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Are You in the Gray on Snow Mold?

Winter is generally a time for preseason planning and snow removal, but superintendents should ask themselves the following questions to ensure their greens, tees and fairways are healthy throughout the winter season. What is snow mold and where does it come from? Are there different types? How do you identify the characteristics? When does snow mold become a problem? Can you prevent it from occurring or cure it after it is actively growing?

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Snow mold is a winter patch disease and is categorized into two types, pink and gray. Outbreaks of these winter patch diseases generally occur during the cold, wet months of late fall, winter and early spring. Many varieties of turfgrasses can be affected by these winter patch diseases, including the following: Colonial, velvet and creeping bentgrasses; tall, red, sheep and chewing fescues; Kentucky and annual bluegrasses; and perennial ryegrasses. The most susceptible host to snow mold formations is annual bluegrass, with the bentgrasses coming in a close second.

Although pink and gray snow mold share similar characteristics, there are some key differences between the two diseases. Pink snow mold and Fusarium patch are interchangeable names for the same winter patch disease; however, Fusarium patch occurs without snow cover and pink snow mold occurs with snow cover. The fungus *Microdochium nivale* causes both of these diseases. This fungus survives hot summers in dormant mycelium or in previously diseased leaves. Mycelium forming around the outer edge of the patch consists of pink fungal spores that accumulate on the infected grass leaves. (A reddish-brown mycelium ring, rather than a pink ring, may form around the patch on annual bluegrass.) The mycelium ring usually measures anywhere from 2″ to 1′ in diameter.

Gray snow mold, also known as Typhula blight, normally occurs only under snow cover. The fungus lays dormant during the summer in dark brown-colored structures called sclerotia. When the weather becomes favorable in late fall, these sclerotia germinate into thousands of spores that infect the plant and form grayish-colored mycelium. The mycelium ring normally grows up to 2′ or 3′ in diameter and has bleached, white, matted turf in the middle.

Identifying snow mold can become tricky when pink and gray snow mold patches overlap. After extended periods of time, pink snow mold patches may become bleached and appear gray in color. Poorly drained soils provide an ideal medium for both types of snow molds, and optimum growing conditions occur with snow cover and unfrozen ground. This snow cover creates a microclimate where the fungus can grow under wet conditions within a consistent temperature range of 32 to 50 degrees F.

Respiration still continues in the grasses under the snow cover, but the light content is decreased and causes a decrease in photosynthetic activity. This reduction of photosynthetic activity in turn causes carbohydrate depletion in the plant leaves, allowing the plant to become stressed and more vulnerable to infection. Both pink and gray snow molds infect the plant at the top of the leaf through open stomata or where the plant is damaged from frost or previous cuttings. Shorter-cut turf (greens) is more susceptible to damage since it has less surface area on its leaves to provide photosynthesis for the plant's carbohydrate reserves. The distance from the top of the leaves to the crown is shorter, therefore allowing pink snow mold to infiltrate the crown and roots quicker and damage the plant further. On the other hand, grass cut at longer heights, especially without clipping removal, will promote a less favorable environment for snow mold development and incur less terminal damage than shorter-cut turf.

Turf damage caused by pink or gray snow mold has been minimal throughout the Chicagoland area during the past few years. Since recent winters have yielded

(continued on page 15)

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little-to-moderate snow cover, Fusarium patch probably occurred most frequently. Remember, Fusarium patch occurs without snow cover and can be treated almost immediately, so it seldom kills the plant by infiltrating the crowns and roots. Similarly, gray snow mold usually kills only leaf blades and does not penetrate the crowns or roots of the plant.

Both pink and gray snow molds can be controlled either preventively or curatively. Cultural practices can be helpful in preventing these winter patch diseases, but fungicides can normally eliminate the problem when applied preventively. If a fungicide program does not prevent the disease, a curative approach must be taken.

Regarding curative treatments for winter patch diseases, contact fungicides work faster in eliminating the disease. Systemic fungicides are recommended for extended control if wet, cool conditions persist into spring and facilitate the development of Fusarium patch.

Cultural practices that can be implemented to decrease snow mold pressures are as follows. First, apply a late fall fertilizer right before the grass is going into dormancy to limit excessive growth. This facilitates regrowth and recovery from disease sooner in the early spring months. Second, maintaining a thatch layer of 0.5″ or less will help in decreasing the intensity of the disease. Third, make sure topdressings are applied when the turf is actively growing and not going into dormancy, because topdressing may elevate the intensity of the snow mold diseases. Finally, if the snow mold exists after the snow melts, breaking up the matted turf with a brush before applying curative fungicides will enhance the performance of the applications and provide for a faster recovery of the turf canopy.

A wide variety of fungicides that can protect turf from snow mold are available. Mercury chlorides were used in conjunction with products like thiram in the past, but the products containing mercury are now off the market. Today, superintendents are using other forms of protection that require either a combination of products or, in some cases, a single product for control of pink and gray snow mold.

Pink snow mold and Fusarium patch usually require one preventative application of fungicide, but Fusarium patch may require another if the weather remains wet and cool into spring. Some options for preventive control include: iprodione (26GT), thiophanate methyl (3336, Fungo 50, Systec), Quintozene (PCNB), thiram (Spotrete) and Azoxystrobin (Heritage).

Gray snow mold typically requires only one preventative application of fungicide. The popular fungicides used most often for preventative control of gray snow mold are: Chlorothalonil (Daconil, Echo, Concorde SST), PCNB, Chloroneb (Teremec SP) or thiram (Spotrete). Superintendents often use a combination of preventive fungicides for extra protection against both pink and gray snow molds. (While PCNB fungicides are an option, they could be stressful to the turf and should be applied with caution on lower-cut turf.)

Preventative treatments can be separated into two applications at half the label rate, and doing so provides two benefits: better coverage of the fungicide, and less fear of overlapping a high rate of fungicide on the turf. The optimal time for preventative treatments is one to two weeks before the first heavy, persistent snowfall. Some superintendents mix an antitranspirant with the fungicide to improve the tackiness and protection against winter desiccation, yet many of the fungicides are formulated to include similar sticker technology.

Curative treatments for pink and gray snow mold require the same types of fungicides listed above. Regarding curative treatments for winter patch diseases, contact fungicides work faster in eliminating the disease. Systemic fungicides are recommended for extended control if wet, cool conditions persist into spring and facilitate the development of Fusarium patch. Some curative treatments may be more expensive than others; however, certain fungicides have a broad spectrum of disease control. Having additional protection from many spring diseases like leaf spot, take-all patch and yellow patch may justify the additional expense for these types of fungicides. Also, products like Chipco

(continued on page 16)

Signature have been added to early spring fungicide treatments to improve spring green-up, control cool-season pythium and help with the early spring stresses of excess moisture, compaction and desiccation.

In some cases, treatments are needed immediately after the snow cover melts. However, the turf may be too wet to support spray equipment. In this case, consider applying granular products like fungicide X (Iprodione), fungicide IX (Chloroneb and Thiophanate-Methyl) and fungicide V (Chloroneb).

Hope for a quick thaw and that your preventive measures protect the turf. Good luck in identifying the snow mold and treating it accordingly.

References

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www.ianr.unl.edu/pubs/PlantDisease/g824.htm, "Snow Mold Diseases of Turfgrass," Watkins, Extension Plant Pathologist (Nebraska).

www.turfgrass2000.tripod.com/pinksnowmold.htm, "Pink Snow Mold (Fusarium Patch)."

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A Note on Phytotoxicity

All of the products tested can cause yellowing or tip burn on fine turf under the right/wrong conditions. Embark and Proxy showed the most activity on seedheads, but (unfortunately) also showed the highest levels of discoloration and thinning of turf. Embark caused a substantial amount of browning and thinning to bentgrass clones in the mixed bent/*Poa* chipping green that was treated at Aurora CC. Proxy showed less damage to the bentgrass, but turned the *Poa annua* light green to yellow and caused noticeable thinning. The higher 7.5 fl. oz.-rate of Proxy was applied at Aurora C.C. (probably too high). Much lower levels of yellowing and thinning were noted at Fox Valley C.C., for both Embark and Proxy treatments.

Final Note

There is good evidence that tank-mixing chelated iron or using follow-up Fe treatments will "safen" or counteract the damage caused by Embark, and possibly Proxy. I did not include any Fe treatments in this initial study; however, I believe I have some circumstantial evidence to support the +Fe "safener" idea. As part of his normal fertility program, Dan Anderson applied chelated Fe (Sprint 330, 10% chelated DTPA Fe) to all the greens at Fox Valley on April 25 and May 8, and had other low-rate applications of Fe in his fertility program. John at Aurora did not apply Fe to the chipping green in spring of 2000 (and when I asked him if he wanted me to, he said, "no, let's see what the worst case scenario is . . ."). So, if you want to try Embark or Proxy for seedhead suppression, be aware of possible phytotoxicity, treat small test areas or the chipping green first and include some chelated Fe. (Note: non-chelated Fe forms interfere with the activity of Embark.)