

## Syngenta Fungicides to Control Snow Mold on Putting Greens in Montana and Washington 2011-2012

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Snow mold control trials were conducted at 3 locations in the Intermountain Region of the PNW, on a research green at the WSU Turfgrass and Agronomy Research Center (TARC) in Pullman, WA, a green at Meadow Lake Resort Golf Course in Columbia Falls, MT, and a nursery green at the Chewelah Golf and Country Club in Chewelah, WA. The research green at Pullman is a pure stand of 'T-1' creeping bentgrass grown on an USGA specification constructed putting green, the green at Columbia Falls is a mixed stand of 'Pennncross' creeping bentgrass and annual bluegrass, and the nursery green at Chewelah is a push-up green on 3" to 4" of sand with a mixed stand of 'Pennncross' creeping bentgrass and annual bluegrass. Individual treatment plots were 6' x 7' with four replications in a randomized complete-block design. Treatments were applied 28 Oct 11, 31 Oct 11, and 15 Nov 11 at Columbia Falls, 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 totaling approximately 42 days. Columbia Falls had snow cover totaling approx. 110 days from December 2011 to the end of March 2012, however there was a brief period in the middle of January that the snow completely melted off. Continuous snow cover lasted from the beginning of December 2011 through the first week of April 2012 (approx. 125 days) at Chewelah. **(Note: A study was put out at the City of McCall golf course in McCall, ID but due to the removal of ice during the winter, in an attempt to avoid ice damage to the green, the green was severely damaged and along with some ice damage no data could be taken).** Individual plots were evaluated for pink (*Microdochium nivale*) and/or gray (*Typhula spp.*) snow mold disease severity (% area infected), turfgrass quality rated on a scale from 1 to 9; 9 = excellent and 6 = acceptable, and color rated on a scale from 1 to 9; 9 = dark green on 27 Mar, 6 Apr, and 9 Apr 2012 at Pullman, Columbia Falls, and Chewelah, respectively.

At Pullman, WA, the untreated Check had approximately 11% pink snow mold when rated on 2 Apr 2012 (Table 1.). All treatments resulted in very good to excellent control of

pink snow mold. Treatments that had Simplot's PAR pigment added had significantly higher turfgrass quality compared to the other treatments that did not except for Interface 4 fl oz/M + Triton FLO 0.5 fl oz/M from Bayer, in which each product is formulated with StressGuard. Treatments with A7087F and/or A9898A all resulted in complete snow mold control. Adding Medallion to the combined treatment A7087F + A9898A was not necessary. Figs. 1 through 6 show the fungicide treatments in reps 1 and 2. Note the darker green color of treatments with PAR added and Bayer's Interface + Triton FLO.

At Columbia Falls, MT, the disease pressure was quite low, the untreated Check had approximately 6% snow mold and it appeared to be primarily pink snow mold when rated on 6 Apr 2012 (Table 2). A9898A 1.3 fl oz/M + Daconil Action 5.4 fl oz/M had the same amount of snow mold compared to the check. All treatments in which PAR was added resulted in significant increases in turfgrass quality and color of >3 rating points when compared to similar fungicide combinations without PAR added. Instrata 5.5 fl oz/M + A7087F (Secure) 0.5 fl oz/M + PAR 0.37 fl oz/M and Instrata 9 fl oz/M + PAR 0.37 fl oz/M had the highest overall disease control, turfgrass quality and color compared to the other Syngenta fungicide combinations in this study. However, Bayer's Interface 6 fl oz/M + Triton FLO 0.85 fl oz/M, although not significantly different than the best Syngenta combinations, did perform best overall. Adding Medallion to the combined treatment A7087F + A9898A did not result in increased disease control. For the most part, fungicides combinations that included A7087F performed slightly better than fungicide combinations that contained A9898A. Figs. 7 through 12 show the fungicide treatments in reps 1 and 2. As mentioned above at the Pullman location, note the darker green color of treatments with PAR added and Bayer Interface + Triton FLO.

At Chewelah, WA, the untreated Check had approximately 27% snow mold and was estimated to have approximately 50% pink and 50% gray (Table 3). Eventhough all treatments resulted in significant reductions in snow mold disease compared to the check, no treatment resulted in complete disease control. However, as seen at the Pullman and Columbia Falls sites those treatments in which PAR was added resulted in significantly higher turfgrass quality and color. Instrata 5.5 fl oz/M + A7087F (Secure) 0.5 fl oz/M + PAR 0.37 fl oz/M in terms of disease control, turfgrass quality and color performed just as good as Banner MAXX II 2 fl oz/M + Medallion TL 0.96 Fl oz/M + PAR 0.37 fl oz/M or Instrata 9 fl oz/M + PAR 0.37 fl oz/M. All Syngenta fungicide combinations in which PAR was added were as good as Bayer's Interface 6 fl oz/M +

Triton FLO 0.85 fl oz/M. Although not significant there was less disease when Medallion was added to the combined treatment A7087F + A9898A. Figs. 13 through 18 show the fungicide treatments in reps 1 and 2. As mentioned above, note the darker green color of treatments with PAR added and Bayer's Interface + Triton FLO.

Overall, at the Pullman location, which gets pink snow mold, all of the Syngenta fungicide combinations resulted in very good to excellent control. With that in mind one may be able to use lower rates of these products to achieve similar control. At Columbia Falls and Chewelah, sites that typically get both pink and gray snow mold, several Syngenta fungicide combinations resulted in very good control. Adding A7087F or A9898A in combination with Instrata or Banner MAXX II + Medallion resulted in very good disease control. The addition of Simplot's PAR pigment to any of the Syngenta fungicide combinations resulted in significant increases in turfgrass quality and color compared to similar fungicide combinations without PAR at all locations. Furthermore these fungicide combinations with PAR added had disease control, turfgrass quality and color comparable to Bayer's Interface 4 or 6 fl oz/M + Triton FLO 0.5 or 0.85 fl oz/M.

Table 1. The effect of fungicides on turfgrass quality and control of pink snow mold on a research green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. Rated 27 Mar 2012.

Fungicide treatment	Snow mold		Turfgrass quality*
	Rate fl oz/M	(% area infected)	
INSTRATA (propiconazole + fludioxonil + chlorothalonil) + PAR (proprietary pigment concentrate)	9 0.37	0.0 b**	6.0 a
INSTRATA (propiconazole + fludioxonil + chlorothalonil) + A7087F (Secure) + PAR (proprietary pigment concentrate)	5.5 0.5 0.37	0.0 b	6.0 a
INTERFACE (iprodione + trifloxystrobin) + TRITON FLO (triticonazole)	4 0.5	0.0 b	5.6 a
A9898A + Medallion TL (fludioxonil)	1.3 0.96	0.0 b	4.8 b
Banner Maxx II (propiconazole) + A7087F (Secure) + Medallion TL (fludioxonil)	2 0.5 0.96	0.0 b	4.4 bc
A9898A + A7087F (Secure)	1.3 0.5	0.0 b	4.1 bcd
A9898A + Daconil Action (chlorothalonil)	1.3 5.4	0.0 b	3.8 cd
A9898A + A7087F (Secure) + Medallion TL (fludioxonil)	1.3 0.5 0.96	0.0 b	3.6 d
Banner Maxx II (propiconazole)+ Medallion TL (fludioxonil) + PAR (proprietary pigment concentrate)	2 0.96 0.37	0.8 b	5.9 a
Banner Maxx II (propiconazole) + Medallion TL (fludioxonil)	2 0.96	1.3 b	3.9 cd
CHECK	0	11.3 a	2.9 e

\*Turfgrass quality rate 1 to 9; 9 = excellent.

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

Fig. 1. Snow mold fungicide treatments on a 'T-1' creeping bentgrass green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. 27 Mar 2012.





Fig. 2. Snow mold fungicide treatments on a 'T-1' creeping bentgrass green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. 27 Mar 2012.

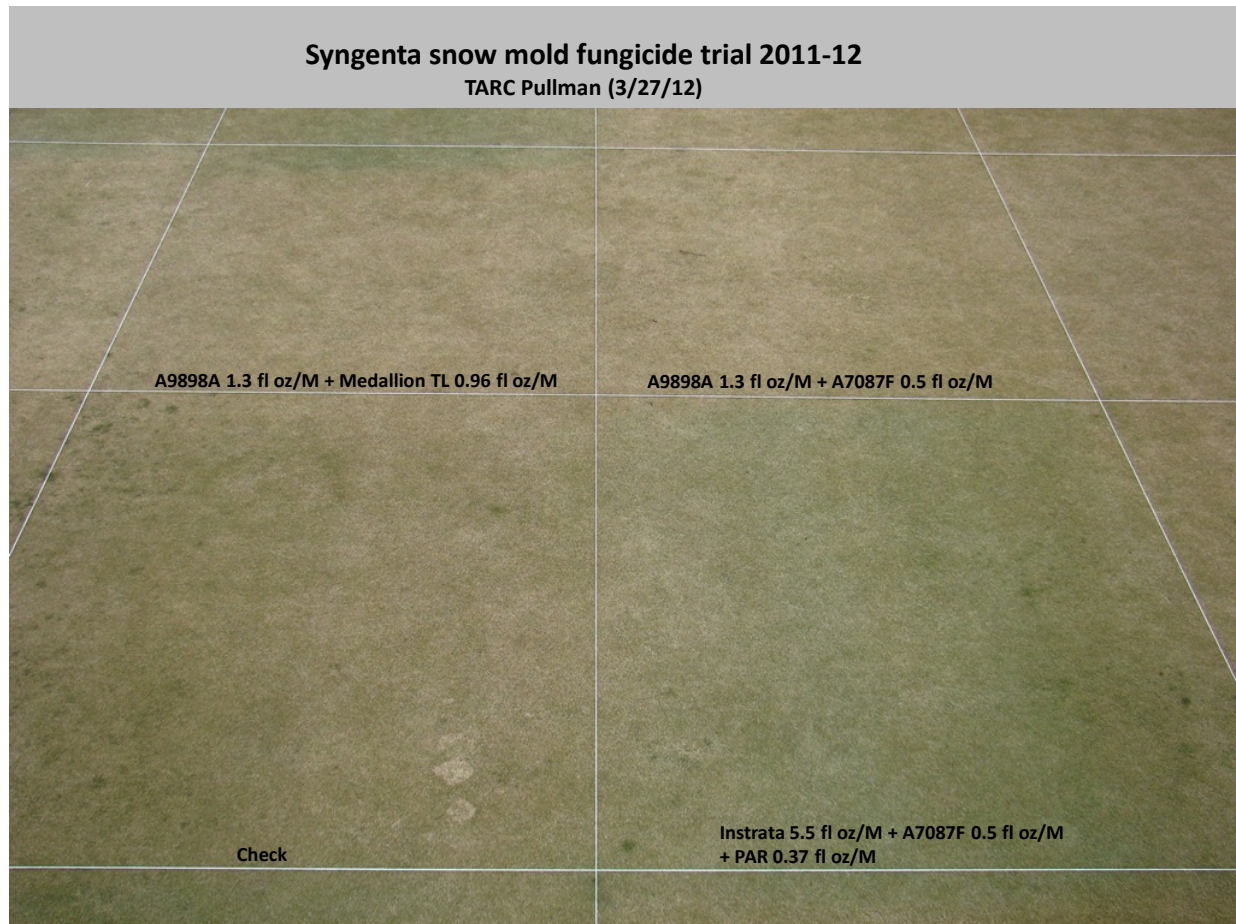


Fig. 3. Snow mold fungicide treatments on a 'T-1' creeping bentgrass green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. 27 Mar 2012.

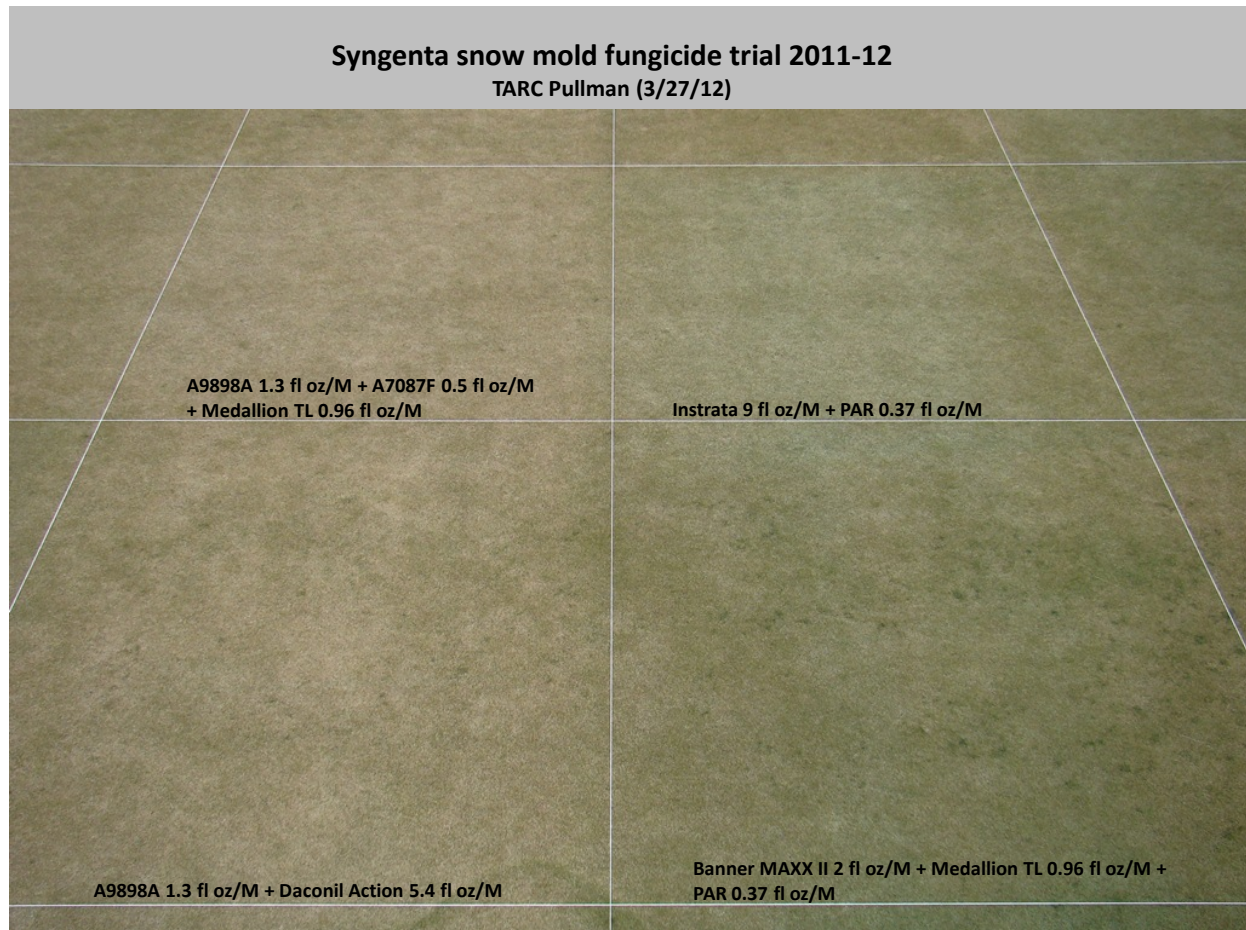




Fig. 4. Snow mold fungicide treatments on a 'T-1' creeping bentgrass green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. 27 Mar 2012.

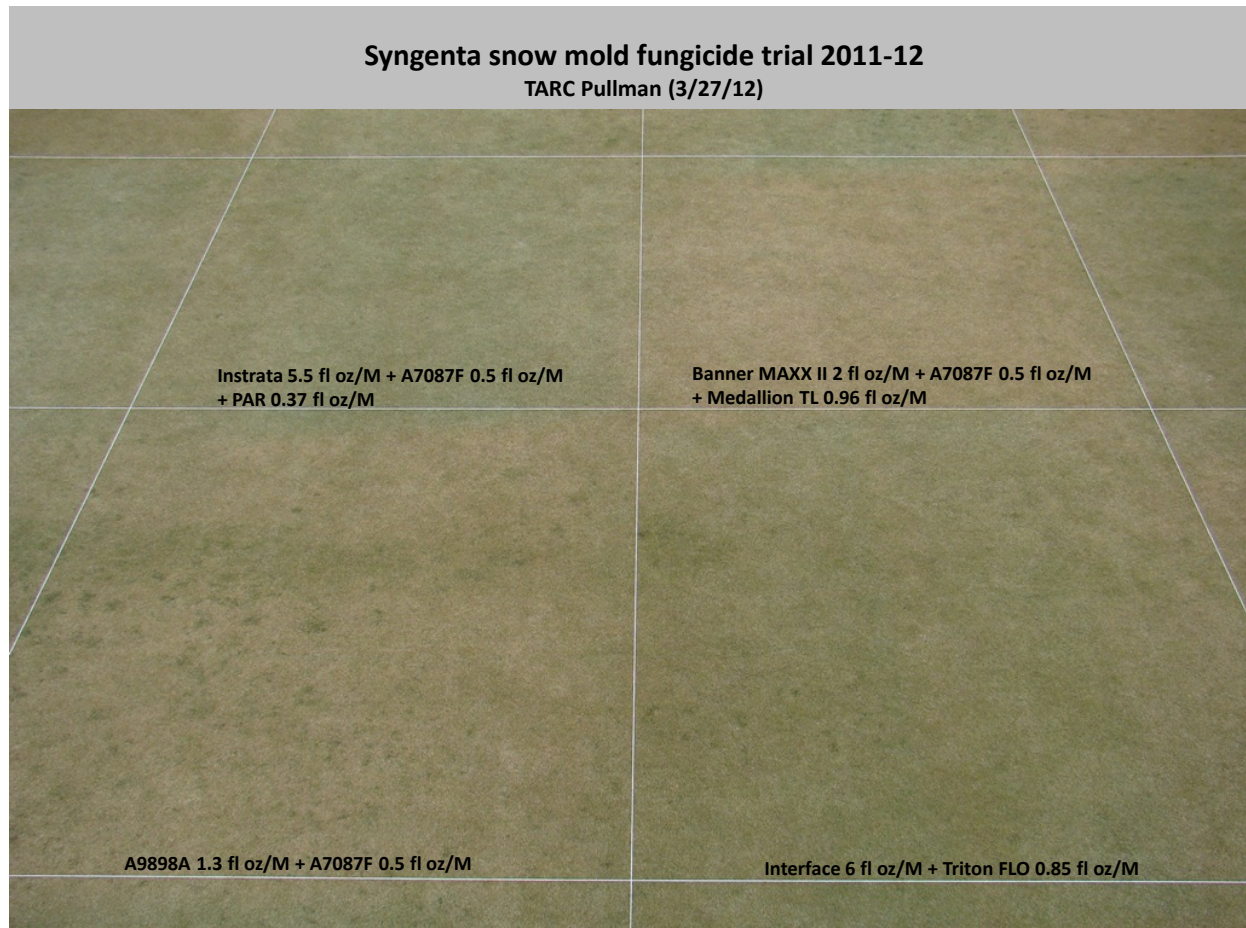




Fig. 5. Snow mold fungicide treatments on a 'T-1' creeping bentgrass green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. 27 Mar 2012.

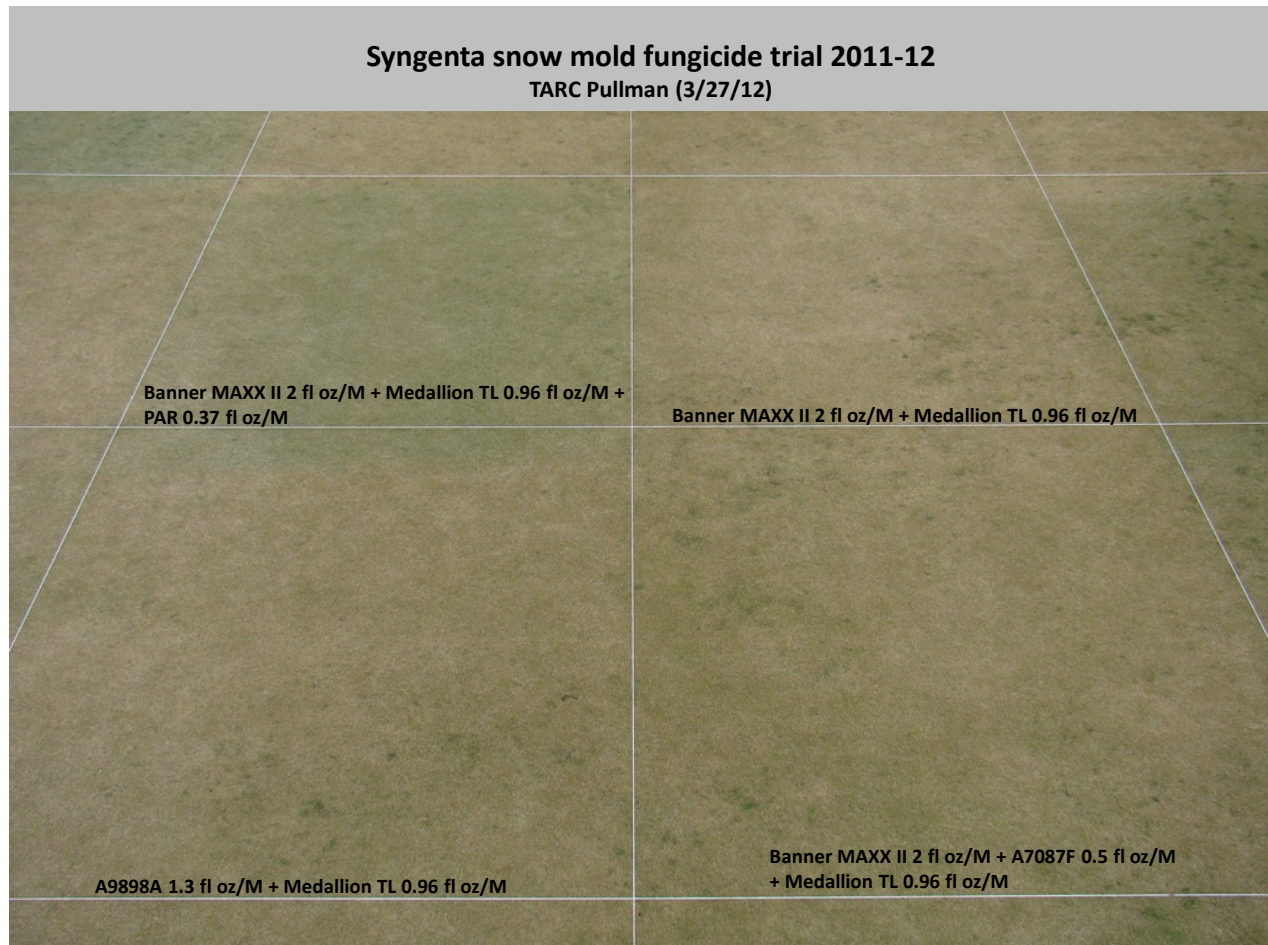


Fig. 6. Snow mold fungicide treatments on a 'T-1' creeping bentgrass green at the WSU Turfgrass and Agronomy Research Center in Pullman, WA. 27 Mar 2012.

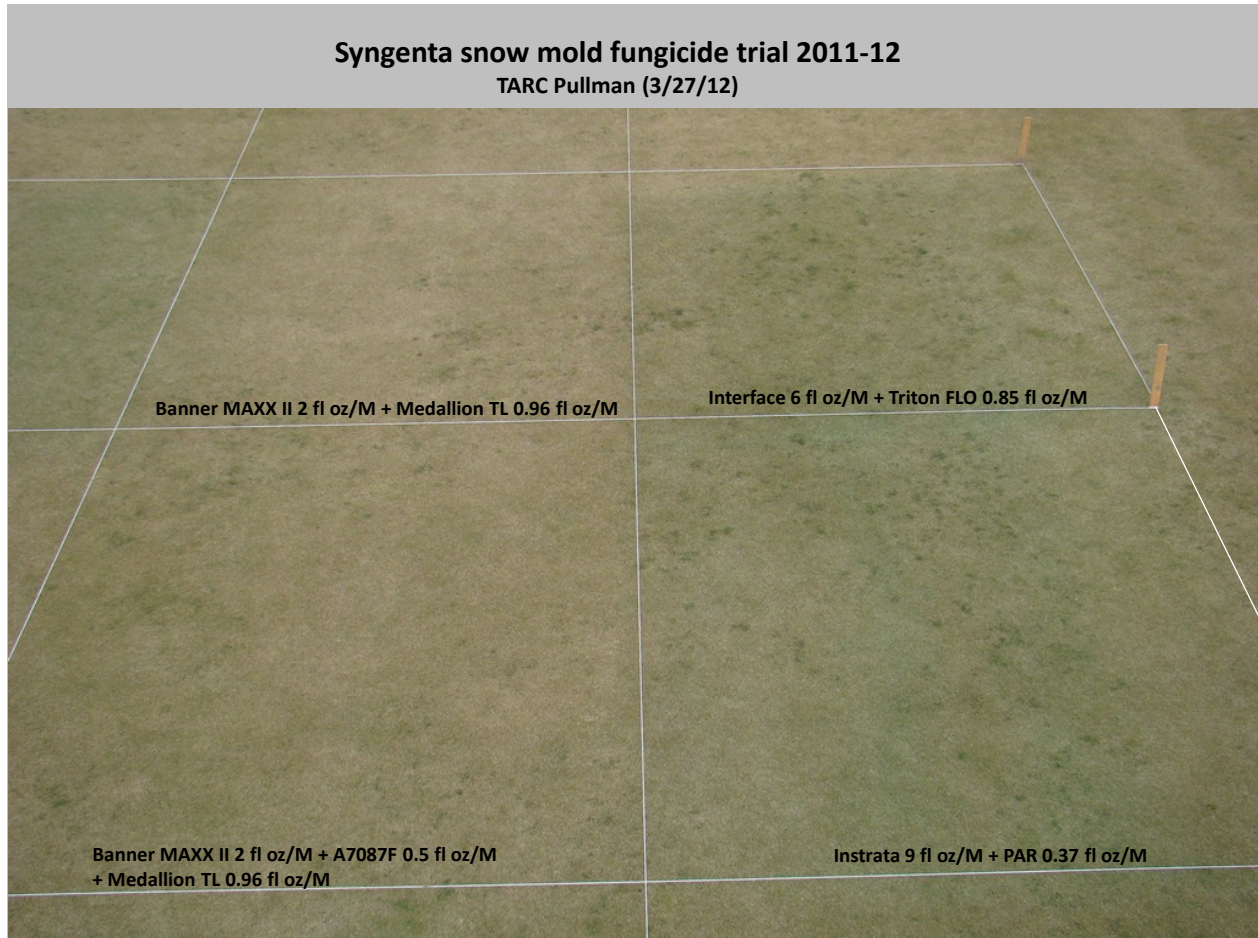


Table 2. The effect of fungicides on turfgrass quality, color, and control of pink and gray mold on a green at Meadow Lake Resort Golf Course in Columbia Falls, MT. Rated 6 Apr 2012.

Fungicide treatment	Rate fl oz/M	Snow Mold (% area infected)	Turfgrass quality*	Color**
INTERFACE (iprodione + trifloxystrobin) + TRITON FLO (triticonazole)	6 0.85	0.0 b***	7.8 a	7.9 a
Banner Maxx II (propiconazole) + Medallion TL (fludioxonil)	2 0.96	0.0 b	4.1 bc	4.3 b
INSTRATA (propiconazole + fludioxonil + chlorothalonil) + A7087F (Secure) + PAR (proprietary pigment concentrate)	5.5 0.5 0.37	0.3 b	7.5 a	7.8 a
Banner Maxx II (propiconazole) + A7087F (Secure) + Medallion TL (fludioxonil)	2 0.5 0.96	0.3 b	4.1 bc	4.3 b
A9898A + A7087F (Secure)	1.3 0.5	0.8 ab	4.4 b	4.3 b
INSTRATA (propiconazole + fludioxonil + chlorothalonil) + PAR (proprietary pigment concentrate)	9 0.37	1.4 ab	7.0 a	7.5 a
A9898A + A7087F (Secure) + Medallion TL (fludioxonil)	1.3 0.5 0.96	1.5 ab	4.3 bc	4.0 bc
A9898A + Medallion TL (fludioxonil)	1.3 0.96	2.5 ab	4.0 bc	4.3 b
Banner Maxx II (propiconazole)+ Medallion TL (fludioxonil) + PAR (proprietary pigment concentrate)	2 0.96 0.37	4.0 ab	6.9 a	7.4 a
A9898A + Daconil Action (chlorothalonil)	1.3 5.4	5.8 a	3.3 cd	3.4 c
CHECK	0	5.8 a	2.6 d	4.3 b

\*Turfgrass quality rated 1 to 9; 9 = excellent.

\*\*Color rated 1 to 9; 9 = dark green.

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



Fig. 7. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Meadow Lake Resort Golf Course in Columbia Falls, MT 6 Apr 2012.

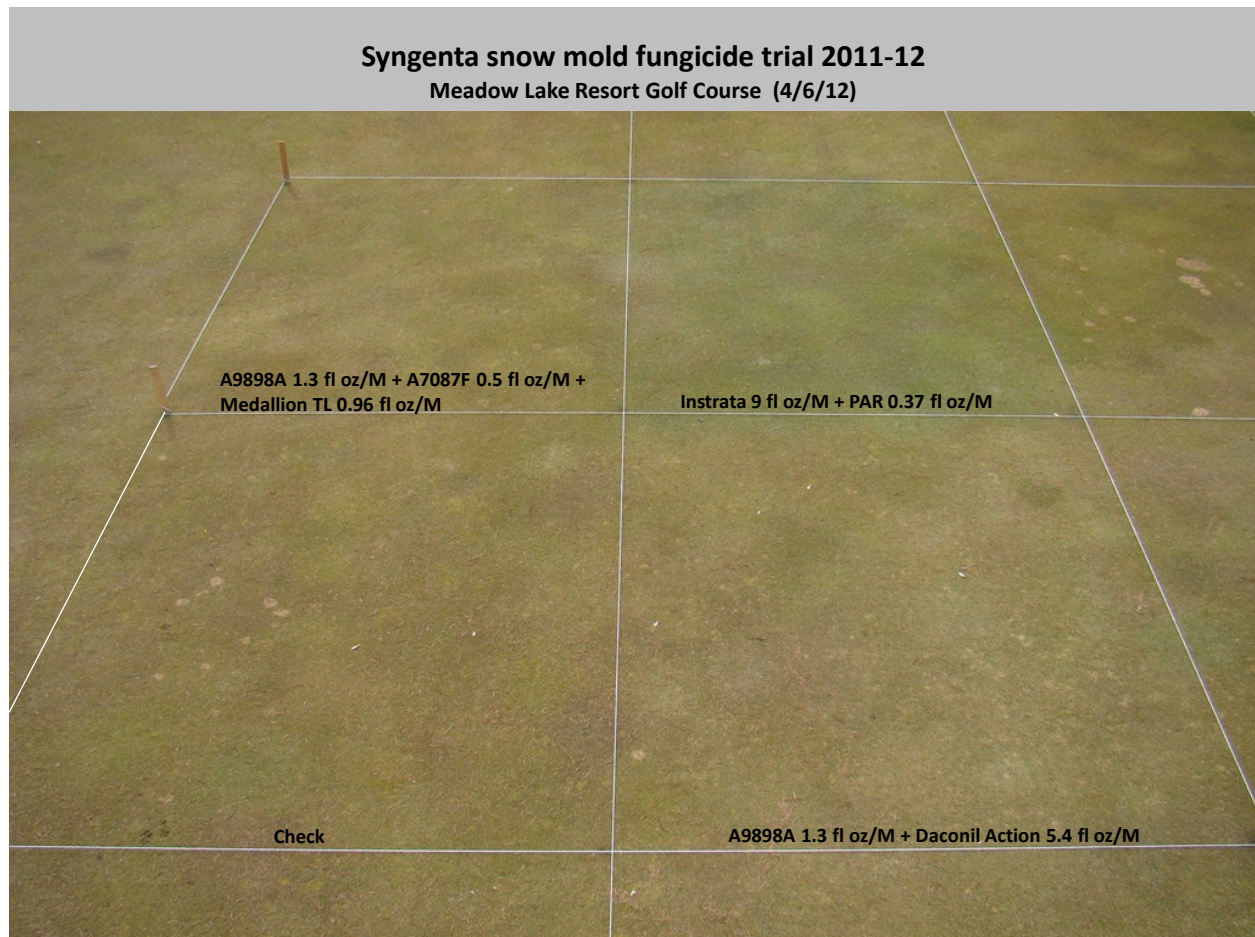




Fig. 8. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Meadow Lake Resort Golf Course in Columbia Falls, MT 6 Apr 2012.

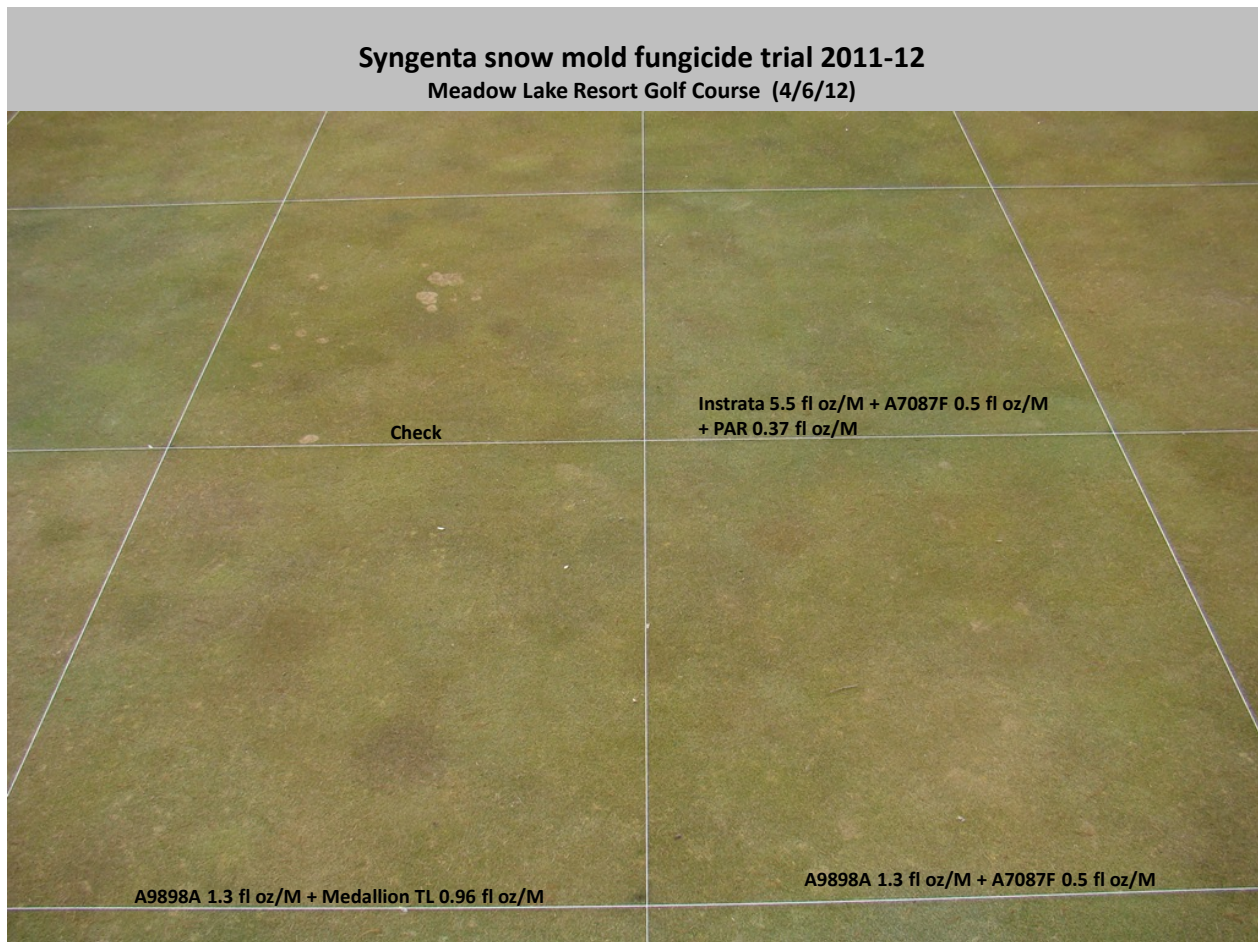


Fig. 9. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Meadow Lake Resort Golf Course in Columbia Falls, MT 6 Apr 2012.





Fig. 10. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Meadow Lake Resort Golf Course in Columbia Falls, MT 6 Apr 2012.



Fig. 11. Snow mold fungicide treatments on a 'Penncross' creeping bentgrass/annual bluegrass putting green at Meadow Lake Resort Golf Course in Columbia Falls, MT 6 Apr 2012.

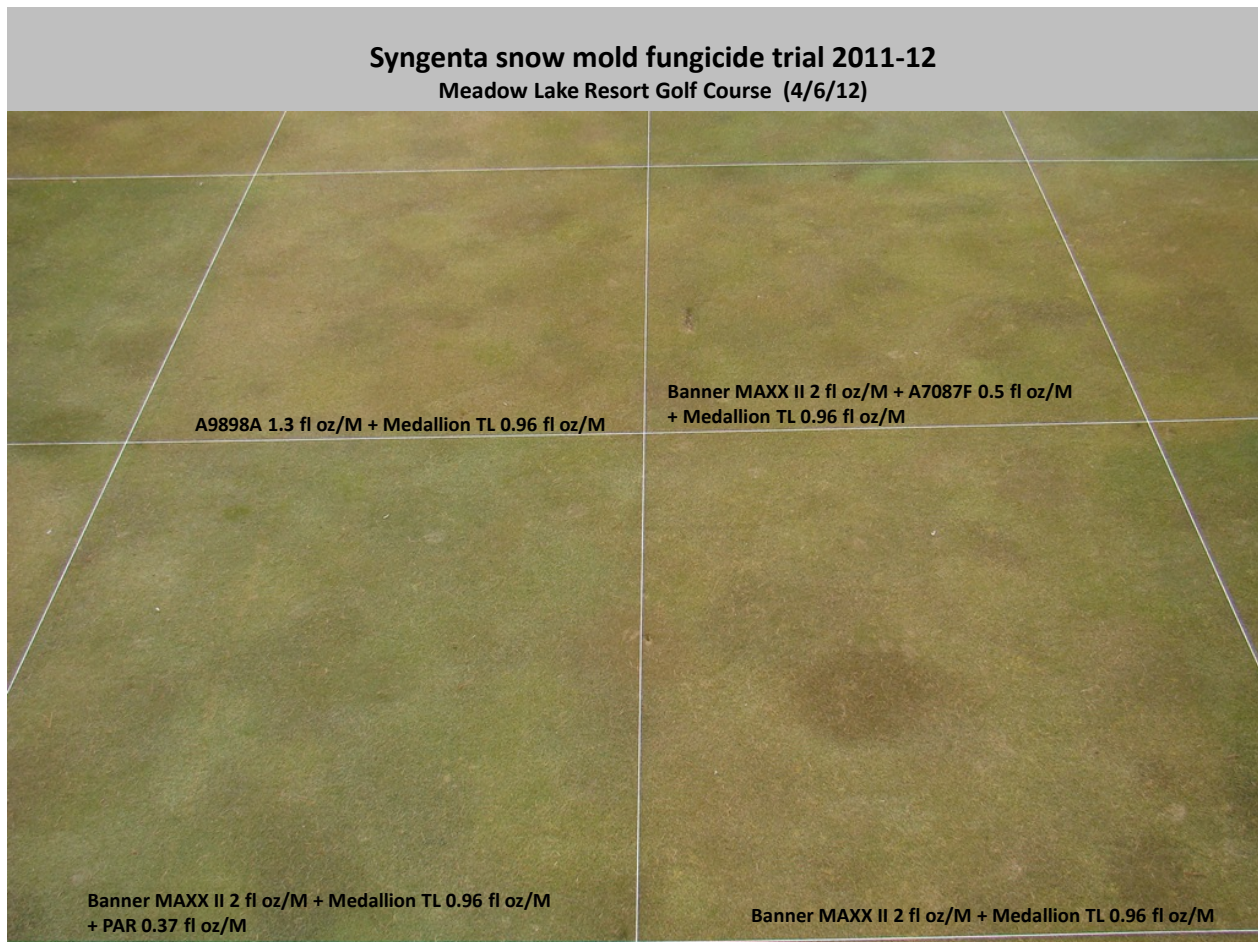




Fig. 12. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Meadow Lake Resort Golf Course in Columbia Falls, MT 6 Apr 2012.

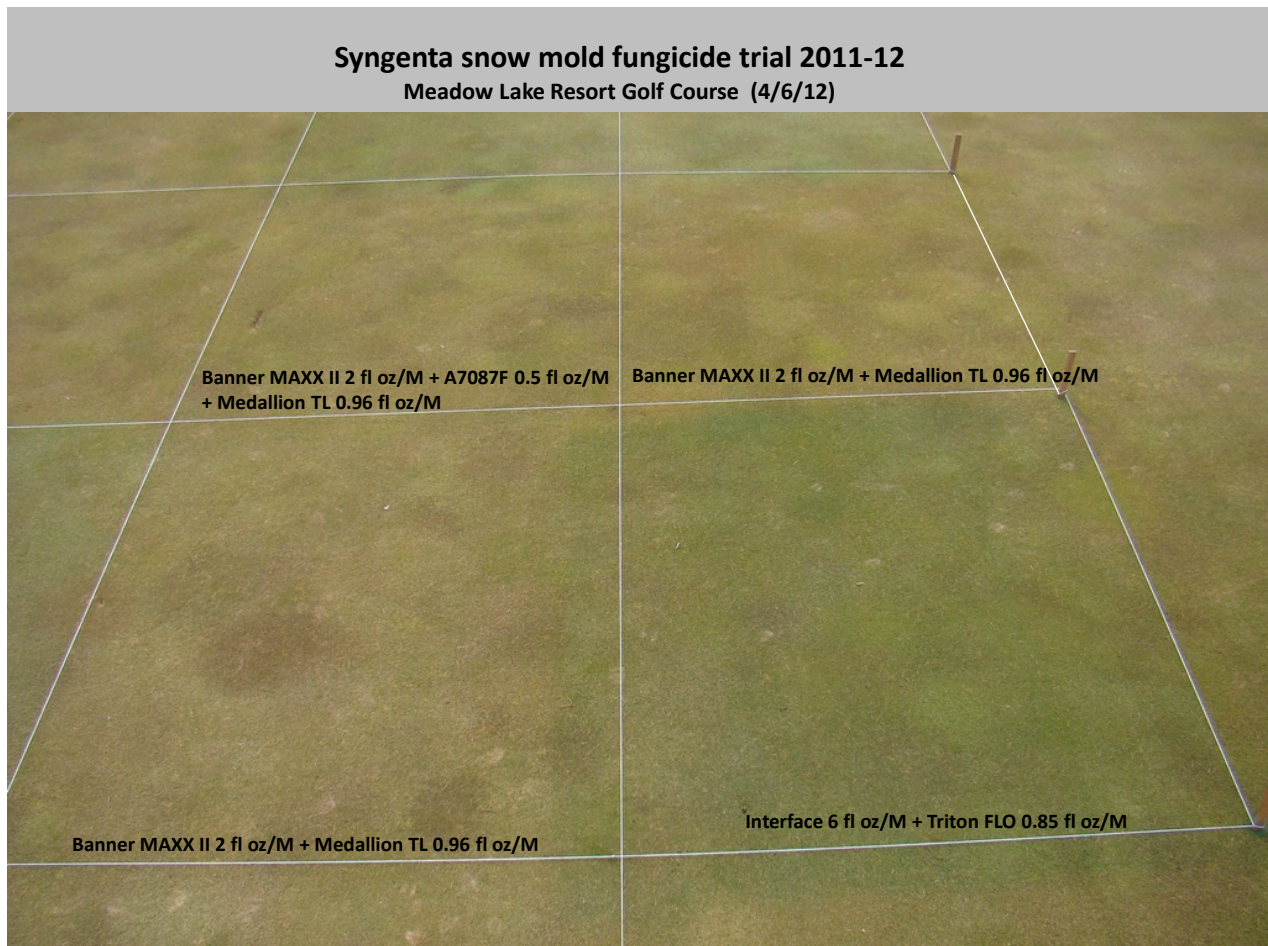


Table 3. The effect of fungicides on turfgrass quality, color and control of pink and gray mold on a green at Chewelah Golf and Country Club in Chewelah, WA. Rated 9 Apr 2012.

Fungicide treatment	Snow mold			
	Rate fl oz/M	(% area infected)	Turfgrass quality*	Color**
Banner Maxx II (propiconazole) + Medallion TL (fludioxonil) + PAR (proprietary pigment concentrate)	2 0.96 0.37	2.3 d***	6.1 a	6.6 a
INTERFACE (iprodione + trifloxystrobin) + TRITON FLO (triticonazole)	6 0.85	2.5 cd	5.9 ab	6.6 a
INSTRATA (propiconazole + fludioxonil + chlorothalonil) + A7087F (Secure) + PAR (proprietary pigment concentrate)	5.5 0.5 0.37	3.3 bcd	5.9 ab	6.6 a
A9898A + Medallion TL (fludioxonil)	1.3 0.96	3.5 bcd	4.8 bcd	4.6 b
INSTRATA (propiconazole + fludioxonil + chlorothalonil) + PAR (proprietary pigment concentrate)	9 0.37	3.8 bcd	5.4 abc	6.5 a
Banner Maxx II (propiconazole) + A7087F (Secure) + Medallion TL (fludioxonil)	2 0.5 0.96	3.8 bcd	4.4 cd	4.8 b
Banner Maxx II (propiconazole) + Medallion TL (fludioxonil)	2 0.96	3.8 bcd	4.4 cd	4.4 b
A9898A + A7087F (Secure) + Medallion TL (fludioxonil)	1.3 0.5 0.96	4.5 bcd	4.0 d	4.5 b
A9898A + Daconil Action (chlorothalonil)	1.3 5.4	6.5 bc	4.1 d	4.3 b
A9898A + A7087F (Secure)	1.3 0.5	7.0 b	4.1 d	4.8 b
CHECK	0	26.8 a	2.0 e	4.3 b

\*Turfgrass quality rated 1 to 9; 9 = excellent.

\*\*Color rated 1 to 9; 9 = dark green.

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

Fig. 13. Snow mold fungicide treatments on a 'Penncross' creeping bentgrass/annual bluegrass putting green at Chewelah Golf and Country Club in Chewelah, WA 9 Apr 2012.

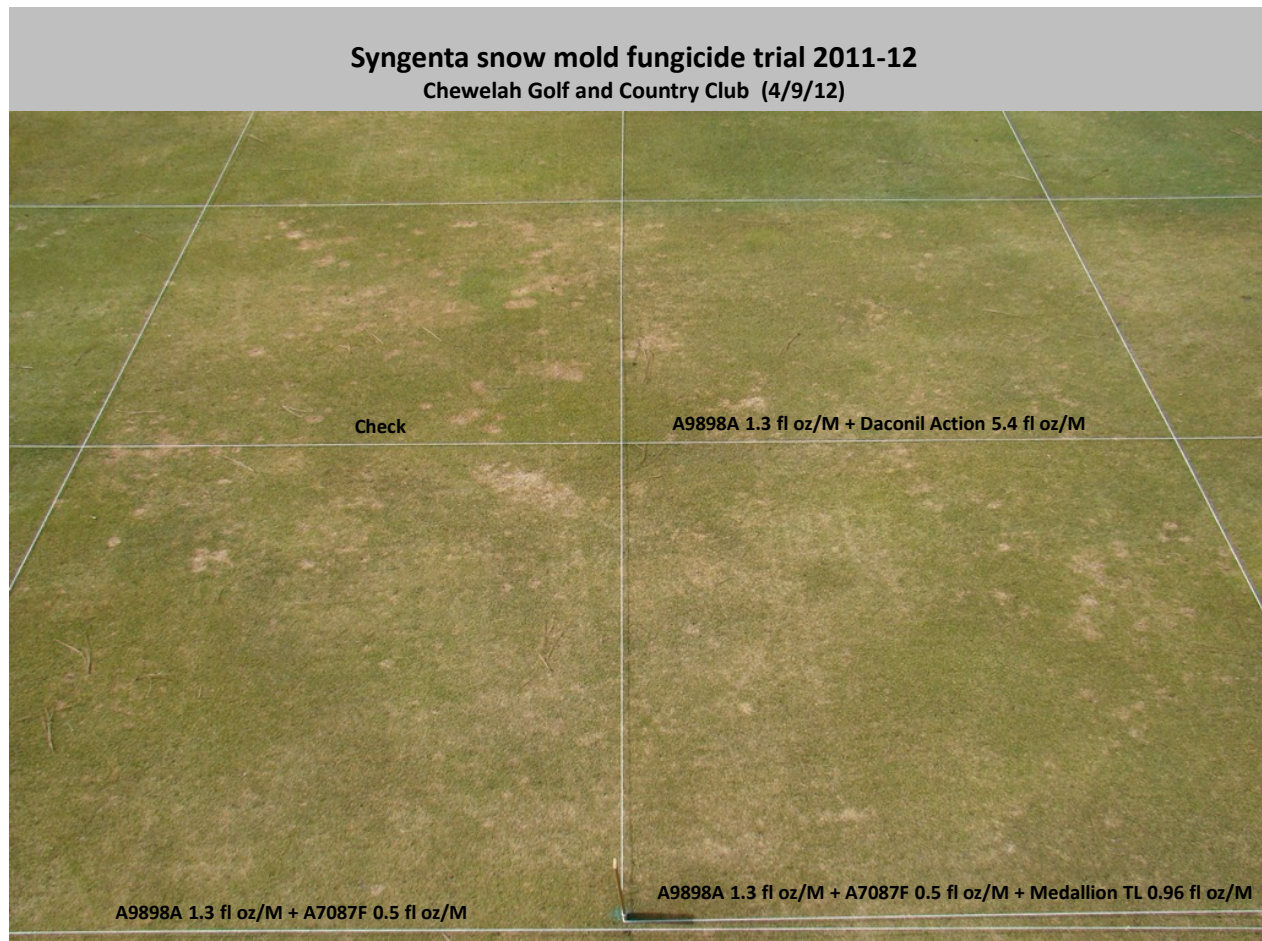




Fig. 14. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Chewelah Golf and Country Club in Chewelah, WA 9 Apr 2012.

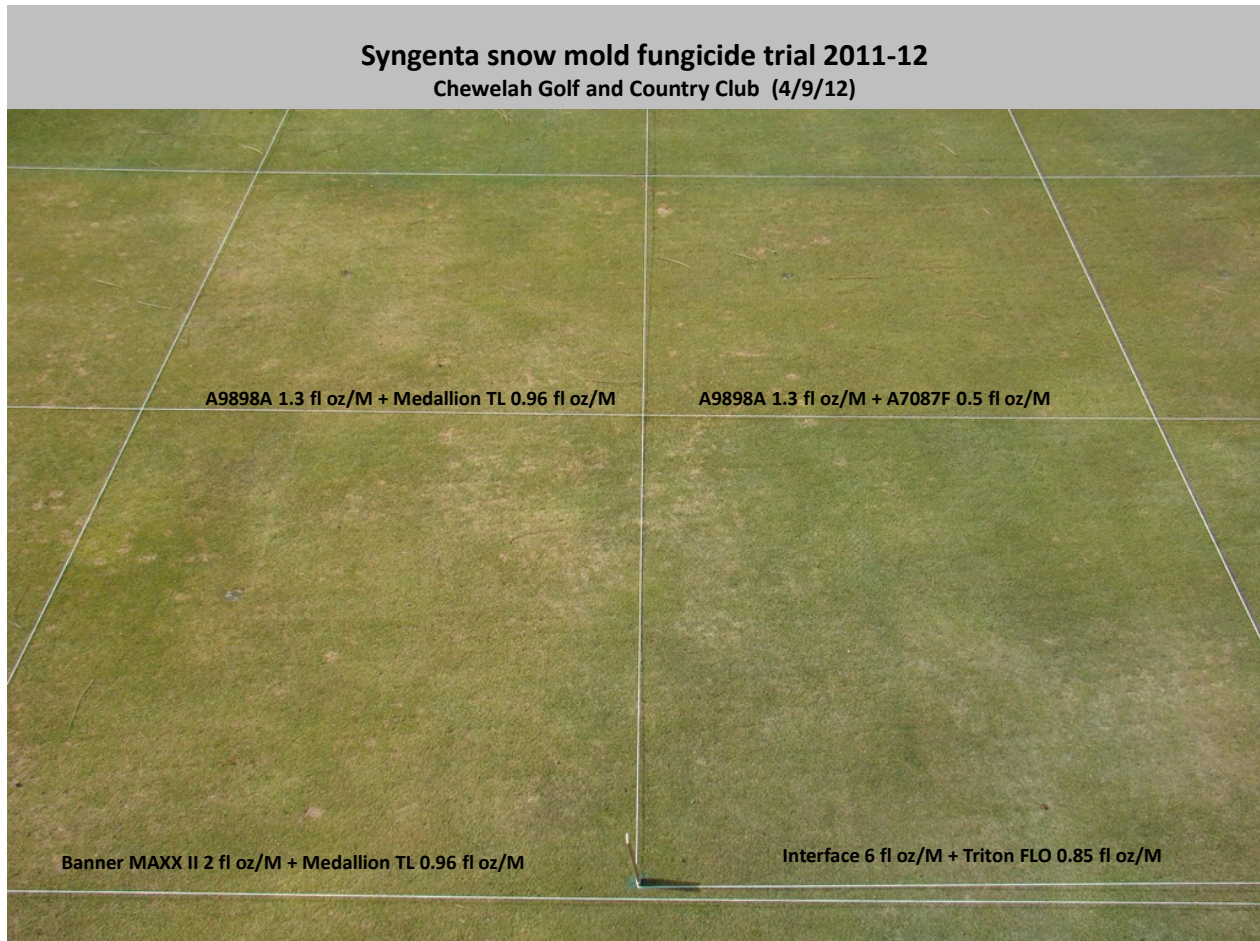




Fig. 15. Snow mold fungicide treatments on a 'Penncross' creeping bentgrass/annual bluegrass putting green at Chewelah Golf and Country Club in Chewelah, WA 9 Apr 2012.

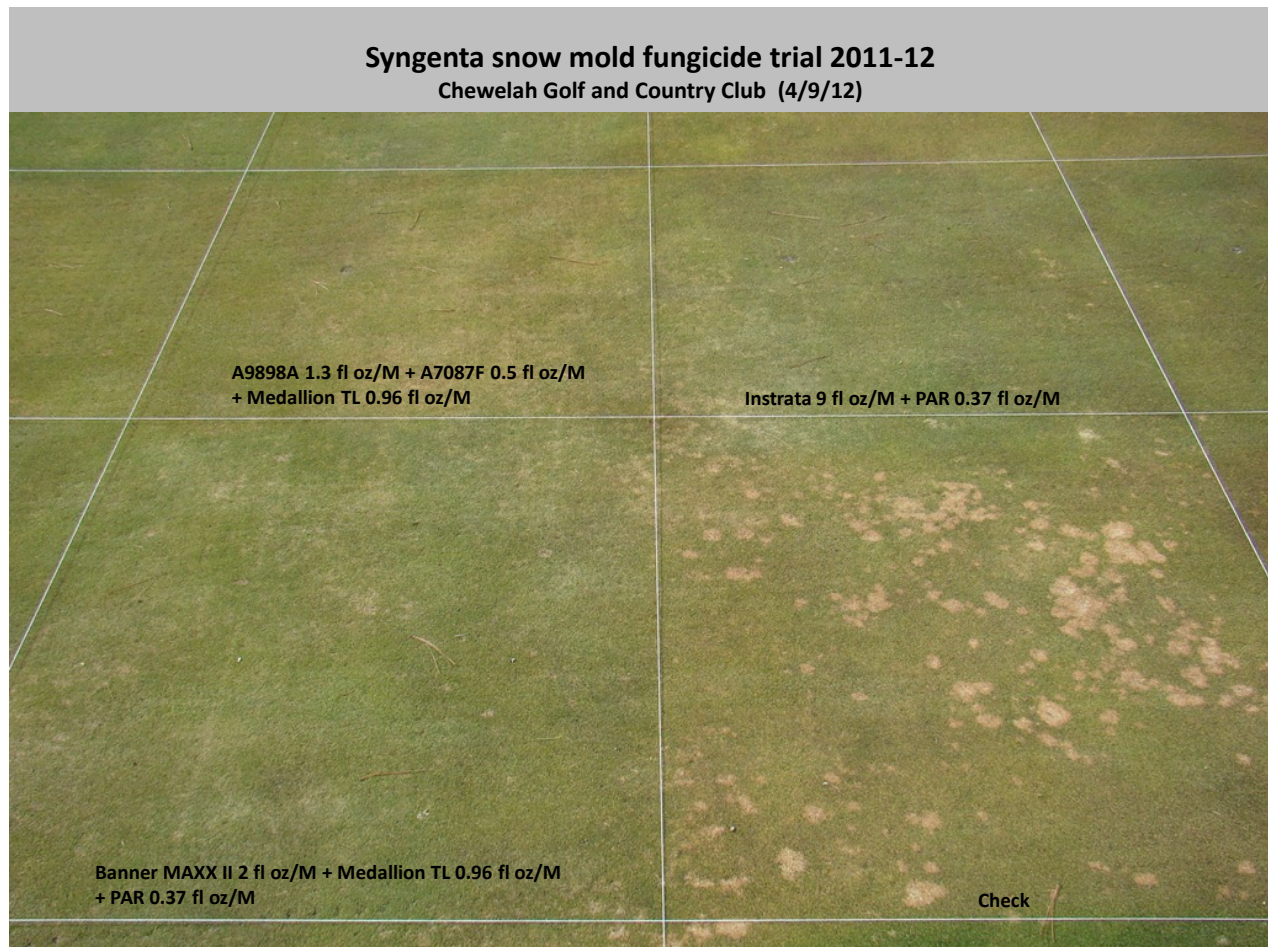


Fig. 16. Snow mold fungicide treatments on a 'Penncross' creeping bentgrass/annual bluegrass putting green at Chewelah Golf and Country Club in Chewelah, WA 9 Apr 2012.

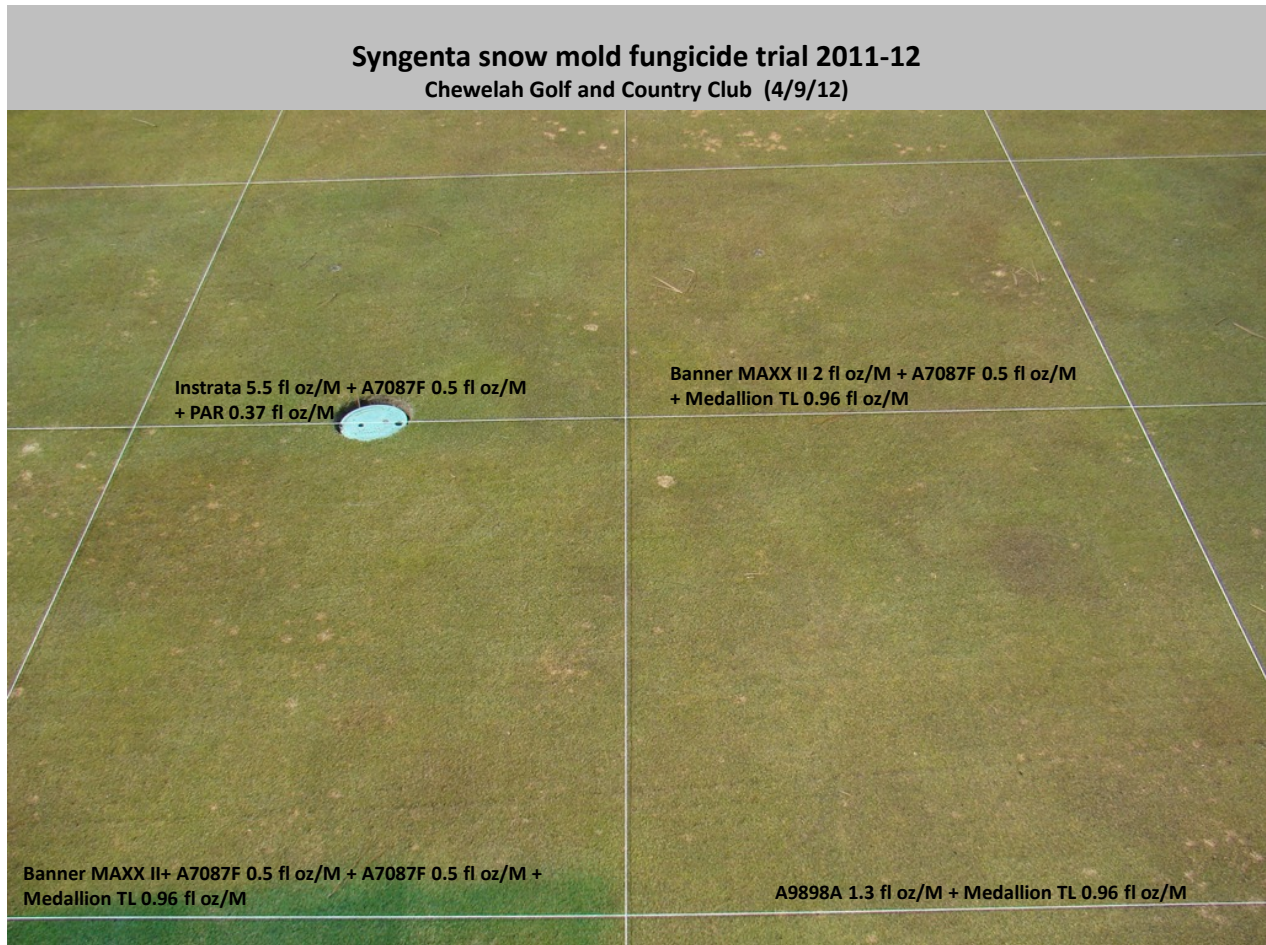




Fig. 17. Snow mold fungicide treatments on a 'Pennncross' creeping bentgrass/annual bluegrass putting green at Chewelah Golf and Country Club in Chewelah, WA 9 Apr 2012.

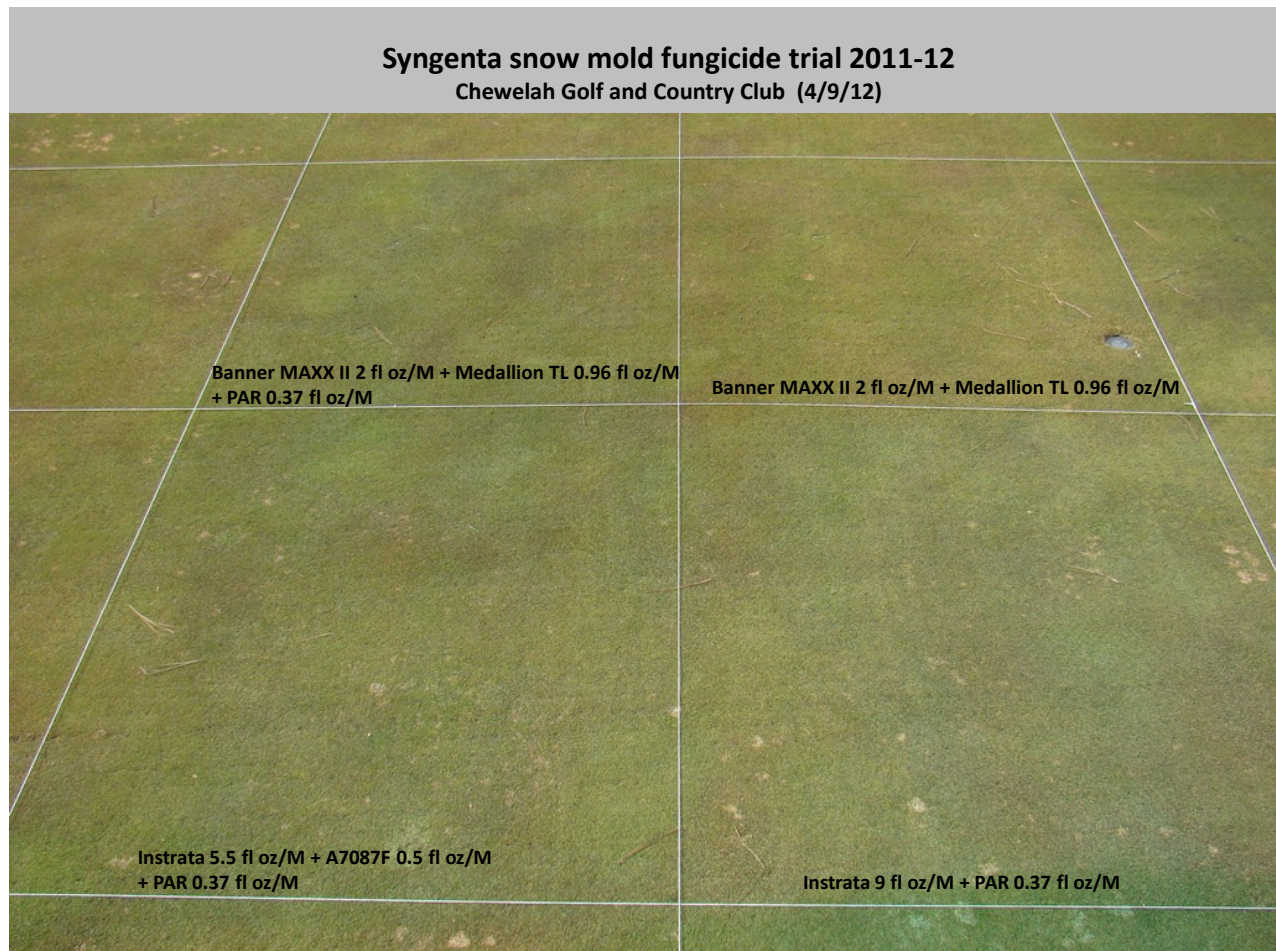




Fig. 18. Snow mold fungicide treatments on a 'Penncross' creeping bentgrass/annual bluegrass putting green at Chewelah Golf and Country Club in Chewelah, WA 9 Apr 2012.

