

EVALUATION OF ANTI-DESICCANTS TO REDUCE WINTER-RELATED INJURY ON A GOLF COURSE PUTTING GREEN.

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INTRODUCTION

Winter damage can often occur on golf course putting greens in situations where either 1) prolonged periods of snow cover result in increased snow mold (*Microdochium nivale* and/or *Typhula* spp); or 2) exposed greens are subject to high winds resulting in turf desiccation. To combat the development of snow mold, most golf course superintendents apply fungicides prior to snow fall. In situations where snowfall is limited and desiccation potential increased, however, the use of these products may not prevent the physiological damage resulting from desiccation. The objective of this study was to evaluate two anti-desiccants at varying rates alone and in combination with Insignia for their ability to suppress snow mold and/or desiccation.

MATERIALS & METHODS

Two field studies were initiated in January 2010. Identical studies were established on a golf course putting green at the Penn State Blue Course and a research putting green at the Valentine Turfgrass Research Facility located in State College and University Park, PA, respectively. Both putting greens consisted of a mixture of creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*). Soil at the Penn State Blue Course putting green consisted of a modified sand with a pH of 7.2 and 0.5% organic matter. Soil for the site located at Valentine was a modified sand with a pH of 7.1 and 1.8% organic matter.

All fungicide treatments were applied with a CO₂ pressurized (40 psi) sprayer equipped with a flat-fan nozzle (8010E), and calibrated to deliver either 2.3 gal water per 1000 ft². Treatments were applied once on 14 January 2010. All treatments are listed in the data tables.

Plots measured 3 ft x 6 ft, and were arranged in a randomized complete block with either three (Valentine) or four (Penn State Blue Course) replications. Percent of plot area blighted by *M. nivale* 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 in the form of discoloration and potential desiccation damage was rated on a 0 to 5 scale where 0 = no injury observed, 2 = minimum acceptable injury for a golf course putting green, and 5 = entire plot area brown or dead. All data was subjected to analysis of variance using ARM 8.2 and means separated at $P \leq 0.05$ using Fisher's protected LSD test.

RESULTS

Following application of all products on 14 January, the area was blanketed with snow. Therefore no phytotoxicity ratings were able to be recorded 1 week after treatment. Snow cover remained on both study sites until early March.

Limited snow mold or desiccation damage was observed in either study site when plots were rated on 10 March. At the Valentine Turfgrass Research Facility location, no differences were observed among any treatments. Desiccation damage was not observed and pink snow mold averaged 2.0 to 7.3% in the varying plots. At the Penn State Golf Course location, no differences in desiccation were observed among any treatments. However, discoloration was visible in the study site and plots treated with Insignia alone or in combination with both FreshSeal products resulted in unacceptable or near-unacceptable injury. Differences in percent plot area affected by pink snow mold were observed among treatments at the golf course location. Although disease pressure was low, plots treated with Insignia or FreshSeal BR

+ Insignia had the lowest amount of disease and were significantly different when compared to the untreated control plots. Similar levels of control were observed within plots treated with FreshSeal CHC + Insignia. The greatest percent of plot affected by disease was observed within plots treated with either rate of FreshSeal BR, but no significant differences were observed between these treatments and other treatments in which Insignia was not included.

DISCUSSION

The potential benefits of the evaluated anti-desiccants in this study were not clear due to limited disease pressure and desiccation at both study sites. Based on the limited results from this study, Insignia was able to reduce pink snow mold symptoms when applied alone or in combination with either FreshSeal product. However, these plots also appeared to have the most injury once the snow melted. Injury levels, however, were not severe. Future work on the efficacy of FreshSeal to reduce desiccation is needed to determine the true benefits of these products during a severe winter. It appears, however, that tank-mixes of these products with an effective snow mold fungicide will be essential.

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Table 1. Turfgrass desiccation and percent pink snow mold (*Microdochium nivale*) on a research putting green located at the Valentine Turfgrass Research Facility following the application of various anti-desiccants and Insignia, 2010.

Treatment and rate per 1000 sq ft ^x	Desiccation ^z	Pink Snow mold ^y
	10 Mar	
	(0-5)	%
FreshSeal BR 3% v/v	1.3 a ^w	6.0 a
FreshSeal BR 6% v/v	0.7 a	7.3 a
FreshSeal CHC 0.25% v/v	1.0 a	7.3 a
FreshSeal CHC 0.5% v/v	1.0 a	3.3 a
Insignia SC 0.54 fl oz	1.0 a	2.0 a
FreshSeal BR 3% v/v + Insignia SC 0.54 fl oz	1.0 a	3.3 a
FreshSeal CHC 0.25% v/v Insignia SC 0.54 fl oz	0.3 a	4.7 a
Untreated	1.0 a	4.7 a

^z Turfgrass desiccation was rated on a 0 to 5 scale where 0 = no discoloration or damage was observed; 2 = minimum acceptable damage for a golf course putting green; and 5 = entire plot brown or dead.

^z Percent plot area affected by pink snow mold was visually rated on a 0 to 100% scale where 0 = no snow mold symptoms present and 100 = entire plot area infested by snow mold.

^y Treatments were applied on 14 Jan.

^w 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.

Table 2. Turfgrass desiccation and percent pink snow mold (*Microdochium nivale*) on a golf course putting green located at the Penn State Blue Course following the application of various anti-desiccants and Insignia, 2010.

Treatment and rate per 1000 sq ft ^x	Desiccation ^z	Pink snow mold ^y
	(0-5)	10 Mar %
FreshSeal BR 3% v/v	0.8 a ^w	5.5 a
FreshSeal BR 6% v/v	1.5 a	5.3 a
FreshSeal CHC 0.25% v/v	1.8 a	2.4 abc
FreshSeal CHC 0.5% v/v	1.0 a	3.8 abc
Insignia SC 0.54 fl oz	2.3 a	1.0 c
FreshSeal BR 3% v/v + Insignia SC 0.54 fl oz	2.3 a	1.1 c
FreshSeal CHC 0.25% v/v Insignia SC 0.54 fl oz	2.0 a	1.3 bc
Untreated	0.8 a	4.8 ab

^z Turfgrass desiccation was rated on a 0 to 5 scale where 0 = no discoloration or damage was observed; 2 = minimum acceptable damage for a golf course putting green; and 5 = entire plot brown or dead.

^z Percent plot area affected by pink snow mold was visually rated on a 0 to 100% scale where 0 = no snow mold symptoms present and 100 = entire plot area infested by snow mold.

^y Treatments were applied on 14 Jan.

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