

The Effects of Various Fungicides on the Control of Overwintering Diseases 2010-11

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Summary

This trial was initiated at two sites, Candle Lake Golf Course and Greywolf Golf Resort, to test the efficacy of two new fungicides that are mixtures of three active ingredients. The predominant disease was pink snow mould at both sites and stand symptoms at Candle Lake indicated that cottony snow mould may also have been present. Disease pressure was considered to be low at Greywolf and moderate at Candle Lake. Both products, Instrata and Legacy G (now registered as Trilogy SC), were very effective in controlling diseases with a single application. This single application may provide sufficient protection when disease pressure is low to moderate.

Introduction

Fine turfgrasses, which are not protected by fungicides are predisposed to damage caused by snow moulds. On golf greens, where creeping bentgrass (*Agrostis palustris*) or annual bluegrass (*Poa annua*) are the predominant species disease damage is a frequent occurrence. Turfgrasses weakened or damaged by snow moulds are extremely slow to recover and are often invaded by opportunistic weedy grass species.

Synthetic fungicides are registered for the prevention of diseases on putting greens through the Pest Management Regulatory Agency, a department within Health Canada. Individual fungicides are most frequently used, but for snow moulds research has shown that a tank mix of fungicides can provide better protection. In addition, research has shown that two applications of the same product are more effective than a single application. Therefore, the industry standard is to make two applications of a tank mix, usually of two fungicides. Recently, fungicides that have been formulated with three active ingredients have shown good effectiveness. This study was developed to test some of these new formulations applied as a single application in areas that typically have high disease pressure.

Materials and Methods

Trials were located on nursery greens at the Candle Lake Golf Course, in Candle Lake, Saskatchewan and at the Greywolf Golf Resort in Panorama, British Columbia. The sites were chosen due to consistently high disease pressure due to the long duration of snow cover. Plots measuring 1 x 2 meters were arranged in a randomized complete block design with four replications. A 0.5 meter buffer was maintained around each plot. Treatments were applied with a compressed air sprayer that was equipped with TeeJet 8004 nozzles and calibrated to apply 10 litres/100m². For this trial, the products were applied as a single application on November 8, 2010 at the Candle Lake site and on November 11, 2010 at the Greywolf site.

Insert Greywolf1

The two products tested were formulated mixes of three fungicides. Instrata is formulated from the fungicides: chlorothalonil (29.9% active ingredient), propiconazole (4.7% active) and

fludioxonil (1.2% active). The product Legacy G (now registered as Trilogy SC) has the actives: iprodione (29.41% active), triticonazole (3.14% active) and trifloxystrobin (1.47% active).

Soon after snow melt, the effectiveness of the treatments were assessed by rating the percent area damaged by snow mould. The Candle Lake site was rated on May 2, while the Greywolf site was rated on May 10, 2011.

Insert Candle nursery1

Ten turf samples were collected from each site and screened in the laboratory to determine the pathogen(s) that were present. Individual plant parts were examined under a microscope for identifying features of individual diseases. To determine if grey snow mould was present, samples were incubated for 14 days and then examined for sclerotia that may have developed. Lastly, fungal structures collected in Candle Lake, which were thought to be sclerotia, were placed on culture plates of potato-dextrose agar and allowed to grow on for a period of three weeks.

Table 1 - List of treatments applied at each site.

Product	Application Rate
1. Untreated control	****
2. Instrata	160mls/100m ²
3. Instrata	260mls/100m ²
4. Instrata	350mls/100m ²
5. Instrata	700mls/100m ²
6. Legacy G (Trilogy SC)	100mls/100m ²
7. Legacy G (Trilogy SC)	177mls/100m ²
8. Legacy G (Trilogy SC)	260mls/100m ²

Results

Weather Conditions 2010-11

Permanent snow cover developed on the day of application at Candle Lake and was present until April 24 when snow melt was complete. Snow cover duration was approximately 165 days and maximum snow depth was 80 cm. Greywolf received a permanent snow cover on November 20 and snow melt was complete by May 1. Duration of snow cover was approximately 160 days and maximum snow depth was 105 cm.

Determination of Pathogens Present

It is not uncommon to find colonies of both pink and grey snow mould coexisting in close proximity to each other. Because control options differ with each organism it is important to identify the primary disease.

When plots were rated at Candle Lake, the site was relatively dry and mycelium was not observed. Turf stand symptoms that had two distinctly different shapes were observed on the plot area. The majority of the patches were circular in nature and bleached in colour. Some patches had become quite large as a number of smaller patches had grown together. These stand symptoms are consistent with pink snow mould (*Microdochium nivale*). Symptoms of a different shape were thought to be produced by cottony snow mould (*Coprinus psychromorbidus*). Cottony snow mould patches tend to be small and irregularly shaped and often do not grow together resulting in narrow strips of uninfected turf visible at the margins. There was evidence of these stand symptoms at Candle Lake. Previous research conducted at this location in the 1990's had confirmed the presence of this disease.

Although, the snow cover had disappeared prior to assessment, some mycelium was still evident on the turf surface at the Greywolf site. It was appeared that only one disease type existed, pink snow mould. In previous years, Greywolf has had a high incidence of grey snow mould (*Typhula ishikariensis*) as evidenced by numerous pepper-like sclerotia on the leaves. This year, we were unable to find any sclerotia.

Ten turf samples were collected from each site and screened in the laboratory to determine the pathogen(s) that were present. When examined under the microscope, conidia of pink snow mould were found on all samples. None of the samples that were incubated for 14 days developed sclerotia of grey snow mould. Examination of the cultured samples did not reveal structures consistent with cottony snow mould.

Efficacy of the Various Treatments

All product applications were significantly better than the untreated control (Table 2). It appeared that there may have been a rate response as both low rates of application for the Legacy G and the Instrata has slightly higher percentages of damage. The highest rate of the Instrata showed some discolouration of the turf and possibly an increase in disease. This would indicate that there was no benefit to applying this product at a higher rate. Both products appeared to provide very effective control with a single application of product.

Insert Greywolf UTC1

Table- 2 Percent area damaged by snow mould, combined site analysis spring 2011.

Product	2011 Spring Rating
	% area damage
Instrata 160mls/100m ²	5.7b
Instrata 260mls/100m ²	2.7b
Instrata 350mls/100m ²	2.8b
Instrata 700mls/100m ²	5.5b
Legacy G 100mls/100m ²	7.6b
Legacy G 177mls/100m ²	3.6b
Legacy G 260mls/100m ²	3.8b
Untreated control	42.1a

LSD_{0.05} =

Insert Trilogy 260

Insert Instrata 260

Discussion

Disease pressure was considered to be moderate i.e. in the range of 40-60%. Although both of these products were very effective with a single application, they would not likely be as effective if disease pressure was in the very high range (80-100%). Generally, disease pressure in the Canadian Prairies has been low to moderate (20-60%) over the last decade and this single application at the tested rates may be enough to provide adequate control.