TURFGRASS TRENDS

SNOWED IN

Preparing for Snow Mold Applications

By Jim Kerns, Ph.D., and Paul Koch

After an amazingly warm winter and excruciating summer, superintendents probably welcome the chance to plan for snow mold applications. Unfortunately for us, the winter in the upper Midwest was extremely mild in 2011-2012. We only had one location out of five with snow mold damage. Yes, it is sick to wish for damage, but when treatments are evaluated under extreme pressure we are confident they will work in the real world. Due to the mild winter, we will only present data from our 2010-2011 UW Snow Mold Trials. Before getting into the results, however, we should briefly review the biology of the more common snow mold pathogens.

Pathogen biology

First, snow mold collectively refers to winter diseases of turfgrasses and includes six different diseases (pink snow mold; gray and speckled snow mold; Coprinus snow mold; snow scald; and Pythium snow blight). This article focuses on pink snow mold (Microdochium patch), gray snow mold, and speckled snow mold biology and management.

Pink snow mold is caused by *Microdochium nivale* and develops when temperatures are between 32 and 46 degrees F. However, pink snow mold can develop when temperatures remain between 50 and 70 degrees F if wet conditions persist. The pink snow mold pathogen does not require snow cover to develop and can be an extreme problem for areas such as the Pacific Northwest. Symptoms initially appear as small, water-soaked spots less than 2 inches in diameter but quickly develop into larger, darker or reddish-brown patches (See Figure 1A, next page). White mycelium may be observed when the disease initially develops or after snow cover recedes. Eventually, the perimeter of patches may have a pinkish hue (See Figure 1B, next page). Pink snow mold symptoms can resemble gray or speckled snow mold. In our experience however, the gray and speckled snow mold pathogens typically dominate under persistent snow cover.

Gray and speckled snow molds are caused by *Typhula incarnata* and *Typhula ishikariensis*, respectively. The recognized common disease name for both of these organisms is Typhula blight, but we do not agree with that terminology. Although the symptoms induced by these fungi are similar, the signs, epidemiology and management are different. Therefore, we separate them when discussing their management. Gray snow mold requires at least 60 days of continual snow cover to develop, while speckled

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FIGURE 1A

FIGURE 1B

(Figure 1A) Pink snow mold starts out small but quickly grows. (Figure 1B) A pink hue can be seen around the edges of pink snow mold damage.

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snow mold needs at least 90 days of continual snow cover. These diseases are only problematic for golf course superintendents managing cool-season turfgrass in northern climates that receive persistent snow cover. Symptoms are apparent when snow melts as circular areas of gray or straw-colored patches ranging from two inches to three feet in diameter (See Figure 2A, page 36). Examining affected foliage for reddish-brown or dark, wrinkled sclerotia is an excellent way to identify gray snow mold (See Figure 2B, 2C, page 36). Speckled snow mold will have much smaller sclerotia, which never have a red color and give the remaining mycelium a peppered look (See Figure 2D, page 36). These sclerotia serve as the inoculum source and typically germinate as temperatures decline to 50 degrees F in the fall.

Timing is everything

Timing of fungicides is extremely important for successful management of snow molds, especially gray and speckled snow mold. We find that applications soon after the last mowing work very well. We also have observed that split applications work well too, but do not expect excellent suppression if fungicides are applied when turf is still being mowed. We have also found that impermeable putting green covers can increase the severity of gray and speckled snow mold, so plan for high rates of mixtures that performed well in our trials.

The 2010-2011 UW Snow Mold Trials were held at five locations throughout Wisconsin, Minnesota and the Upper Peninsula of Michigan. The trials were held at Grant Park GC in south Milwaukee, Wis; Sentryworld GC in Stevens Point, Wis.; Wawonowin CC in Champion, Mich.; Les Bolstad GC in St. Paul, Minn.; and The Legacy at Craguns GC in Brainerd, Minn. The full reports for each site can be found at the Turfgrass Diagnostic Lab's Research page at **www.tdl.wisc.edu/research.php**.

The 2010-2011 trials that showed the greatest differences among treatments were observed at Sentryworld GC. Ninety different treatments were tested, and not a single one contained PCNB. Disease pressure was high, as non-treated controls averaged 74.8 percent disease. Despite this high pressure, nine treatments completely suppressed speckled snow mold (*T. ishikariensis*) and 13 kept disease below 5 percent. We tested numerous experimental products and mixtures. There were 14 experimental treatments that kept disease below 5 percent as well.

Treatments that performed well included tank mixtures of two or three active ingredients from different fungicide chemistries (contact, DMI, QoI). In general, products that included

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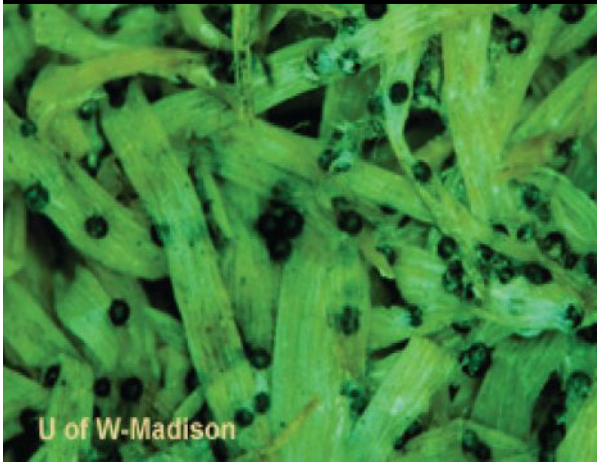
FIGURE 2A

FIGURE 2B

FIGURE 2C

FIGURE 2D



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high rates of a DMI did very well in our trials. Products that performed well when mixed with other products included Insignia, Trinity, Instrata, Interface, Reserve, Velista, Torque and 26/36 (See Figures 3A and 3B, page 37). With 36 treatments performing exceptionally well, including experimental products that are forthcoming, there is a wide range of options for chemical snow mold management.

In most areas, the primary snow mold of concern is pink snow mold. Products that are typically very effective against pink snow mold are iprodione, QoI fungicides (Heritage, Insignia, Compass, Disarm), Trinity, Torque and various pre-mix products. Research from Dr. Derek Settle reveals that tank mixtures of Banner MAXX and Daconil Ultrex work well against pink snow mold, as do applications of Tartan or Heritage TL (See Figure 4A, page 38). Data from the West Coast demonstrate that applications of Interface, Headway and Torque are effective in suppressing pink snow mold development (See Figure 4B, page 38). Fairway applications in many areas may not be warranted, but be prepared to deal with pink snow mold during the spring if wet conditions develop and persist. If the disease does develop, it is normally easy to clean up with any of the fungicides listed above. Moreover, research has shown that applications of ammonium sulfate help to limit severity of pink snow mold, especially in calcareous soils.

The treatments listed above will provide

LEFT (Figure 2A) Gray snow mold patches range in size from two-inches to three feet. (Figure 2B, 2C) Examining affected foliage for reddish-brown or dark, wrinkled sclerotia is a good way to identify gray snow mold. (2D) Speckled snow mold has much smaller sclerotia than gray snow mold, which never have a red color and give the remaining mycelium a peppered look.

FIGURE 3A

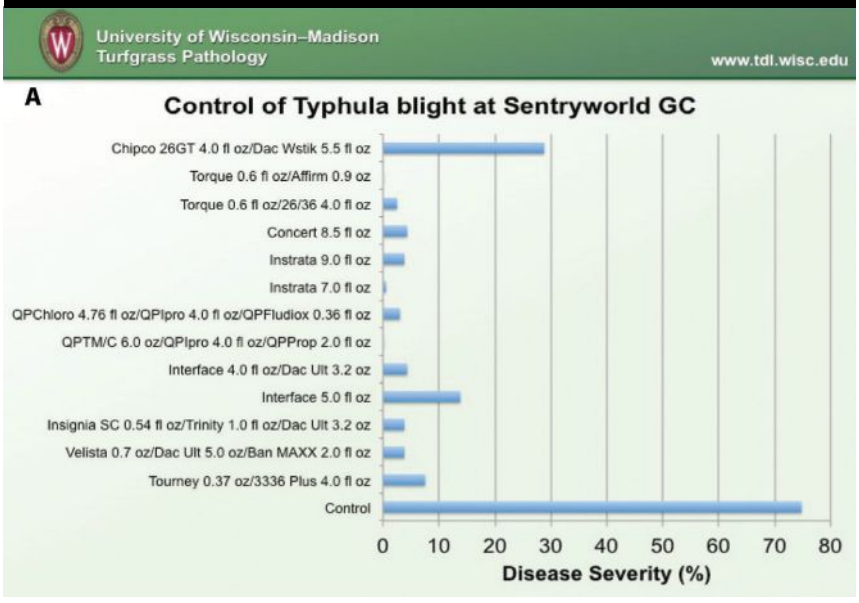
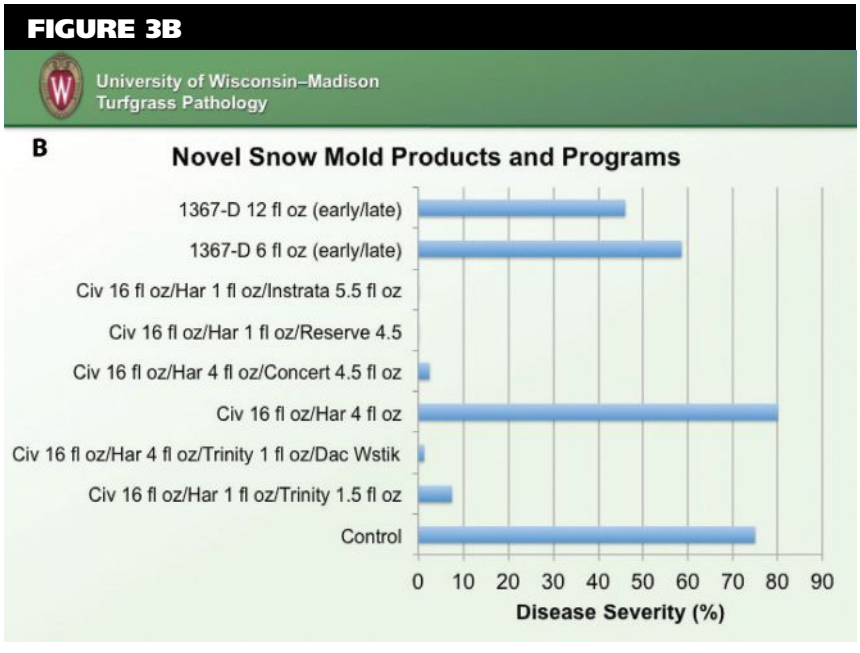


FIGURE 3B



The pink snow mold pathogen does not require snow cover to develop and can be an extreme problem.

excellent snow mold protection but may not be practical for most facilities or larger areas such as fairways. PCNB is a popular product because it provides a reasonable level of control at an affordable price.

Trinity and Torque will both provide a reasonable level of snow mold control (0 to 20 percent disease allowed) at costs that most facilities can afford. If greater levels of control are desired and can be afforded, mixing in products such as Daconil, 26/36 and Insignia will improve disease suppression. A final consideration about snow mold fungicides is how soil temperatures affect their residual efficacy. Once soil temperatures consistently eclipse 32 degrees F, fungicides applied prior to snow cover quickly degrade.

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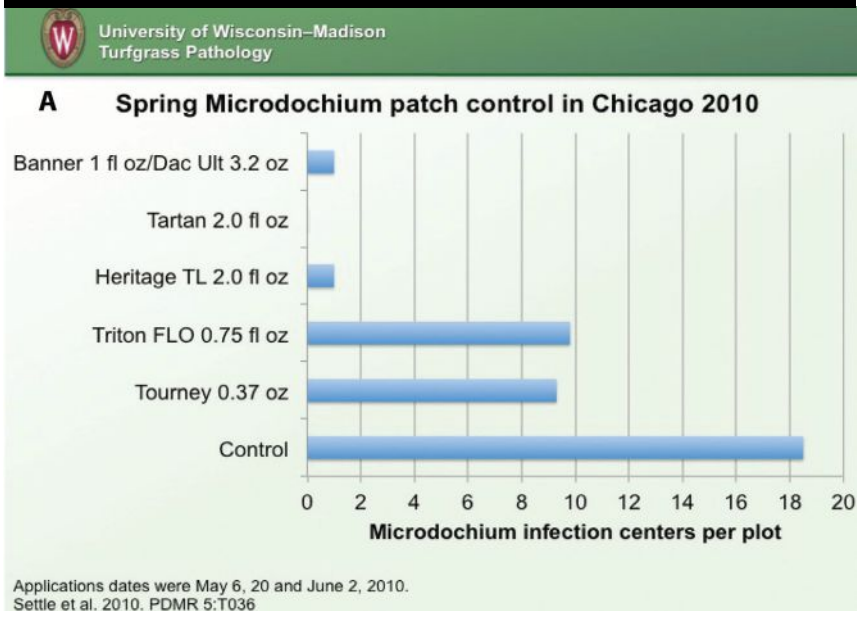
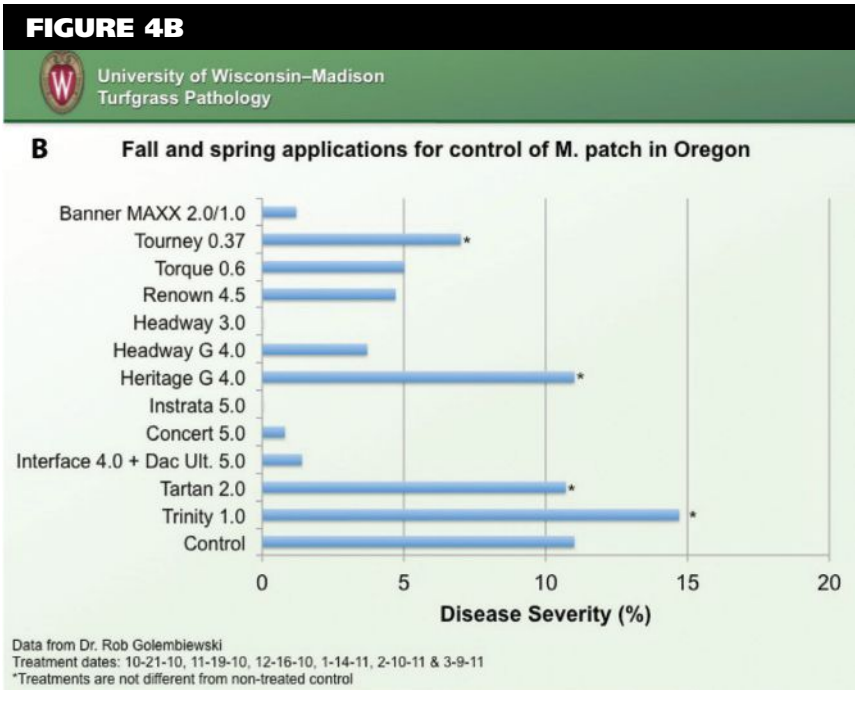
FIGURE 4A



There is a wide range of options for chemical snow mold management.

FIGURE 4B



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Ultimately, once the snow melts and the ground thaws, fungicides applied in the fall are no longer effective, and re-applications may be warranted to protect against new pink snow mold infections.

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