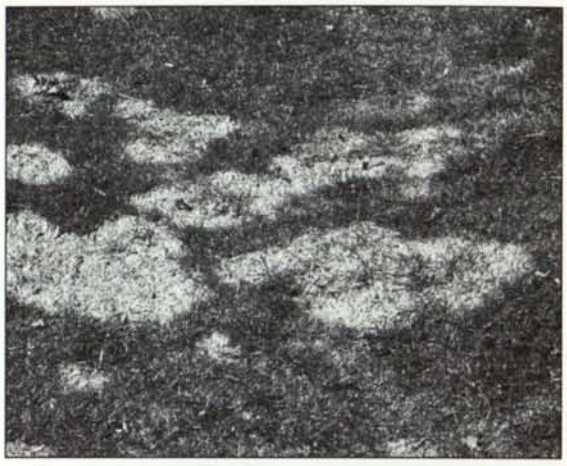
Snow Mold Identification and Management Strategies



Gray snow mold. Photo courtesy R.T. Kane.

By R.T. Kane

Northern turf managers should begin planning early for winter disease control. Of primary concern are so-called "snow molds" — a group of fungi that attack dormant or near-dormant turf at or near freezing temperatures. Snow molds occur under snow cover or in cold, rainy periods of late fall and early spring. Although persistent snow cover is not required for all pathogens in this group, prolonged snow cover increases mold severity, especially when snow accumulates on unfrozen ground.

Snow mold damage is often more significant on intensively managed fine turf areas such as golf course greens and tees. Also, bentgrasses and *Poa annua* are more susceptible to snow molds than Kentucky bluegrass, ryegrass, and fescues. Most turf managers have a good handle on their snow mold control requirements, since these diseases tend to reappear yearly in the same areas (depending on weather conditions).

Snow Mold Identification

It is important to be able to differentiate between the types of snow molds, since more than one disease can occur at the same site, and control measures may vary in effectiveness for each disease. In the upper Midwest and most of the Northeast, there are two primary types of snow mold: Typhula blight (gray snow mold, speckled snow mold) and Fusarium patch (pink snow mold).

Fusarium patch/pink snow mold is characterized initially by small circles of water-soaked grass that may subsequently turn yellow, orange-brown, or reddish-brown. Patches two to four inches in diameter may have a gray or reddish-brown border if the disease is actively spreading.

Fusarium patch usually occurs during cool, rainy periods in spring and fall when temperatures are between 40 and 60 degrees F. In northern areas, Fusarium patch can occur well into June and reappear in September or early October.

When this disease occurs under snow, somewhat different symptoms may be observed and the disease is often referred to as pink snow mold instead of Fusarium patch. Under snow, somewhat larger patches (six to eight inches) may develop wherein the leaves are matted and covered by fungal mycelium. When sunlight hits the diseased tissues at snow melt, the mycelium and infected leaves turn a pink to coppery red color. Thus the "pink snow mold" name is used.

It is critical to remember that both symptom types are caused by the same fungus and are actually just different expressions of the same disease. The fungus *Microdochium nivale* (formerly *Fusarium nivale*) is the cause of Fusarium patch/pink snow mold. *M. Nivale* can be confirmed microscopically by its abundant production of colorless, crescent-shaped spores that are formed in salmon- or peach-colored structures called sporodochia. In some cases, sporodochia can be observed with a hand lens, especially when they form in distinct rows in leaf stomata. These spores are the primary means of spread of the pathogen, via wind and rain splashing, and on feet and equipment.

Gray snow mold/Typhula blight is caused by the fungus *Typhula incarnata*, which is physiologically adapted to grow and infect at freezing temperatures. Snow cover is usually required for significant disease development. Symptoms of gray snow mold are most distinctive if seen while the disease is active, which would be at or just after snow melt. Symptoms include white to grayish brown, roughly circular patches of four to eight inches in diameter. Larger irregular shapes may occur when patches coalesce or environmental conditions favor prolonged fungal activity. White to gray fungal mycelium may be seen matted on diseased foliage. Also, close inspection may reveal fungal structures called sclerotia imbedded in decaying leaves. Sclerotia are roughly spherical, approximately one to five millimeters in diameter, and can be various shades of orange to brown. Sclerotia serve as survival structures of *Typhula* during the summer months.

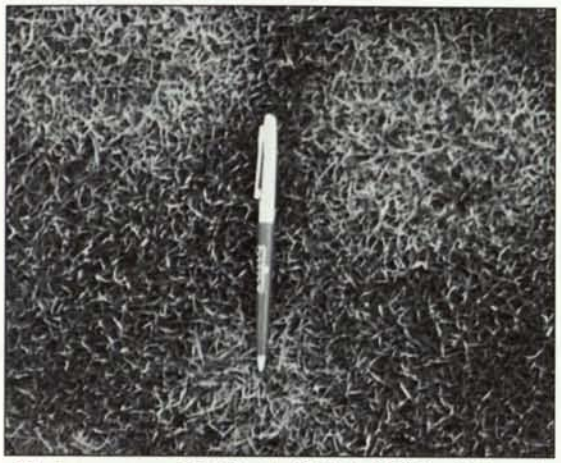
Another form of Typhula blight is caused by the fungus *Typhula ishikariensis*. Symptoms are similar to gray snow mold, but this fungus forms very small, black sclerotia snow mold. Formation of sclerotia is useful in separating Typhula snow molds from *Microdochium nivale*, which does not form sclerotia.

Snow Mold Control Options

Fungicides. On intensively managed, high value turf such as golf greens, snow mold prevention via fungicide application has long been the standard practice. The most commonly used fungicides are those containing mercury (Hg) in the form of mercuric chloride or phenyl mercury acetate (PMA). These are restricted use products labeled only for greens and tees. Hg fungicides provide the highest level of snow mold control at relatively low rates, and with residual activity to last through the winter.

However, products contained Hg have been banned in several states and are the target of regulatory action by the Environmental Protection Agency. Recently, manufacturers suspended production of some Hg-based fungicides and/or have withdrawn registration. Once existing stocks of these fungicides are sold out, there will be no more product available. This is especially disconcerting news to turf managers in the northern tier of states where snow mold pressure is greatest.

There are a number of good alternatives to Hg fungicides, but the level and length of control may not be as great, even at high application rates. The cost of control presumably will be higher as well.



Pink snow mold. Photo ©1978 CSSA, slide set "Diseases of Turfgrass."

Fungicides containing PCNB, chloroneb, iprodione, vinclozolin, and chlorothalonil have activity against one or both of the major snow molds. Good results have been observed with iprodione/chlorothalonil and PCNB/chloroneb tank mixes. The systemic DMI fungicides fenarimol, propiconazole, and triadimefon are also active against snow molds. Check with your state or regional pathologist or extension personnel to determine what works best in your area. Be sure to read and follow all label directions — rates and timing are important.

Fungicides are normally applied before the first heavy snow or cold, rainy period. Systemic compounds should be applied before leaves become dormant to ensure uptake and distribution of the product. Also, susceptible sites should be retreated during a spring thaw to provide late-season protection and improve recovery.

Alternatives to Fungicides. There are several factors that have been identified which contribute to snow mold severity. Some examples are prolonged snow cover, compaction of the snow cover, shaded sites, poor soil drainage, long matted leaves, and imbalanced fertility. Examination of susceptible sites and their management may reveal problem areas that can be corrected and result in reduced snow mold severity.

For example, simply continuing to mow the grass at a suitable height until dormancy is important. Another key is to avoid a mid-fall nitrogen application which can stimulate a flush of late-season growth and increase susceptibility. Use of snow fences or other barriers can reduce snow accumulation or drifting on some sites. Controlling traffic from skiers, snow mobiles, and other machinery may keep snow from compacting. Trimming trees to increase sunlight penetration and using dark-colored granulated products such as activated charcoal or organic fertilizers could speed snow melt and soil warming in spring. Improving surface and subsurface drainage of water from snow melt will also reduce diseases and improve turf growth and recovery.

Use of disease-resistant plant materials where possible should not be overlooked. There are a number of Kentucky bluegrasses, perennial ryegrasses, and fine fescues reported to have improved snow mold resistance. Again, check with state or local experts for planting recommendations before renovating a snow mold-susceptible site.

Biological control. In the near future, we may see development of commercially viable biocontrol-type products for snow mold suppression. Research has shown that a nonpathogenic species of *Typhula* can compete with and suppress the activity of *T. incarnata* under snow. The level of disease suppression was comparable to a PCNB treatment. Another series of studies has shown that certain types of organic composts can suppress snow mold when applied in late autumn. Other microbial antagonists may be found as the search continues — a major stipulation is that the microbes must be active at or near 32 degrees F.

Since Hg fungicides are being discontinued and other products require high rates or repeat applications, manufacturers should become increasingly interested in developing biocontrols or alternatives to fungicides. A market for new products could boom in the not-to-distant future! ❑

Editor's note: Dr. R.T. Kane is a turf grass advisor for the Chicago District Golf Association and a frequent contributor to this sportsTURF.

Further Information

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