# HOLE NOTES

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WINTER DISEASE AND PREPARATION ISSUE

# Christmas in August:

## *Covering Up During Winter's Extremes*


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As you talk with golf course superintendents about winter protection for greens, you soon realize that there are as many opinions as there are options for covering greens. Historically, covers have included polyethylene sheeting, saran shade cloth, topdressing, branches or snow fence to accumulate snow, straw, organic compost and mulches, wood fiber mats, geotextile fabrics, and more recently, water impermeable covers.

The type of cover to use, or whether or not one should be used, can be a hotly debated topic among fellow superintendents, as well as with players, members, greens committees, and owners. It's a debate that the majority of the time has little significance. However, after a winter such as the 2002-2003 it can become a major point of contention.


An example of all treatments at Rolling Green CC on the day that the covers were removed, March 26, 2003.

Because the weather is unpredictable, the correct course of action is also difficult to predict. We have seen the stitched seam between two geotextile panels produce the most outstanding turf one year and cause the greatest damage the next. We have seen covers that protect annual bluegrass one year and cause complete desiccation the next. The choice that is made for each course has to depend upon the factors that are unique to each situation and the approach taken may vary for each individual green.

Many factors need to be considered when deciding how to best protect a green from potential winter injury. The most important factor is to determine the most likely cause of winter injury to each green or set of greens. Covers can play an integral part in the winter management of golf greens through the prevention of desiccation, protection from low temperature injury, prevention of ice cover, and to provide earlier spring green-up.

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# Christmas in August –

*(Continued from Front Cover)*

A larger number of covers were tested on small plots over the previous couple of years by Dr. Jon Powell. Based upon his data, three covers that had performed well were chosen plus a new product to test over an entire green or as large plots (25 by 50 ft).

### Materials and Methods

The current study was conducted on push-up greens comprised of a mixture of creeping bentgrass and annual bluegrass at Rolling Green CC (RG) and on a newly established USGA green seeded to L-93 creeping bentgrass at the TROE Center on the St. Paul Campus (campus). This was the first year of a two year study. The data presented should be considered preliminary until a second year of data is compiled.

The treatments included in the research project were:

1. Uncovered control
2. Basic green/brown tarp purchased from Menards; laid green side up
3. GreenJacket which is a non-permeable cross-laminated high-density polyethylene with reinforcing tabs
4. Crane Creek which is a two layer system with straw placed between the layers. The lower layer is a polyester mesh that is staked to the ground and the upper layer is a non-permeable polyethylene cover that is laced to the lower mesh layer. The lacing attachment process is supposed to allow maximum air exchange. This treatment used 6-8 bales per 1000 ft2 evenly spread between the layers
5. American Excelsior which is a four foot wide roll of wood fiber inside netting. (only included on the newly established USGA green on campus).

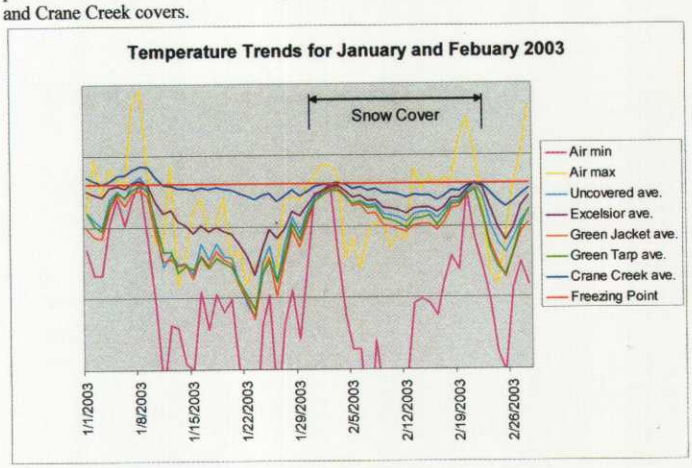
The covers were installed November 7, 2002 on the newly established green on campus and November 13, 2002 on the greens at RG. Temperature sensors/recorders were placed on the green surface, in the green near the crown of the turfgrass plant, and at a 2" soil depth before the covers were installed.

Covers were removed March 18, 2003 on campus and March 26, 2003 at RG. The plots were rated for turf quality (TQ), color, and percent injury (PI) the day of cover removal and then weekly until all treatments had ratings that were not statistically different. All treatments were replicated three times at each location.

### Results

Some of the results were quite interesting. This past winter was an unusual year having little or no snow cover for the majority of the winter. As we examined the temperature data that was collected, we noticed that the temperatures under most of the covers fluctuated greatly along with the air temperature. A portion of the graph in Figure 1 shows the insulating affect that snow cover can provide by dampening the extremes in temperature. Only two inches of snow was required to have a dramatic affect on temperatures under the snow.

**Figure 1.** Temperature trends for January and February 2003 on the USGA green on campus. Notice how snow cover dampens the temperature fluctuations as compared to periods without snow cover and the greater insulating affect of the American Excelsior and Crane Creek covers.




There was also a noticeable insulating affect from the American Excelsior covers as well as a major affect with the Crane Creek cover because of the straw (Figure 1).

When the covers were removed, all covered plots had significantly better TQ and color than the uncovered plots at both locations.

The campus ratings for the Crane Creek cover suffered because of excessive etiolation and some patch-like areas that had incurred some injury (because of the etiolation that occurred it may be better to use less straw than we used, although this has not been tested). After two weeks the etiolated turf had turned green and the plots had the top color ratings along with American Excelsior. The patches, on-the-other-hand took four weeks to heal and kept the TQ ratings suppressed because of it. The story was different at RG where there was only a little etiolation on some of the collars surrounding the putting green. These greens had good color and TQ (though color was not statistically different from others on some dates).

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The uncovered plots were brown when the other covers were removed. It took 4-5 weeks before they were statistically similar to any of the covered plots and 6-7 weeks for full recovery. The recovery process was probably longer than normal due to the lack of snow cover which contributed to desiccation. One of the uncovered plots at RG had significant desiccation injury on the highest portion of the plot. After 7 weeks, there was still at least 50% injury whereas none of the covered greens received any desiccation injury.

GreenJacket plots took longer to green up than some of the other plots and had TQ ratings that were intermediate but ratings were significantly better than the uncovered plots.

The green/brown tarp provided excellent TQ and good color at RG however the ratings on campus suffered from some leaf tip browning after the covers were removed.

The American Excelsior covers were only used at the St. Paul campus on the USGA green, but they provided the highest overall TQ and color ratings. However, as we have seen with the other covers, it doesn't mean that they would necessarily perform the same at the other location.

The variation seen between the two locations could be attributed to the environmental conditions, location, soil type, grass species, or stand age.

Cost can be another important consideration when deciding upon the cover that best suits your situation. Table 1 lists the cost per square foot for each of the covers and additional notes about each option. Some companies offer early order and volume discounts. The costs for each cover should be adjusted to a cost per year based upon the anticipated longevity. The labor involved with the installation, removal and storage should also be considered. Discussion

**Table 1**

A list of covers used in the study, the cost per square foot and additional notes.

| Cover | Cost/ft2 | Notes |
|---|---|---|
| Uncovered | $0.00 | Turf may be vulnerable to some injury during severe winters. |
| GreenJacket | $0.12-0.17 | Requires reinforcing tabs which are included along with spikes; can be cut to fit.Water impermeable. |
| Green/Brown Tarp | $0.03-0.05 | Only available in precut dimensions so multiple covers for each green may be required. Spikes also need to be purchased which adds to the cost.Water impermeable. |
| Crane Creek | $1.00 | Fully guaranteed for 10 years; custom cut to fit greens; yearly straw cost of about $0.01/ft2.Top layer is water impermeable. |
| American Excelsior | $0.10-0.14 | Storage can be an issue.Water permeable. |

The biggest problem was on the newly established green. Because the soil was not yet stable, until the ground froze, it was difficult to keep the spikes anchored in the ground. All the covers except the American Excelsior allowed the wind to provide enough lift that the spikes would pull loose from the ground.

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Other problems were also encountered. Some of the tabs for the GreenJacket covers did not adhere as they should have and allowed the covers to tear. You also cannot stake the cover with out the tabs. The grommets on the green/brown tarp could not always withstand the force from the wind and would tear off. We later learned that if we triple fold the edge of the tarp, the spikes didn't tear free. The Crane Creek cover also had grommets and some of the stitching in the tie downs tear off during a wind storm. Also, the straw removal for the Crane Creek cover was very laborious and you need to have a place for disposal or composting of the straw. Although there were no problems with the American Excelsior ripping or coming up, it did allow dirt that had blown onto the green from a nearby open field to filter down through the cover and leave a thin soil layer on top of the sand profile and the turf along the seams sometimes responds differently. American Excelsior are also very bulky and can create a storage problem.

Noticeably, both the green/brown tarp and the GreenJacket stretch after the sun warms them. They were less prone to the wind pulling them off if they were spread out temporarily and allowed to warm before the final stretching and staking.

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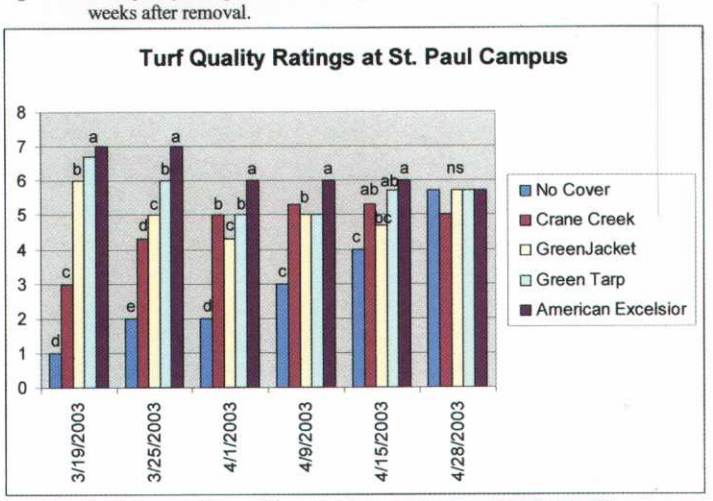
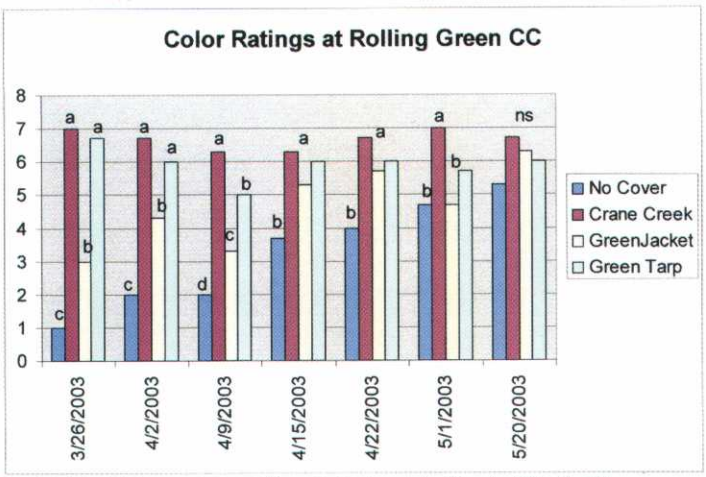
Green 7 at Rolling Green Country Club the day the covers were removed. The uncovered portion was severely desiccated.

**Figure 2.** Turf quality ratings on the USGA green the day of cover removal and for 6 weeks after removal.



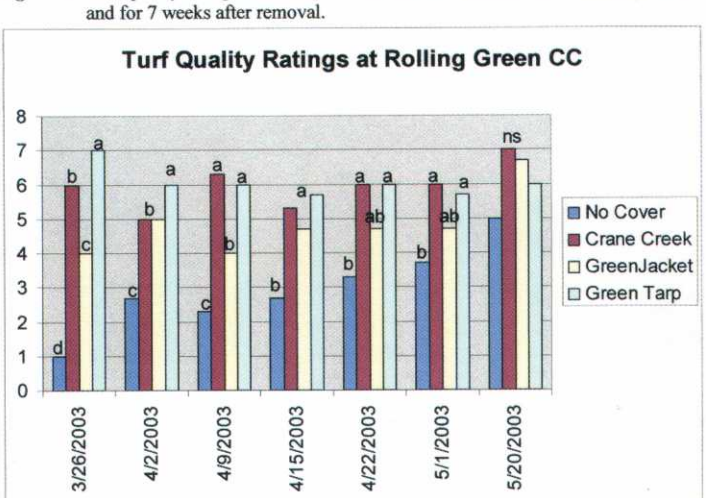

Bars labeled with the same letter within each date do not significantly differ (P=.05).

**Figure 3.** Color ratings at Rolling Green Country Club the day of cover removal and for 7 weeks after removal.




Bars labeled with the same letter within each date do not significantly differ (P=.05).

**Figure 4.** Turf quality ratings at Rolling Green Country Club the day of cover removal and for 7 weeks after removal.




Bars labeled with the same letter within each date do not significantly differ (P=.05).

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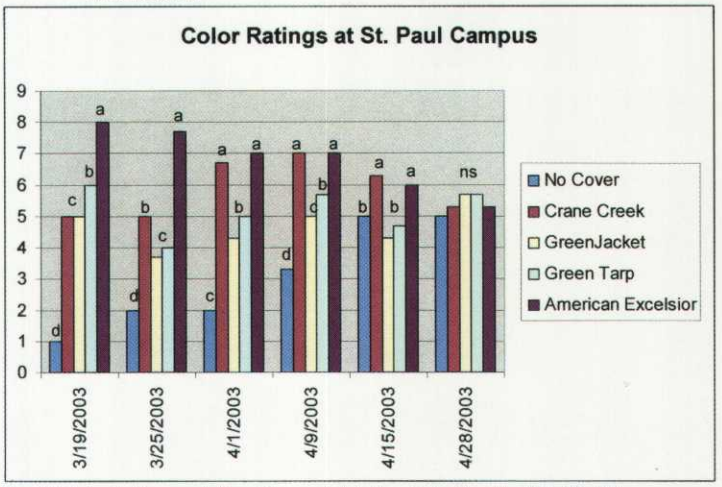
No matter which type of cover is used, it is extremely important that fungicides be applied for the prevention of snow mold. Most of the covers retain moisture or allow the surface to remain wet for longer periods of time than uncovered turf. This increases the likelihood of having an incidence of typhula blight or microdochium patch.

This first year of data showed that all of the covers tested provided increased TQ and color ratings over the uncovered areas. However, it also showed that under differing site conditions each cover might perform differently. Therefore, it is important to take your specific factors into consideration when choosing the right cover for your greens. If you are in a site with very cold temperatures and little snow cover, you may want to use a Crane Creek or American Excelsior cover to provide some protection from low temperature injury. If your potentional problem is crown hydration from excess water, you may want to use one of the water impermeable covers (Table 1). However, if your only concern is desiccation, any cover may work well. Finally, during open winters like the one we just had, covers can provide you with good quality turf 4-5 weeks sooner than when covers are not used.

We look forward to collecting the second years data and seeing how it compares.

**Figure 5** Color ratings on the USGA green the day of cover removal and for 6 weeks after removal.




Bars labeled with the same letter within each date do not significantly differ (P=.05).

Below: An example of all treatments at the TROE Center on the day that the covers were removed, March 18, 2003.