves, hence, the name Pink Snow Mold.

The pathogen survives adverse periods in a dormant state in infected grass plants or in debris of previously diseased leaves. The fungus produces numerous spores whenever temperature and moisture conditions are favorable. These spores may be important in disease spread. It is probable that they are carried by wind and splashing rain to leaves where they initiate new infections. The rate of disease spread is directly dependent upon the rapidity of mycelium growth. Lateral spread of the fungus is largely by mycelial growth from diseased leaves to adjacent healthy ones and is rapid in wet, cold weather.

GRAY SNOW MOLD or TYPHULA BLIGHT

Gray snow mold, also known as snow scald, speckled snow mold, winter scald and Typhula blight, is caused by various species of the genus Typhula. The disease is strictly associated with cold weather and snow and is most frequently found where the snow is deep or drifted and slow to melt in the spring.

The optimum conditions for gray snow mold development occur when snow falls on unfrozen ground (32-40° F). When the ground is frozen, the parasitic activity of Typhula ceases. In spring, however, when snow is melting and the temperature between snow and soil is above freezing, fungus activity resumes and the areas of damage enlarge. As long as the turfgrass area remains moist and temperature does not exceed 64° F. Typhula can damage turf. Damage can range from blighting of individual grass blades to complete destruction of the grass plant.

Since Typhula is particularly active under snow cover, symptoms usually are very conspicuous after the first spring thaw. Damaged areas appear as circular, dead, bleached-brown areas, which vary from a few inches to 2 feet in diameter. Under optimum conditions several infection centers may run together, forming large, irregular zones of blighted turfgrass. These areas are covered with a white or light-gray mycelium. A ring of fluffy, aerial mycelium is often massed at the outer margin of these areas. Leaves in the infected area quickly wither, become brown, and then turn a gray-white color due to the presence of the light gray mycelium. The mycelium and infected dead leaves are usually matted together. Infection severity can range from leaf-blade destruction, from which the grass area easily recovers, to sheath and crown infection, which usually results in dead areas requiring reseeding or resodding. The damage caused by **Typhula** spp. (Gray Snow Mold) is distinguished from damage caused by **Fusarium nivale** (Pink Snow Mold) by the presence of small, hard, tan to dark brown resting bodies called sclerotia. These sclerotia are the means by which the fungus survives the adverse conditions of summer. They are embedded in the leaves, sheaths, and other plant parts. The sclerotia are pinkish-orange when they are developing on moist leaves, amber to reddish brown when mature, and dark brown or nearly black on dead, dry leaves. The shape and size of the sclerotia are variable, but they tend to be irregularly spherical and about the size of a pin head. In late fall or early spring, under the stimulus of cold weather, high humidity and natural light of short wave length, sclerotia may germinate and initiate infection centers.

SNOW MOLD CONTROL

Both gray and pink snow mold damage can be minimized by certain cultural practices and proper fungicide treatment. A late summer or early fall application of nitrogen fertilizers can enhance the development of both pink and gray snow mold. Turf should not be allowed to go into winter growing at a

fast rate. This produces a succulent grass plant that is more prone to snow mold damage.

Keeping turf cut at the recommended height until snow fall will help prevent a mat of grass from forming under snow cover. It may also be necessary to remove the clippings in late fall. Leaves as well should not be allowed to lie on the ground over the winter. Management practices that reduce the accumulation of thatch will help reduce the severity of snow mold.

When establishing or completely renovating turf areas, provide for adequate surface drainage, since moisture is a major requirement for infection. You should also provide for light penetration and air movement to hasten surface drying. This is especially important on turf with a northern exposure, where snow is slow to melt. When possible, the placement of snow fences and planting of windbreaks to keep snow from accumulating can help reduce conditions favorable for disease development.

Snow mold damage may be minimized by selecting turfgrasses that are somewhat resistant. In general, Kentucky bluegrass is fairly resistant; red fescue, annual bluegrass, Colonial and creeping bentgrasses are very susceptible. There are differences in snow mold susceptibility among varieties of creeping and Colonial bentgrasses. The varieties, Seaside and Cohansey are very susceptible. Penncross, Washington, and Toronto are moderately susceptible. Congressional is quite resistant, as is the Astoria variety of Colonial bentgrass. Varieties of grasses cannot be chosen for resistance to snow molds alone. They must also meet the requirements for player acceptance and ease of management, as well as resistance to other diseases. Varietal resistance is usually only a factor in the case of pink snow mold or Fusarium patch. All bentgrasses are quite susceptible to gray snow mold, therefore, bentgrass stands where Typhula commonly occurs should be given preventive fungicide treatments.

In areas with a history of snow mold damage a preventive fungicide program is recommended. Curative programs are of little or no use with these diseases. Because mercury fungicides are no longer widely used or readily available, the causal organism must be known in order that appropriate fungicides can be applied (see Table 1). In other words you must be able to determine, which disease you have.

Fungicides should be applied during cold, rainy weather in the fall and prior to the first snowfall. Reapplication may be made in spring or late winter if the disease is active. Since **Fusarium nivale** can continue to cause damage after the snow has melted, regular fungicide treatments may be required to prevent damage during cold, wet weather in early spring. Now is the time to give consideration to snow mold prevention to eliminate or reduce the problems this winter may cause you.

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TABLE 1.
Fungicides recommended for the control of snow molds.

DISEASE	FUNGICIDE*
Fusarium Patch or Pink Snow Mold	Benomyl (Tersan 1991) Thiabendazole (Mertect 140-F) Thiophanate methyl (Fungo, Spot Kleen) Thiophanate ethyl (CL 3336) Acti-dione Thiram Cadmium fungicides (Cadminate, Caddy, Kromad) **Mercury compounds I.
Typhula Blight or Gray Snow Mold	Chloroneb (Tersan SP) Dyrene Acti-dione Thiram Cadmium fungicides (Cadminate, Caddy, Kromad) **Mercury compounds

*Fungicides are listed by common names and **some** examples of trade names are given in parentheses. Where trade names are used no discrimination is intended and no endorsement by the author or Pennsylvania State University is implied.

**Mercury compounds are still under investigation and allowed to be used for snow mold control in Pennsylvania until a decision is made.

Carl Hopphan, newly elected President receives gavel from out-going President Fred Opperman.

M.A.G.C.S. Officers and Directors for 1977: l to r. - Don Hoffman, Dave Meyer, Robert Siebert, Ed Fischer, Carl Grassl, Carl Hopphan, Fred Opperman, and Joe Grenko. [Clifford Behrendt and Peter Voykin not present].

The November 11 annual meeting held at Butterfield C.C. was not up to our usual number in attendance. Art Benson, Jr. was our host. After refreshments and a wonderful dinner and the best of service, the important part of the meeting took place. All the various committees gave their reports, then the election took place. The results were: Carl Hopphan, President; Carl Grassl, 1st Vice President; Cliff Behrendt, 2nd Vice President; Joe Grenko, Secretary/Treasurer. New Directors: Robert Siebert, Ed Fischer, & Don Hoffman.