Impact of Winter Covers on Snow Mold Development – Year 2 Update

By Dr. Paul Koch, Department of Pathology, University of Wisconsin - Madison

Due to the cool conditions that persisted for much of this past summer, the UW turf pathology team inoculated and covered many of the disease-research plots to encourage intense disease development. For the dollar spot research trials, the daily process would entail placing an Evergreen® cover down in the afternoon prior to leaving for the day (to increase humidity at night) and removing them upon arrival the next morning (to prevent temperatures getting too hot for dollar spot during the day). This process was repeated daily for over a month to different degrees, and became affectionately (or begrudgingly) known as 'tucking or untucking the kids.'

While superintendents don't 'tuck in their kids' (i.e. putting greens) during the summer months to increase their disease pressure and challenge themselves as men and women, many superintendents in Wisconsin and beyond do cover their putting greens during the winter months. They don't do this to really challenge the effectiveness of their snow mold fungicide program, they do this to protect against the various ailments that winter can hurl at fragile putting surfaces. The most common ailments include desiccation (Figure 1) and crown hydration (Figure 2), but toxic gas buildup and low temperature kill can also occur. In addition, winter covers can offer up earlier spring green-up, giving the superintendent a potential (but also potentially risky) leg-up on the fickle spring season.

But are superintendents unintentionally challenging their snow mold fungicide programs when they install these winter covers each fall, and could they be setting themselves up for more severe damage as a result of snow mold than they would have received from the various abiotic forms of winterkill (Figure 3)? That is precisely the question that Dr. Jim Kerns (former UW pathologist, now at North Carolina State University) and myself set out to answer during the fall of 2011. Dr. Kerns delivered a first-year update in the Sept/Oct 2012 issue of *The Grass Roots* (Kerns and Koch, 2012), and this article provides an update from the second and final year of the study.

Figure 1. Windswept areas in winters of relatively low snowfall can dehydrate the plants and cause desiccation injury.

Figure 2. Rapid freezing of free water near the base of the plant can rupture cells in the turfgrass crown, killing the plants. Annual bluegrass is most susceptible to this type of winter injury.

The study was conducted on the chipping green at Antigo Bass Lake Country Club. Host superintendent Dave van Auken provided and installed two types of winter covers; a permeable Evergreen® cover and an impermeable GreenJacket® cover with foam insulation underneath. Fungicide treatments consisted of a non-treated control and a tank-mixture of Interface (4.0 fl oz/1000 ft2) and Triton Flo (0.85 fl oz/1000 ft2) applied at only an early timing, only a late timing, or at half rate and applied at both the early and late timing. The early application for year 2 was made on October 4th, 2012 and the late timing for year 2 was made on October 29th, 2012. Covers were installed the same day as the late fungicide application.

The results from the winter of 2012-2013 provide an interesting comparison to the previous winter of 2011-2012. In 2011-2012, snow mold severity on non-treated plots was increased on plots covered with a GreenJacket® cover but relatively similar between the no cover treatment and the Evergreen® treatment. In 2012-2013, however, snow mold severity was higher under the Evergreen® cover compared to no cover, and was again highest under the Green Jacket® cover (Figure 3). Why did the Evergreen® cover increase snow mold severity relative to no cover in year 2 but not year 1? The answer likely lies in the different environmental conditions present during each winter. The winter of 2011-2012 provided a relatively early and constant snow cover in the Antigo area, whereas the winter of 2012-2013 saw a significant thaw during mid-January that saw snow depth fall to near 0. As a result, in conditions of constant snow cover there was little difference in snow mold severity under no cover or under an Evergreen® cover, but under conditions of less consistent snow cover Evergreen® covers increased snow mold pressure.

Did fungicide timing have an impact on snow mold development under the covers? In year 1, the answer was not really. While spraying at only the early fungicide timing did not provide acceptable snow mold control (an expected result), there were not significant differences in the late fungicide timing or the split early + late fungicide timing. However, under the heaviest disease pressure found under the Green Jacket® cover there was a slight decrease in snow mold under the split application compared to the late timing. Year 2 provided almost an exact replica of year 1, with highest disease breakthrough on the early treatments and no statistical differences between early + late and late (Figure 4). As in year 1, however, slight decreases in snow mold under the Green Jacket® were observed with the split timing treatment compared to the late timing.

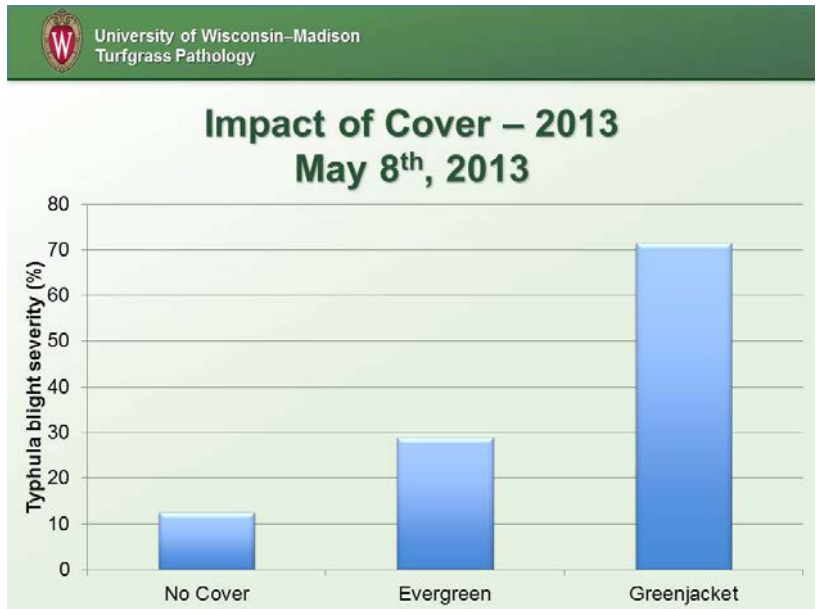

Figure 3. Snow mold severity under no cover, Evergreen® cover, or Green Jacket® cover in spring of 2013.

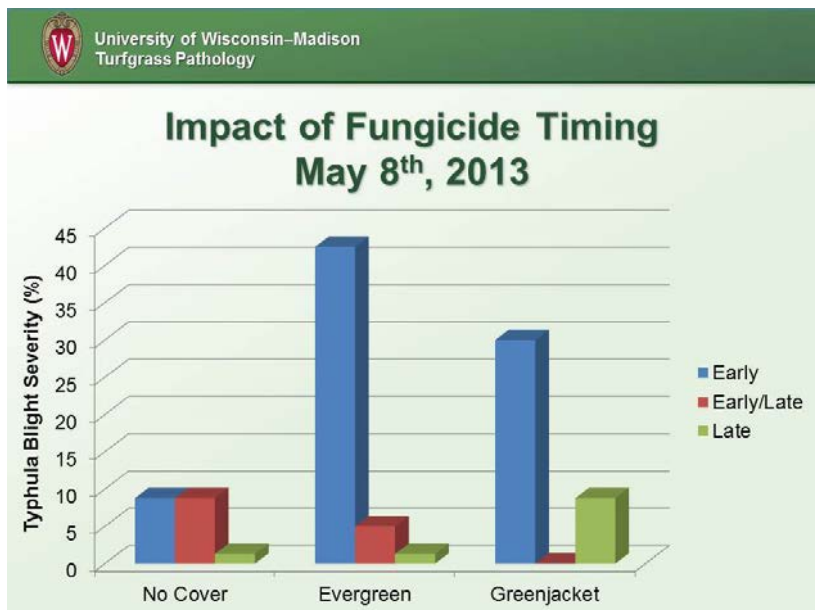

Figure 4. Snow mold severity on fungicide treatment applied as early, late, or early + late under no cover, Evergreen® cover, or Green Jacket® cover in spring of 2013. Fungicide treatment consisted of Interface applied at 4.0 fl oz per 1000 ft2 tank-mixed with Triton FLO at 0.85 fl oz per 1000 ft2. Fungicides were applied at half rate for each application in split early + late application. Early application as made on October 4th, 2012 and late application was made on October 29th, 2012.

The research presented here clearly demonstrates that winter covers, especially Green Jacket®, increase snow mold severity compared to no cover. But the differences in snow mold severity under the Evergreen cover from year 1 to 2 suggest that the degree of impact the covers have will vary based on snow depth and snow cover duration. Those areas where the snow cover is deep and persistent won't see as large a difference between covered greens and non-covered greens, whereas those areas in the southern portion of Wisconsin where snow cover is more shallow and less consistent will be more likely to see dramatic increases in snow mold severity under winter covers.

What are the environmental conditions that these winter covers impact to increase snow mold severity? Alas, further analysis of the winter environmental data is needed before a final answer to that question can be provided. A final write-up including analysis of the environmental data will be provided to *The Grass Roots* in 2014 following publication of the study in a scientific journal. Until then, sleep tight this winter little putting greens.

Acknowledgements:
Special acknowledgement to Antigo Bass Lake CC superintendent Dave van Auken for providing the host site, covers, and installation of the covers. In addition, special thanks to the WGCSA Par 4 Research program for providing the financial support required to conduct this study.

References:

Kerns, J. P., Koch, P. L. 2012. Influence of Winter Covers on Snow Mold Severity: A Summary of Year 1. *The Grass Roots* 41(5): 20-22.