

Editor's Note - Sorry that this article is not timely. Please read it and then file it and read it again in September or October.

SNOW MOLDS

Malcolm C. Shurtleff and John R. Street¹

The winter of 1978-79 has provided ideal conditions for the development of one of our more serious winter injury problems--snow mold. Golf courses and other turfgrass areas in Illinois were blanketed with several inches to a foot or more of snow depending on location. Snow cover in the northern areas of the state occurred in mid-to-late November and extended well into March. In many areas, the turf and soil underneath the snow cover were not frozen, and in the central areas of the state, ice cover preceeded the snow. These conditions resulted in serious snow mold injury in many areas, especially northern Illinois. Snow mold pressure and damage was extensive even on turfgrass areas receiving preventative fungicide applications.

Snow molds damage lawns and fine turfgrasses from December to April especially in shaded or wet areas where the snow is slow to melt. Roots, stems, and leaves may be rotted over a wide range of temperatures (25° to 60°F.). Injury may take place under the snow, as the snow is melting, or during cold, drizzly periods when snow is absent. Snow mold damage frequently conforms to footprints, paths, ski tracks, etc., because compaction of snow favors the disease. Attack by snow mold fungi ceases when the grass surface dries out; however, infection tends to reappear in the same areas year after year.

Snow molds are favored by mid-to-late fall applications of nitrogenous fertilizers or by a cover of straw, leaves, or other moisture-holding debris on the turf. Disease is most serious when air movement and soil drainage are poor and the grass stays wet for long periods.

There are two types of snow mold, gray snow mold, also known as *Typhula* blight or snow scald (caused by the fungus *Typhula itoana*), and pink snow mold or *Fusarium* patch (caused by the fungus *Fusarium nivale*). The two types are found in the same geographical areas in the United States, including Illinois. Pink snow mold may be found farther south than gray snow mold.

Gray Snow Mold, *Typhula* Blight, or Snow Scald

Gray snow mold appears to have caused the most extensive damage so far this winter. Gray snow mold appears in turfgrass areas as roughly circular, dead, bleached-brown areas up to a foot or more in diameter. Several spots may merge, forming large, irregular areas. The wet grass may be covered at first with a fluffy white mold (mycelial) growth that soon turns bluish-gray to almost black. At other times a silvery membranous crust develops over the injured turf. It is during this period of active growth that the *Typhula* fungus produces small, hard, tan to chocolate brown resting bodies called sclerotia. These sclerotia are embedded in the leaves and crowns of diseased plants and lie dormant during the following summer and early fall. The sclerotia can be easily seen on close observation. In cold, wet weather--at temperatures as low as several degrees below freezing--they germinate to produce delicate threads (hyphae) under the snow.

A deep snow cover on unfrozen soil produces optimum conditions for disease development. The fungus hyphae infect all tissues of the grass plant and start the disease cycle once again. The fungus is inactivated while the turf and soil are frozen. In early spring, when the snow melts and the turf thaws, the

fungus again becomes active, and the size of the infection centers enlarge rapidly. As the weather warms and the turf dries, *Typhula* becomes dormant until late fall. The optimum temperature for growth of the fungus in culture is between 46° and 59°F. The organism is not seed-borne.

Pink Snow Mold or *Fusarium* Patch

Pink snow mold patches are round and usually smaller than those of gray snow mold, commonly being one to three inches in diameter. Under prolonged cold, wet conditions, the spots may enlarge up to about a foot across or merge to cover large areas. In cool, wet weather the bleached-brown patches may be covered with a dense whitish-pink mold growth. As with gray snow mold, the slimy growth quickly disappears as the grass blades dry. Usually only the leaves are attacked, but the fungus may cause a rotting of the crowns, killing the plant. Conditions favoring pink snow mold include a wet fall, snow falling on unfrozen soil, deep snow, and a late, cold, wet spring. Infection and disease development occur most rapidly when the humidity is high and temperatures are 30° to 45° (maximum about 65°F).

When temperature and moisture conditions are favorable, the fungus produces tremendous numbers of microscopic spores. These spores are carried primarily by air currents and water to grass leaves. Infection occurs through breathing pores (stomates). The fungus can exist and attack grasses in all soils from strongly acid to alkaline. (Fungus growth occurs in culture from a pH of 2.5 to 13, with an optimum of about 6.6 to 6.9).

Control

In general, the bentgrasses are most susceptible to both snow mold diseases. Snow mold damage can also be quite severe on annual bluegrass. Turfgrass damage is usually more extensive and severe on closely mowed turf (e.g. golf course greens) and on areas where heavy rates or improperly timed nitrogen applications in mid-to-late fall stimulate shoot growth going into the winter. Thus, late fall fertilization, if attempted, should be applied after shoot growth has ceased in late fall. Thatch also appears to favor the development of these diseases. Where snow molds cause damage year after year, the construction of barriers (like snow fences or windbreaks) will keep snow from accumulating and help to reduce disease.

Preventative applications should be made before the first heavy snow or cold, drizzly weather is forecast in November or early December. Fungicides labeled and recommended for winter disease control are listed below. **Follow the manufacturer's directions carefully.** Reapply one or more times during the winter or early spring as the snow melts.

Typhula blight	Fusarium patch
Tersan SP	Tersan SP
Calo-clor*	Tersan 1991
Calo-Gran*	Calo-clor
	Calo-Gran

*(Calo-clor and Calo-Gran are cleared for use only on golf course greens, aprons, and tees by certified golf course superintendents only).

Areas damaged by snow mold should be raked during the early spring to break the crusted, matted leaves. A light fertilization is also advantageous at this time. These practices will encourage the production of new growth in the affected turf areas. Recovery is usually slow on areas left unattended. Reseeding or sodding will be necessary where crown and root rot has occurred.

¹ Malcolm C. Shurtleff is Extension Plant Pathologist, Department of Plant Pathology, and J. R. Street is Extension Turf Specialist, Department of Horticulture.