

// SNOW MOLD CONTROL

PCNB Turns 50

A look at the past, present and future of one of the industry's most economical snow mold control products.

By Charles Silcox, Ph.D.

This fall marks the 50th snow mold season since PCNB was first registered in 1964. An active ingredient must possess a unique combination of characteristics to remain viable in the marketplace for five decades. PCNB continues to be selected by superintendents based on its performance, economical cost, mode of action and versatility.

This active ingredient is currently marketed in two formulations under the Turfcide brand — Turfcide 400 flowable turf fungicide and Turfcide 10-percent Granular turf fungicide.

Turfcide products are renowned for their cost-effectiveness. And after nearly 50 years of use on golf courses, there has been no evidence of resistance development by pink and gray snow molds. So Turfcide products have an important role to play in maintaining our ability to control snow molds over the long run and are viewed by many superintendents as the foundation of their snow mold control program.

Their versatility makes these products ideally suited for this role. They may be applied to golf course fairways, greens and tees and they may be applied alone or Turfcide 400 may be tank-mixed with other fungicides. Used alone, Turfcide products provide cost-effectiveness. Used in tank-mixtures, Turfcide 400 makes good products better and better products best.

TARGET DISEASES AND APPLICATION TIMING

Turfcide products are primarily applied for control of pink snow mold (*Microdochium nivale*) and gray snow



After 50 years on the market, Amvac Environmental Products looks to the future at how to better control pink and gray snow molds.

molds (*Typhula incarnata* and *T. ishikariensis*). Turfcide products should be applied just before the first snowfall or when temperatures remain below 60 degrees F and extended wet conditions are expected. Many superintendents make their application soon after the last mowing in the fall.

In most locations, pink snow mold is the primary species confronted by superintendents because its development does not require snow cover. If cool, wet conditions persist without snow cover, then additional applications of Turfcide products can be made at 4 to 6 week intervals if conditions warrant them. Gray snow mold development requires 60 and 90 days of continual snow cover for *T. incarnata* and *T. ishikariensis*, respectively, so superintendents make sure that their

fungicide application is on the ground before winter settles in for good.

APPLICATION RATES AND POST-APPLICATION IRRIGATION

The labeled application rates for Turfcide 400 applied for snow mold control are 12 to 16 fluid ounces of product per 1,000 square feet. Turfcide 10 percent Granular is applied at 5 to 10 pounds per 1,000 square feet for gray snow mold control and from 5 to 7.5 pounds per 1,000 square feet for pink snow mold control. The active ingredient must be moved into the thatch to ensure effective control. Thus, applications must be followed by 1/4 inch of either irrigation or rainfall on the day of application.

As strange as it may sound to superintendents in the northern regions of

the country, it is often difficult for university researchers to achieve high levels of snow mold on the sites where they conduct replicated small plot efficacy trials. This held true during the winter of 2012/2013, in spite of long periods of snow cover in many areas. Under low snow mold pressure, many treatments provide acceptable control. The real effectiveness test comes at sites with intense snow mold pressure. Fortunately, two field trials from AMVAC's 2012/2013 snow mold efficacy program showed very high levels of disease when evaluated in the spring. This level of disease pressure allowed Turfcide to demonstrate its versatility for snow mold control.

Paul Koch, Ph.D. and coworkers at the University of Wisconsin conducted a field trial in Champion, Mich., that developed 78.8 percent disease severity (primarily *T. ishikariensis*) in the untreated plots (Koch et al., 2013). Table 1 shows the results from selected treatments that were included in the trial.

The treatments were applied October 30, 2012 and were rated at 189 days after application on May, 8 2013. The low label rate of Turfcide 400 (12 fl. oz. per 1,000 sq. ft.) provided greater than 90 percent control. A treatment of Turfcide 400 applied at 8 fl. oz. /1,000 sq. ft. was included in the trial as a reference for other treatments where this rate of Turfcide was tank-mixed with companion products. Turfcide was tank-mixed with Banner Maxx II (propiconazole) (2 fl. oz. /1,000 sq. ft.), Daconil Ultrex (chlorothalonil) (3.2 oz. /1,000 sq. ft.) and Interface (3 fl. oz. /1,000 sq. ft.).

Each of these tank-mixtures provided excellent control under high snow mold pressure and the combinations provided significantly better control than did the companion products applied alone. The Interface plus Turfcide treatment was applied at a number of locations last fall and certain results may lead to a new area of further research.

Charles Golob, M.S. and William

FIGURE 1

Results of a snow mold trial conducted by Paul Koch, P.J. Liesch, Sam Soper and Jim Kerns of the University of Wisconsin in Champion, MI

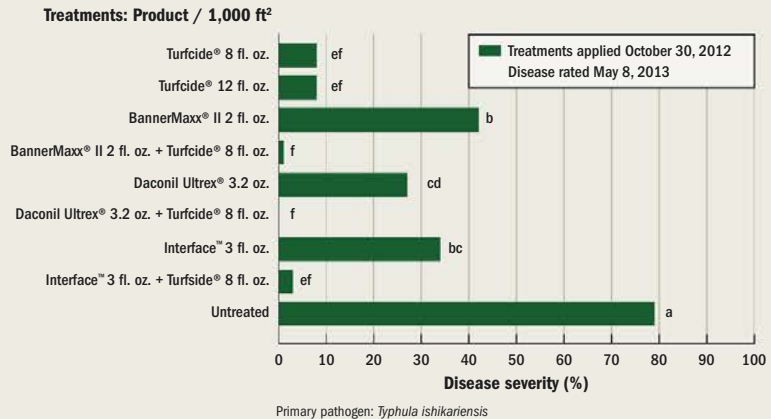
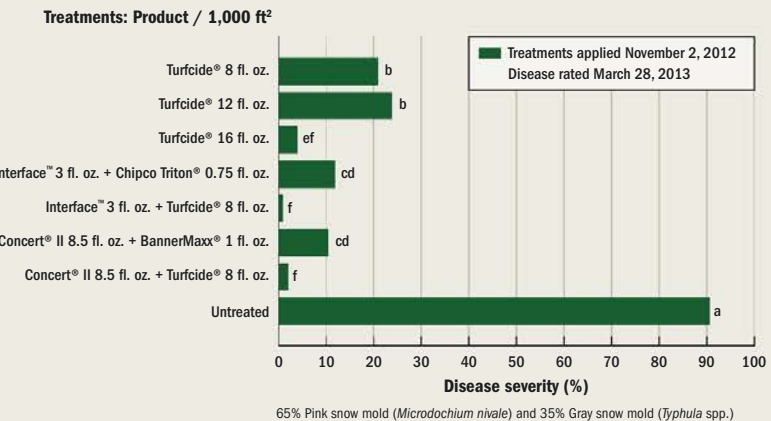


FIGURE 2

Results of a snow mold trial conducted by Charles Golob and William Johnston of Washington State University in Columbia Falls, MT



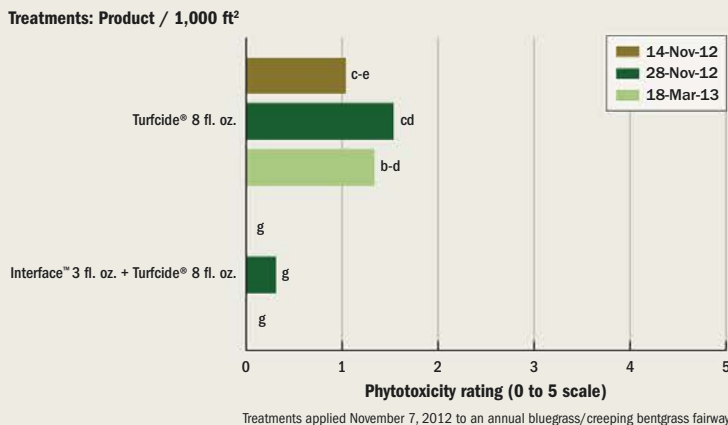
Johnston, Ph.D. of Washington State University conducted a field trial in Columbia Falls, Mont., that developed 91.3 percent disease severity (65-percent pink snow mold [*Microdochium nivale*] and 35-percent gray snow mold [*Typhula* spp.]) (Golob and Johnston, 2013). Table 2 shows the results from selected treatments that were included in the trial. The treatments were applied November 2, 2012 and were rated for

snow mold at 145 days after application on March 28, 2013. Under such severe disease pressure, the high label rate of Turfcide 400 (16 fl. oz. /1,000 sq. ft.) was required to provide excellent control. Tank-mixtures of Turfcide applied at 8 fl. oz. /1,000 sq. ft. with companion products performed exceptionally well in this trial. The combination of Interface (iprodione + trifloxystrobin)

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FIGURE 3

Results from a trial conducted by J. Popko and G. Jung of the University of Massachusetts in Queensbury, NY



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(3 fl. oz./1,000) plus Turfcide at 8 fl. oz. /1,000 sq. ft. provided significantly better control than did the combination of Interface (3 fl. oz./1,000 sq. ft.) plus Chipco Triton (triticonazole) (0.75 fl. oz./1,000 sq. ft.). The combination of Concert II (chlorothalonil + propiconazole) (8.5 fl. oz./1,000 sq. ft.) plus Turfcide provided significantly better control than did the combination of Concert II (8.5 fl. oz./1,000 sq. ft.) plus Banner Maxx II (1 fl. oz./1,000 sq. ft.).

An issue with Turfcide that most superintendents are well aware of is that under certain situations there may be a transient yellowing of creeping bentgrass after application. This has generally been managed through application timing by using the snow mold rates only after the turf has stopped growing in the fall. Applying Turfcide immediately prior to precipitation or irrigating the treated area after application minimizes the potential for yellowing by moving the active ingredient from the leaves into the thatch.

An interesting area for further research has been discovered recently by Geunhwa Jung, Ph.D. of the University of Massachusetts. Table 3 shows phytotoxicity ratings for two treatments from

a trial that he conducted in Queensbury, N.Y. (Popko and Jung, 2013). The results show a marked reduction in phytotoxicity of creeping bentgrass when Turfcide 400 was tank-mixed with Interface. These results suggest that the StressGard Formulation Technology that is included in Interface may also help to reduce phytotoxicity by PCNB. As one can imagine, additional research on this topic will be conducted in 2013.

At the completion of their first half-century of use, Turfcide brand products are still an important component of snow mold management programs based on their performance, economy, versatility and mode of action. And current research is focused on expanding these attributes to redefine their place in the market for many years to come.

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