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Snow Mold on Turfgrass

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What You Should Know

Snow molds are fungi that attack turfgrass under snow cover or in cool, wet weather. There are two different types of snow mold fungi that can infect grass and they can occur together on a plant. The symptoms for both diseases can look similar. There are no turfgrass species that are completely resistant to these snow mold fungi but some turf species are less susceptible than others. This disease can be managed by cultural practices and in most cases the turf will recover.

Introduction

Snow molds are fungi that are classified as psychrophilic, or cold-loving, and will attack plants under a layer of snow. The snow cover provides the fungus with a dark, humid environment suitable for fungal growth. It also predisposes the plants to disease by increasing the contact of pathogens in the soil with plant tissues and depleting carbohydrates stored in the plant as metabolism slows down. Two of the most common snow molds are pink snow mold (also known as *Microdochium* patch) caused by the pathogen *Microdochium nivale*, and gray snow mold (also known as Typhula blight or speckled snow mold) caused by *Typhula incarnata* and three types of *Typhula ishikariensis*. Both pink snow mold and gray snow mold can occur together and almost all grass species are susceptible to both of these diseases.

Fig. 1. Snow mold can easily be seen in this image at the interface of receding snow and matted, snow mold diseased turf.

Symptoms

The first symptoms of pink snow mold are circular patches of infected turf after long periods of cool, wet weather. The patches will be approximately 2 inches in diameter at first and will change colors from orange-brown to dark reddish-brown and finally light gray or tan. There may also be a faint growth of white or light pink mycelium at the edges of the patch, but the pink color is usually only noticeable in early daylight hours. The patches can enlarge to a size of 8 to 12 inches in diameter. Plants in the center of the patches may start to recover from the disease while the pathogen is still invading plants on the edge of the patch creating a “frogeye” symptom. Under long periods of low temperatures and leaf wetness the patches can combine creating large areas of blighted turf. As the snow melts, the most common symptom is mostly circular patches that are a dull white color. Newly exposed patches near the receding snow line have an abundant growth of white to light pink mycelium on leaves that have been matted down. Under prolonged periods of leaf wetness, numerous, small clusters of pink spores will be produced on the surface of the leaves. As the snow recedes, the patches of infected turf will have a bleached color and may be confused with symptoms of gray snow mold. The symptoms of gray snow mold are a little different. Once snowmelt has begun, areas of light yellow, straw-colored turf will appear. The leaves are usually matted down and covered with either a thick or thin layer of white to gray mycelium. As the grass dries, the mycelium will dry out and disappear turning the leaves a gray or silver color. There may also be a ring of gray or white mycelia present at the edge of the infected area. Under optimal conditions, the diseased areas can coalesce causing a large area of turf to be affected. However, only the leaves of infected plants are killed while the crown is not affected. So new leaves will be produced from the crown during the spring. A characteristic

Fig. 2. Snow molds can cause extensive necrosis in a patchwork damaged turf. The pattern of these patches can be mild to severe.

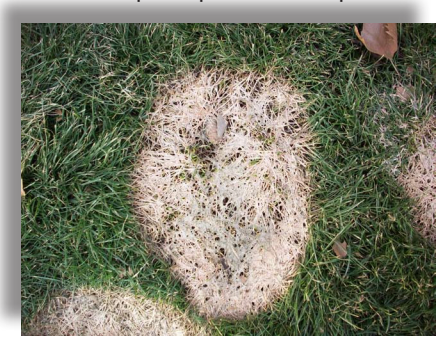

Fig. 3. Patches showing a pink edge at their margin are indicative of pink snow mold (*Microdochium nivale*).

feature of gray snow mold fungi is the production of sclerotia, which are overwintering structures. These small sclerotia form on infected leaves and are often pink, white, or amber in color when they are young. As they mature, the color darkens to a reddish-brown, dark brown or black.

Disease Cycle

Pink snow mold will survive unfavorable conditions in infected plants and dead debris of previously infected leaves. Once conditions become favorable for pathogen growth, mycelia will grow from the infected plants and debris. The fungus will grow slowly at first allowing infected turf to go undetected for a period of time. Once conditions are favorably wet and overcast and temperatures range from near freezing to 60°F, the pathogen will spread very rapidly. When sunny and dry conditions dry out the turf, the pathogen will become inactive. Snow cover is not a requirement for pink snow mold. The disease can occur at any time of the year if temperatures are cool and humidity is high.

The fungus causing gray snow mold will survive unfavorable conditions as sclerotia during the summer and will germinate in fall once they have been exposed to cool, wet conditions and the temperatures are 50-65°F. Mycelia from the germinating sclerotia may infect turf under the snow and more sclerotia will be formed in the infected leaves. As the leaves decompose in the spring, the sclerotia will fall into the thatch layer of the turf. Therefore, the disease tends to appear in the same areas year after year when conditions are favorable. Severe disease outbreaks typically only develop in areas where there is persistent snow cover in the winter, although a few cases have been reported in areas where there is usually little or no snow cover.

Pink snow mold spreads slowly when the humidity is low or when there is very little moisture present on the surface of the turf. However, it spreads more rapidly and is more severe in turf that is growing slowly and has a thick layer of thatch. This usually occurs when the weather is cool and wet and when a layer of snow or heavy mulch covers unfrozen turf. Frosts, cold fog, or light-misting rain favor the spread of the pathogen from leaf to leaf. The disease is also favored by poor drainage and when leaves get long and matted down, creating pockets of turf where the humidity is higher. Gray snow mold is similar to pink snow mold in that the disease is most severe on unfrozen turf under a layer of snow or heavy mulch. Deep snow is particularly favorable for the development of this disease. The deep snow prevents soil from freezing, it increases the relative humidity of the canopy and it also mats down the leaves of turf that was mowed high or not mowed at all. Gray snow mold will develop under deep snow that continues for long periods of time, which allows more time for the pathogen to be active. Applying high rates of nitrogen fertilizers before winter dormancy may also facilitate disease by causing the development of succulent leaf tissue.

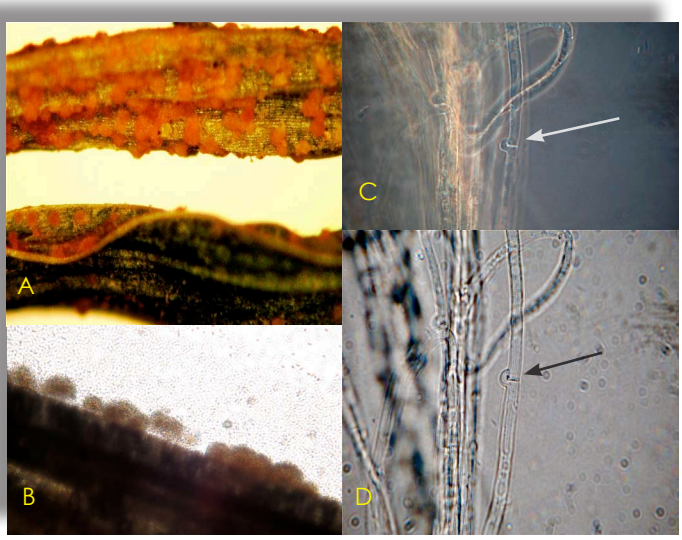

Fig. 4. Sporodochia of *Microdochium nivale* (boxes A and B) are diagnostic of the pathogen, as are the presence of clamp connections on the hyphae of *Typhula* spp. (boxes C and D are the same photo using different imaging techniques of microscopy, clamp is at the arrow tip).

Fig. 5. Sclerotia of *Typhula incarnata* are lighter colored and spherical (top photo), whereas sclerotia of *Typhula ishikarensis* are darker and smaller (bottom photo).

Diagnosis

To be sure that snow mold is causing the symptoms in your turf, the symptomatic plants can be sampled and checked for the fungus. Your local county Extension educator may be able to do this for you as they often can provide diagnoses quickly and accurately. If confirmation is desired, then the sample may be sent to the diagnostic laboratory. To do this, collect a piece of the turf exhibiting symptoms of infection. Turf samples should be sealed in a plastic bag and sent to the: Utah Plant Pest Diagnostic Lab, Department of Biology, 5305 Old Main Hill, Logan, UT 84322. Care should be taken not to expose the bag to excessive heat or cold so that the specimen and pathogen remain alive until the sample is received. General instructions for sample collection and shipment can be found at: http://utahpests.usu.edu/uppdl/htm/forms and directing your browser to the diagnostic laboratory sample submission information.

Fig. 6. Raking snow mold patches to loosen matted turf will help the turfgrass to recover more quickly. Raking improves sunlight penetration and air circulation at the turfgrass surface. Note the color of the patches in the background that have been raked, compared to the coloration of the non-raked densly matted patches in the foreground.

Management

Management practices are similar for both pink snow mold and gray snow mold. Avoid applying nitrogen fertilizers late in the growing season. In the fall, the cutting height should be 20% higher than previous cuttings and continue to cut until the top growth stops. Do not leave the grass uncut at the end of the season. The last cutting, as the grass becomes dormant, can be cut much closer to minimize potential matting when covered with snow. This will allow better winter survival for the turf. Avoid extreme thatch buildup and prevent large snowdrifts from forming by using snow fences, windbreaks or other types of barriers. Rapid drying and warming will lessen the outbreak of disease. Removing snow to prevent better drainage and removing the mycelial crust on infected turf by raking will help recovery of the grass. Lightly applying fertilizer in the spring will promote new growth. Fungicides can be useful in controlling disease when applied in the fall, but are not as effective as applications in late winter or early spring. Additionally, for pink snow mold it's important to maintain low soil pH and balanced soil fertility.

Resistant Varieties

All grass species are susceptible to both pink and gray snow mold, but some species are less susceptible than others. Annual bluegrass is the most susceptible grass to pink snow mold. Under heavy disease pressure, an entire population can be affected and killed. Bentgrasses are also very susceptible to pink snow mold, with colonial bentgrass more susceptible than creeping bentgrass and velvet bentgrass. Kentucky bluegrass, perennial ryegrass, and red fescue are susceptible as well, but more resistant than the other grass varieties. These varieties may have foliar blighting, but extensive colonization of the root and crown are rare. Infected plants of these varieties usually recover.

Bentgrasses and annual bluegrass are the most susceptible to gray snow mold. Kentucky bluegrass is less susceptible; however, some cultivars are more susceptible than others. Cultivars that show some resistance include Adelphi, Baron, Bonnieblue, Galaxie, Glade, and Monopoly. Cultivars that are very susceptible include Fylking, Merion, Nugget, and Pennstar. Fescues, particularly red fescues, and perennial ryegrasses are more resistant to gray snow mold than Kentucky bluegrass and bentgrasses.

Control

Fungicides are not recommended for homeowner use in lawns infected with snow molds because in most cases the turf will recover on its own after following management recommendations. Fungicides that control pink snow mold are similar to those that control gray snow mold. Applications to control pink snow mold should be made approximately two weeks before the first snowfall. Additional applications can be made in the middle of winter and early spring when weather conditions permit. Fungicides with components such as quintozene, fludioxanil, iprodione, strobilurins and thiophanate-methyl have been effective in controlling pink snow mold.

For gray snow mold, fungicides are more effective when applied in the fall and are not as effective when applied in late winter or early spring. Fungicides that are absorbed and translocated by the plant should be applied in the fall before leaf growth completely stops. When applying a contact fungicide in late fall it is better to combine it with a penetrant fungicide (iprodione, fludioxanil, etc.) and apply once more before the first long-lasting snow falls. This will interrupt germination of the sclerotia. Additional protection against the disease may be achieved through repeated fungicide applications during the middle of winter. However, fungicides for gray snow mold must be chosen very carefully. Since this disease is caused by two different species of Typhula, fungicides that are effective for one species may not be effective for the other species.

References

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