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report on
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SNOW MOLDS OF TURFGRASSES

Snow molds are cold tolerant fungi that grow at freezing or near freezing temperatures. Snow molds can damage turfgrasses from late fall to spring and at snow melt or during cold, drizzly periods when snow is absent. It causes roots, stems, and leaves to rot when temperatures range from 25° to 60°F (-3° to 15°C). When the grass surface dries out and the weather warms, snow mold fungi cease to attack; however, infection can reappear in the area year after year.

Figure 1. Gray snow mold on a home lawn (courtesy R. Alden Miller).

Snow molds are favored by excessive early fall applications of fast release nitrogenous fertilizers, excessive shade, a thatch greater than 3/4 inch thick, or mulches of straw, leaves, synthetics, and 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, e.g., where snow is deposited in drifts or piles.

Figure 2. Pink snow mold or Fusarium patch. patches are 8-12 inches across, covered with pink mold as snow melts (courtesy R.W. Smiley).

All turfgrasses grown in the Midwest are susceptible to one or more snow mold fungi. They include Kentucky and annual bluegrasses, fescues, bentgrasses, ryegrasses, bermudagrass, and zoysiagrasses with bentgrasses often more severely damaged than coarser turfgrasses.

There are two types of snow mold in the Midwest: gray or speckled snow mold, also known as Typhula blight or snow scald, and pink snow mold or Fusarium patch. The two types are found in the same geographical areas in the Midwest, including Illinois. Pink snow mold occurs farther south than gray snow mold.

For further information on turfgrass diseases, contact Nancy R. Pataky, Extension Specialist and Director of the Plant Clinic, Department of Crop Sciences at the University of Illinois, Urbana-Champaign.

GRAY SNOW MOLD OR TYPHULA BLIGHT

Gray or speckled snow mold is caused by the fungus *Typhula incarnata* and three varieties of *typhula ishikariensis.* A deep and prolonged snow cover on unfrozen soil, tall grass matted down, and unbalanced nitrogen fertilization produces favorable conditions for disease development. The fungus (or fungi) are less active while the turf and soil are frozen. In early spring, when the snow melts and the turf thaws, the fungus may again become active, and diseased patches may enlarge. As the weather warms and the turf dries, *Typhula* becomes dormant until mid to late autumn. The optimum temperature for infection is between 30° and 45°F (-1° to 7°C). All northern turfgrasses are susceptible, with bentgrasses and annual bluegrass being most susceptible. Kentucky bluegrass cultivars differ in resistance to the *Typhula fungi*. The fine leaved fescues are commonly more resistant than are Kentucky bluegrasses and especially bentgrasses.

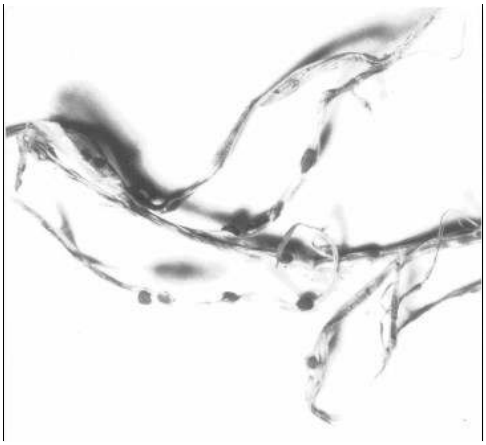

Figure 3. Sclerotia of the gray snow mold fungus (Typhula) embedded in grass leaves (courtesy Dr. R.E. Partyka).

Symptoms

After snow melt, gray snow mold appears as roughly circular, white to grayish white areas with regular margins that coalesce to form areas up to 2 or 3 feet in diameter (Figure 1). The disease is active where the snow is melting. Several spots may merge, forming large, irregular, straw-colored dead areas. The wet grass may be matted together and covered at first with a fluffy, grayish white mold (mycelium) that is speckled with numerous pale to dark brown or black sclerotia (Figure 3). The mold soon turns bluish gray to almost black. At other times a silvery membraneous crust develops over the injured turf. When conditions favor disease development, large turf areas may be killed but commonly, only the leaves are killed and new leaves form from the over wintered plant crowns. Old gray mold "scars" may be evident until May or early June (Figure 4).

Figure 4. Sporocarps of typhula incarnata, a common gray snow mold fungus (courtesy Noel Jackson).

Disease Cycle

After the period of active mycelial growth when the snow melts, the *Typhula* fungi produce small (0.2 to 5 mm), roundish or flattened, orange yellow to tan or reddish brown, chocolate brown, or black survival structures called sclerotia. (The sclerotia of *T. ishikariensis* are tiny and black when mature). The hard sclerotia are embedded in or attached to the leaves and crowns of diseased plants (Figure 3) and lie dormant during the following summer and early autumn. The sclerotia germinate in cold, wet weather or after autumn snow melt to produce delicate, pink to grayish white, spore bearing sporocarps up to 20 mm tall or hyphae with clamp connections that infect all tissues of the grass plant and start the disease cycle once again. the fungi spread by movement of sclerotia, or by windborne basidiospores produced by the clublike sporocarps, splashing or flowing water, turf equipment, and shoes. *Typhula* fungi that infect grasses are not seedborne.

Cultivars of Kentucky bluegrass resistant to one or more *Typhula* fungi include Adelphi, Baron, Bonnieblue, Galaxie, Glade, and Monopoly. Very susceptible Kentucky bluegrasses include Fylking, Merion, Nugget, Pennstar, and South Dakota Common or Certified. The red fescues are, in general, more resistant to gray snow mold than are Kentucky bluegrass and bentgrasses. Atlanta chewings fescue is resistant. Boreal and Reptans are highly resistant red fescues; Dawson is moderately resistant. Perennial ryegrasses that are resistant or moderately resistant include Delray, NK-200 and Pennfine.

PINK SNOW MOLD OR FUSARIUM PATCH

Pink snow mold is caused by *Microdochium nivale* (synonyms - *Fusarium nivale* and *Gerlachia nivalis*). This disease is common and troublesome in northern areas where prolonged periods of wet, cool weather occur from autumn to middle or late spring and early summer. Fusarium patch disease in these areas often occurs in the absence of snow and is favored by cool or cold wet weather when grass growth is retarded. Patches of the disease, which persist until a snow cover develops, may increase in size, especially if the snow falls on unfrozen ground. At snow melt, on exposure to light the fungus on diseased turf turns pink, hence the name "pink snow mold." Infection, spread, and disease development occur most rapidly when the turf moisture and air humidity are high and temperatures are 30° to 45°F (-1° to 7°C); maximum about 65°F (18°C). Nearly all cool season turfgrasses, bermudagrass, and zoysiagrass are susceptible. Fine leaved fescues and tall fescue are usually not damaged as severely as annual bluegrass, bentgrasses, redtop, Kentucky bluegrass, and ryegrasses. Moderately resistant or resistant turfgrasses include Delray perennial ryegrass, Atlanta and Ruby chewings fescue, and Dawson red fescue.

Symptoms

Pink snow mold or Fusarium patch disease first appears as round, water soaked spots, 1 to 3 inches in diameter, that soon turn into yellow, orange brown, or reddish brown patches with sparse or abundant mold growth. Later, they may enlarge and become ringlike, light gray or light tan patches up to about 8 inches across with an orange brown or brown border. The roughly circular patches, usually rounder and smaller than those of gray snow mold, are often pink after exposure to light (Figure 2). The spots may enlarge up to 8 or 12 inches across or merge to cover large areas.

Disease Cycle

The *Microdochium* fungus is inactive when the grass is dry and the weather is warm (72°F [22°C] and above). It survives from one season to the next probably as dark aggregates of mycelium in infected grass plants or in dead grass debris and soil. There is also some evidence that the fungus is systemic within the grassplant. When temperature and moisture conditions are favorable, the fungus produces large numbers of crescent-shaped microscopic spores (macroconidia) in sticky masses. The spores are carried primarily by splashing or flowing water, air currents, turfgrass equipment, and shoes to grass leaves. Infection occurs through breathing pores (stomates). The fungus can exist and attack grasses in all soils from pH 5.5 to 7.5, but is favored by alkaline (pH greater than 7) turf surfaces.

Control

1. Follow a recommended fertilizer program for your area and the grass or grasses being grown. Snow mold damage can be reduced by using balanced fertilization. Maintain high potassium and phosphorus soil test values. Avoid fertilization with nitrogen within about 6 weeks of a killing frost or when the first heavy snow is expected. Slow release forms of nitrogen fertilizer are usually

preferred although soluble forms of nitrogen (such as ammonium sulfate) can be used. Turfgrasses should **not** go into the winter in a succulent condition. Use lime **only** when the need is indicated by a soil test; avoid excessive use of lime. Avoid sudden changes in the surface thatch-soil reaction (pH), especially on *Poa annua* turf.

2. Keep the grass cut to recommended height (1½ to 2 inches for bluegrasses, red fescues, and ryegrasses; 1/2 inch or less for bentgrasses). Mow the turf frequently so that the grass will not be damaged by excessive defoliation at any one mowing. Do not remove more than one third of the leaf surface at one mowing. Mow throughout the autumn until the grass stops growing.

3. Avoid organic or synthetic mulches and thatch accumulation. If the thatch is more than 1/2 inch thick, you can use a "vertical mower," "power rake," or "aerifier" to reduce this problem. These machines may be rented at most garden supply and tool rental stores.

4. Prevent large snow drifts and excessive accumulation of snow on high value turf areas by proper placement of snow fences, living evergreen windbreaks and similar barriers.

5. Before the first heavy snow or cold, drizzly weather is forecast in November or early December, apply **one** of the suggested turf fungicides to areas with a history of snow mold infection. Use lower fungicide rates in **preventive** programs, higher rates for **curative** programs. Fungicide use and restrictions are subject to change without notice. Always read and follow the instructions and precautions on the container label. Reapply the fungicide one or more times during the winter or early spring as the snow melts.

6. Repair snow mold damage in spring by raking the matted grass and fertilizing. Reseed or resod as necessary using resistant varieties. Fungicide sprays may be needed.

7. When establishing a new lawn or other turf area, provide for adequate surface drainage by grading to a slope of 2 to 4 percent and filling in depressions to achieve a smooth, uniform surface.

8. Improve light and air circulation by pruning or removing dense trees and shrubs that shade or border the turf area.

Mention of a trade name or propietary product does not constitute warranty of the product and does not imply approval of this material to the exclusion of comparable products that may be equally suitable.

Refer to Illinois Commercial Landscape & Turfgrass Pest Management Handbook or Illinois Homeowner's Guide to Pest Management for further details on fertilization and fungicide usage. The publications can be found at your nearest Extension office or the Information Technology and Communication Services.