

# **Civitas Plus Harmonizer Tank Mixed with Reduced Rates of Fungicides to Control Snow Mold on Putting Greens in Idaho and Washington 2009-2010**

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Snow mold control trials were conducted at 3 different locations in the Intermountain Region of the PNW, on a practice green at the City of McCall Golf Course in McCall, ID, on a nursery green at the Chewelah Golf and Country Club in Chewelah, WA, and on a research green at the WSU Turfgrass and Agronomy Research Center (TARC) in Pullman, WA. The practice green at McCall is a stand of creeping bentgrass/annual bluegrass, the nursery green at Chewelah is a push-up green covered with 3" to 4" of sand with a mixed stand of 'Penncross' creeping bentgrass and annual bluegrass, and the research green at Pullman is a pure stand of 'T-1' creeping bentgrass on a USGA specification putting green. Individual treatment plots were 6' x 7' with three replications in a randomized complete-block design. Treatments were applied 25 Oct 09, 2 Nov 09, and 18 Nov 09 at McCall, Chewelah, and Pullman, respectively. Fungicides were applied at 80 GPA with a bicycle-wheeled CO<sub>2</sub> pressurized (40 psi) sprayer with 11008 flat fan TeeJet nozzles. At Pullman, snow cover was intermittent and in general light throughout the winter. Continuous snow cover lasted from the first of December 2009 through the first of March 2010 (approx. 100 days) at Chewelah and from the first of December 2009 to 19 April 2010 at McCall (approx. 138 days). At McCall, snow was not allowed to melt naturally compared to the other 2 sites. On April 19 approximately 1 to 1.5 feet of snow was mechanically removed from the green and plots were rated 2 days later. Individual plots were evaluated for pink (*Microdochium nivale*) and/or gray (*Typhula spp.*) snow mold disease severity (% area infected) and turfgrass quality (rated on a scale of 1-9; 9 = excellent) on 17 Mar 10 at Pullman, 19 Mar 10 at Chewelah, and 21 Apr 10 at McCall.

The Pullman site experienced intermittent snow cover during the winter. The non-treated control (check) had 9% of the plot area infected with pink snow mold (*M. nivale*) (Table 1). There were no statistical differences in snow mold disease between any of the treatments. However, treatments with Civitas plus Harmonizer had significantly higher turfgrass quality ratings, primarily due to enhanced green color. It appears that the green colorant (Harmonizer) persists on the leaf blade throughout the winter and appears to contribute to the green color observed when rated. It would be interesting to repeat this study and take a closer look at these treatments in the lab to get a clearer picture of what is actually

happening to the leaf blades. One can see in Figure 1 the increased color in all treatments with Civitas plus Harmonizer compared to the check.

At Chewelah the check had 30% of the plot area infected with both pink and gray snow mold (Table 2). All fungicide treatments with Civitas plus Harmonizer had significant reductions in the percentage of snow mold compared to the check. In addition, these same treatments had much higher turfgrass quality, not only by reducing the amount of disease present but also by exhibiting a more green color. As mentioned above the green colorant (Harmonizer) appears to contribute to the greener color observed.

At McCall, the check surprisingly had 10% of the plot area infected with snow mold (Table 3). Normally one would expect with this extreme snow cover that snow mold would be much more prevalent. Furthermore, it was difficult to determine whether both pink and/or gray snow mold were present. In any event, all fungicide treatments with Civitas plus Harmonizer resulted in significant reductions in the percentage of snow mold compared to the check. Turfgrass quality was significantly better with these treatments as well. It is difficult to tell from the photos in figures 4 and 5 but all treatments with Civitas plus Harmonizer had higher turfgrass quality when compared to the check.

Overall, it is difficult to determine how much Civitas plus Harmonizer really contributed to disease control since there was no individual Banner MAXX or Chipco 26GT treatment to compare to. However, there was a significant decrease in snow mold disease when tank mixed with either Banner MAXX or Chipco 26GT at Chewelah and McCall compared to the check. There was a definite increase in turfgrass quality when the studies were rated the spring following the fall application of all fungicide treatments at all locations in this study. It does appear that Harmonizer lasts throughout the winter and may contribute, to some extent, to increased green leaf color in the spring when rated.

Table 1. The effect of Civitas plus Harmonizer tank mixed with reduced rates of Banner MAXX or Chipco 26GT to control snow mold and turfgrass quality on a research green at the WSU Turfgrass and Agronomy Research Center (TARC) in Pullman, WA. Rated 17 Mar 2010.

Fungicide treatment	Rate (fl oz/M)	Snow mold disease (% area infected)	Turf quality (rated 1-9)
Check	0	9.0 a**	3.7 b
Civitas (synthetic isoparaffin-based formulation*) + Harmonizer + Banner MAXX (propiconazole)	15 fl oz 1 fl oz 1 fl oz	5.0 a	6.3 a
Civitas (synthetic isoparaffin-based formulation) + Harmonizer + Banner MAXX (propiconazole)	15 fl oz 1 fl oz 0.5 fl oz	12.3 a	5.3 ab
Civitas (synthetic isoparaffin-based formulation) + Harmonizer + Chipco 26GT (iprodione)	15 fl oz 1 fl oz 2 fl oz	2.7 a	6.3 a

\*Mineral oil

\*\*Means followed by the same letter are not significantly different. LSD  $F = 0.05$ .

Figure 1. A view of the complete snow mold study at the WSU TARC in Pullman, WA on 17 Mar 2010.

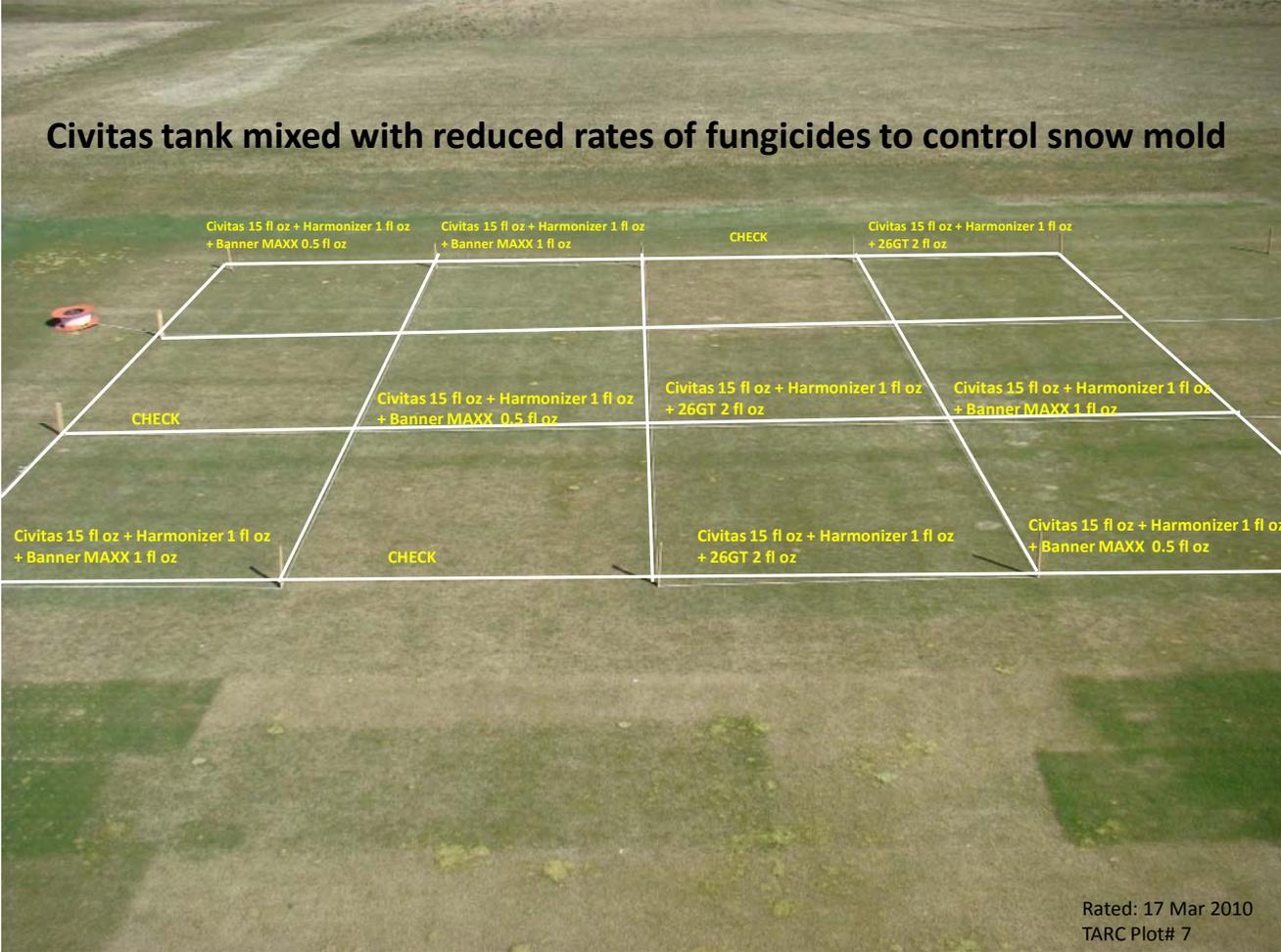


Table 2. The effect of Civitas plus Harmonizer tank mixed with reduced rates of Banner MAXX or Chipco 26GT to control snow mold and turfgrass quality on a practice green at the Chewelah Golf and Country Club in Chewelah, WA. Rated 19 Mar 2010.

Fungicide treatment	Rate (fl oz/M)	Snow mold disease (% area infected)	Turf quality (rated 1-9)
Check	0	30.0 a**	2.3 b
Civitas (synthetic isoparaffin-based formulation*) + Harmonizer (proprietary pigment dispersion) + Banner MAXX (propiconazole)	15 fl oz 1 fl oz 1 fl oz	9.0 b	6.0 a
Civitas (synthetic isoparaffin-based formulation*) + Harmonizer (proprietary pigment dispersion) + Banner MAXX (propiconazole)	15 fl oz 1 fl oz 0.5 fl oz	6.3 b	6.0 a
Civitas (synthetic isoparaffin-based formulation*) + Harmonizer (proprietary pigment dispersion) + Chipco 26GT (iprodione)	15 fl oz 1 fl oz 2 fl oz	3.3 b	6.7 a

\*Mineral oil

\*Means followed by the same letter are not significantly different. LSD= 0.05.

Figure 2. A view of some of the Civitas plus Harmonizer treatments at the Chewelah Golf and Country Club in Chewelah, WA on 19 Mar 2010.

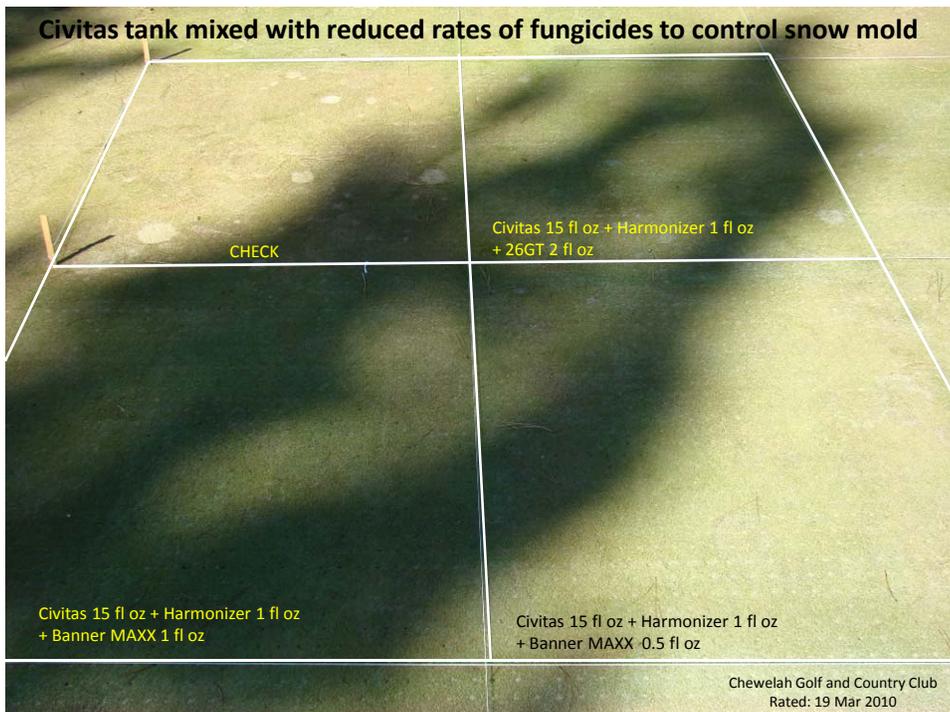


Figure 3. A view of some of the Civitas plus Harmonizer treatments at the Chewelah Golf and Country Club in Chewelah, WA on 19 Mar 2010.



Table 3. The effect of Civitas plus Harmonizer tank mixed with reduced rates of Banner MAXX or Chipco 26GT to control snow mold and turfgrass quality on a practice green at the City of McCall Golf Course in McCall, ID. Rated 21 Apr 2010.

Fungicide treatment	Rate (fl oz/M)	Snow mold Disease (% area infected)	Turf quality (rated 1-9)
Check	0	10.0 a**	5.7 b
Civitas (synthetic isoparaffin-based formulation*) + Harmonizer + Banner MAXX (propiconazole)	15 fl oz 1 fl oz 1 fl oz	2.7 b	7.7 a
Civitas (synthetic isoparaffin-based formulation) + Harmonizer + Banner MAXX (propiconazole)	15 fl oz 1 fl oz 0.5 fl oz	3.0 b	7.7 a
Civitas (synthetic isoparaffin-based formulation) + Harmonizer + Chipco 26GT (iprodione)	15 fl oz 1 fl oz 2 fl oz	2.3 b	7.8 a

\*Mineral oil

\*Means followed by the same letter are not significantly different. LSD  $P = 0.05$ .

Figure 4. A view of some of the Civitas plus Harmonizer treatments at the City of McCall Golf Course in McCall, ID on 21 Apr 2010.



Figure 5. A view of some of the Civitas plus Harmonizer treatments at the City of McCall Golf Course in McCall, ID on 21 Apr 2010.

