

SNOW MOLD CONTROL IN A MIXED CREEPING BENTGRASS AND ANNUAL BLUEGRASS FAIRWAY WITH VARIOUS FUNGICIDE, 2009-2010

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INTRODUCTION

Pink snow mold (*Microdochium nivale*) and gray snow mold (*Typhula incarnata*) are two common winter diseases in Pennsylvania and the surrounding region. Depending on snow cover, damage from one or both of these diseases may be apparent in the spring following snow melt. Since the length of snow cover is not predictable with any certainty prior to winter, golf course superintendents must rely on preventive applications of single or tank-mixed fungicides for the suppression of these diseases. The objective of this field study was to determine the efficacy of various commercially available and experimental fungicides on snow mold.

MATERIALS & METHODS

This field trial was initiated on the 17th fairway located at Yahnundasis Golf Club in New Hartford, NY. The fairways consisted of a mixed stand of creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*). The site was selected due to the prolonged period of snow cover from extensive shade provided by a large planting of pine trees (*Pinus* spp.) to the south of the study. Soil at the site was a loamy clay with a pH of 5.5 and 5.11% organic matter.

All fungicide treatments were applied with a CO₂ pressurized (40 psi) sprayer equipped with a flat-fan nozzle (AI9508E), and calibrated to deliver either 2.0 or 4.0 gal water per 1000 ft². Treatments were applied once on 2 December 2009.

Plots measured 3 ft x 6 ft, and were arranged in a randomized complete block with four replications. Percent of plot area blighted by either *M. nivale* and/or *T. incarnata* was assessed visually on a linear 0 to 100% scale where 0 = entire plot area green and healthy, and 100 = entire plot area blighted. In addition to disease ratings, injury was assessed following snow melt. Turfgrass injury was not severe and was therefore described as either present (=1) or absent (=0).

RESULTS & DISCUSSION

Trace levels of pink snow mold were present within the study area when treatments were applied on 2 December and disease activity was allowed to naturally progress during the winter months. A heavy snow covered the area the week after applications and generally remained in place for the duration of the study. Following snow melt in early March, disease symptoms were visible. Microscopic examination

confirmed the presence of both *M. nivale* and *T. incarnata* within the study site. During the rating, attempts were made to distinguish between the two based on the presence or absence of *T. incarnata* sclerotia.

Snow Mold. Snow mold pressure was moderate for the study site and a total of 16 to 24% snow mold symptoms were observed within the untreated control plots when plots were rated on 16 Mar 2010. Based on the presence of sclerotia, it appeared that a majority of symptoms within the untreated plots were caused by *T. incarnata*. All fungicide treatments provided statistically similar levels of suppression of both pink and gray snow mold. Although there were no statistical differences among plots treated with any fungicide or fungicide combination, plots treated with the following products had <1% snow mold visible and were generally considered to provide excellent control: QP chlorothalonil + QP Iprodion + QP myclobutanil; BASF 63700F; Daconil Ultrex + Banner MAXX; Daconil Ultrex + Chipco 26GT; QP Chlorothalonil + QP Iprodione; Disarm M; Instrata at 7.0 fl oz or greater; Concert + Chipco 26GT; Concert; Headway at both rates; and Reserve. Plots treated with Tourney (in 2.0 gal of water), Medallion alone, and Veranda were considered unacceptable ($\geq 5\%$ disease) although they were not statistically different from any fungicide treatment.

Injury. Very little injury was observed when plots were rated in the spring and injury was not consistent among all replications of treatments. Although injury was noticeable in select plots, no treatments resulted in unacceptable levels of injury.

Disease pressure within these studies was considered moderate and untreated control plots had significant damage from snow mold. Although both *M. nivale* and *T. incarnata* was positively identified within the study site and select plots appeared to be more heavily infested with one snow mold pathogen when compared to the other, distinguishing between the disease symptoms during the spring rating was difficult. For this reason, total percent plot area affected by all snow molds is the most reliable representation of the data. All fungicides evaluated in this study significantly reduced snow mold symptoms when compared to the untreated control. Future work should continue to evaluate single and tank-mix combinations for their efficacy on snow molds. Multiple sites with a history of either *M. nivale* or *T. incarnata* would further improve the findings and usefulness of this data. Additionally, variation in application volume strategies may result in an increase in fungicide efficacy for certain chemical classes and may be worth investigating further.

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Table 1. Percent grey and/or pink snow mold in creeping bentgrass and annual bluegrass fairway following the application of various fungicide, 16 Mar 2010.

Treatment and rate per 1000 sq ft ^z	PSM	GSM	Snow mold ^y
QP TM/C 6.0 fl oz + QP Ipro 2SE 4.0 fl oz + QP Propiconazole 2.0 fl oz	1.3 a ^x	0.0 c	1.3 c
QP TM/C 6.0 fl oz + QP Ipro 2SE 4.0 fl oz + QP Myclobutinaol 2.4 fl oz	1.0 a	3.1 c	4.1 c
QP Chlorothalonil 720 5.5 fl oz + QP Ipro 2SE 4.0 fl oz + QP Propiconazole 2.0 fl oz.....	1.0 a	0.0 c	1.0 c
QP Chlorothalonil 720 5.5 fl oz + QP Ipro 2SE 4.0 fl oz + QP Myclobutinaol 2.4 fl oz	0.3 a	0.0 c	0.3 c
Tourney 0.44 fl oz.....	5.0 a	0.3 c	5.3 c
Tourney 0.44 fl oz + Daconil Weather Stik 3.6 fl oz	1.5 a	0.0 c	1.5 c
Tourney 0.44 fl oz ^w	2.0 a	0.0 c	2.0 c
Tourney 0.44 fl oz + Daconil Weather Stik 3.6 fl oz ^w	1.4 a	0.3 c	1.6 c
BASF 67300F 2.25 lb	0.9 a	3.8 c	4.6 c
BASF 67300F 3.0 lb	0.3 a	0.3 c	0.5 c
Insignia 0.9 oz	0.8 a	0.8 c	1.5 c
Insignia 0.9 oz + Trinity 1.0 fl oz.....	2.1 a	0.0 c	2.1 c
Daconil Ultrex 5.0 oz + Banner MAXX 4.0 fl	0.0 a	0.3 c	0.3 c
Daconil Ultrex 5.0 oz + Chipco 26GT 4.0 fl oz	0.3a	0.0 c	0.3 c
QP Chlorothalonil 720 5.5 fl oz + QP Ipro 2SE 4.0 fl oz	0.0 a	0.3 c	0.3 c
Disarm C 5.9 fl oz.....	1.8 a	0.0 c	1.8 c
Disarm M 1.0 fl oz.....	0.9 a	0.0 c	0.9 c
Instrata 5.0 fl oz.....	1.0 a	0.0 c	1.0 c
Instrata 7.0 fl oz.....	3.5 a	0.0 c	3.5 c
Instrata 9.3 fl oz.....	0.1 a	0.0 c	0.1 c
Instrata 11.0 fl oz.....	0.0 a	0.0 c	0.0 c
Medallion 0.5 oz + Banner MAXX 4.0 fl oz.....	0.1 a	0.5 c	0.6 c
Medallion 0.25 oz + Banner MAXX 2.0 fl oz.....	1.3 a	0.1 c	1.4 c
Medallion 0.5 oz	0.0 a	6.3 c	6.3 c
Banner MAXX 4.0 fl oz	1.0 a	2.3 c	3.3 c
Eagle 2.4 fl oz.....	1.3 a	1.3 c	2.5 c
Trinity 2.0 fl oz	1.4 a	0.0 c	1.4 c
Heritage TL 3.5 fl oz	0.1 a	1.0 c	1.1 c
Concert 8.5 fl oz	1.0 a	0.0 c	1.0 c
Concert 4.25 fl oz + Chipco 26GT 2.0 fl oz	0.3 a	0.0 c	0.3 c
Chipco 26GT 2.0 fl oz.....	1.5 a	1.8 c	3.3 c
Concert 4.25 fl oz	0.8 a	0.0 c	0.8 c
Headway 1.5 fl oz.....	0.1 a	0.0 c	0.1 c
Headway 3.0 fl oz.....	0.0 a	0.3 c	0.3 c
Triton FLO 1.1 fl oz.....	0.0 a	1.3 c	1.3 c
Veranda 1.0 oz	0.8 a	4.5 c	5.3 c
Reserve 3.6 fl oz.....	0.4 a	0.0 c	0.4 c
PCNP 12 fl oz.....	1.0 a	0.8 c	1.8 c
Untreated.....	1.0 a	15.0 b	16.0 b
Untreated.....	0.0 a	24.0 a	24.0 a

^z Treatments were applied on 2 Dec 2009.

^y Percent of plot area blighted by either snow mold pathogen (PSM = pink snow mold; GSM = gray snow mold) was assessed visually on a linear 0 to 100% scale where 0 = entire plot area green and healthy, ≥ 5% = unacceptable disease pressure for a golf course fairway, and 100 = entire plot area blighted.

^x Means in a column followed by the same letter are not significantly different at $P \leq 0.05$ level according to the Fisher's protected least significant difference t-test.

^w Designated treatments were applied in 4.0 gal of water per 1000 sq ft.