

Localized Dry Spot Eradication on a Sand Based Putting Green

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Summary

A simple study was established in order to determine if it was possible to eradicate or reduce the effects of localized dry spot (LDS) on a USGA specification putting green. A single application of Primer 604 was compared with a granular and a liquid experimental product and was either applied once or three times. All treatments reduced LDS symptoms when assessed 28 days after the initial treatment. There were no differences between the various treatments when volumetric water content was assessed. Multiple applications were no more effective than single applications. This would indicate that it is not necessary to make any more than one application to reduce the symptoms of LDS. Although there were slight differences between the granular and liquid applications, the differences were so small that they were not considered significant. From this short term study it would appear that it is not possible to completely eradicate LDS with wetting agents.

Introduction

Localized dry spot (LDS) is a condition that often occurs on USGA sand based putting greens. These irregularly shaped areas are very difficult to wet and the turf suffers as a result of moisture stress.

These spots are thought to be as a result of excretions that coat soil particles from microbes that reside in the soil. These excretions eventually bridge pore spaces and restrict water flow. When sufficient pore spaces are clogged the soil becomes very difficult to wet.

Wetting agents have long been used to counter the effects of LDS. These non-ionic products are thought to improve the ability of the coated sand particle to attract water and thus wet more uniformly. The negative effects of the LDS is reduced when this occurs.

This test was conducted to determine if it was possible to eradicate or reduce the effects of LDS on a USGA specification putting green.

Methodology

This study was undertaken on a USGA sand based putting green that had previously exhibited visible signs of LDS. The Penncross creeping bentgrass green was nine years and was located at the Prairie Turfgrass Research Centre at Olds College (Olds, Alberta). Treatments were applied to plots that measured 0.5 by 0.5 metres and that contained an individual LDS. Each plot was replicated three times. The location of each plot was identified and staked to allow for future reference.

An initial assessment was conducted for two factors: the percent area symptomatic of LDS and the average volumetric water content within each plot. Localized dry spot was visually determined by estimating the percent area symptomatic of LDS. The average volumetric soil moisture content of each plot was determined using a Campbell Scientific HydroSense meter.

Three wetting agents were applied to each of the LDS and were compared with an untreated control. The treatments were either applied as a single application or applied

weekly for a period of three weeks. Specific information on the treatments is listed in table 1.

Table 1- Treatment schedule for LDS eradication study, August 2005.

Products	Formulation	Product Rate	Application Timing
Primer 604 Liquid Non-ionic surfactant	Liquid	125mls/100m ²	1. A Single application 2. Three consecutive weekly applications
Product A Non-ionic surfactant	Liquid	190mls/100m ²	1. A Single application 2. Three consecutive weekly applications
Product B Non-ionic surfactant	granular blend	1.8kg/100m ²	1. A Single application 2. Three consecutive weekly applications
Untreated Control			1. A Single application

The liquid treatments were mixed with water and applied with a compressed CO₂ sprayer, while the granular product was individually weighed into plot sized lots and applied by hand using a simple shaker bottle. The products were watered in soon after all the treatments were placed.

After four weeks the plots were once again evaluated. The percent of visible LDS and the average volumetric soil moisture content of each plot were determined.

Data was analyzed using a computerized statistic program. Normally, data is analyzed at the 95% confidence level, but due to great variability from plot to plot the data in this experiment was analyzed at the 90% level. This means that there was a 10% chance that the difference in the results was due to some other factor than the products tested.

Results

Precipitation prior to and during the test period was well above average. Natural precipitation was thought to reduce the symptoms of LDS.

Initially, visual LDS ranged from 25-47% area that had symptoms. All treatments reduced LDS symptoms when assessed 28 days after the initial treatment. The treatments Primer 604 (single application), Primer 604 (weekly application), and the treatments Product B granular (single application) and Product B granular (weekly application) were the most effective.

There were no differences between the various treatments when volumetric water content was assessed.

Multiple applications were no more effective than single applications. This would indicate that it is not necessary to make any more than one application to reduce the symptoms of LDS.

Although there were slight differences between the granular and liquid applications, the differences were so small that they were not considered significant.

Table 2 - Localized dry spot reduction trial, August 2005

Treatments	Percent of plot area with visible dry spot			Percent volumetric soil moisture content		
	0DAT	28DAT	% Change	0DAT	28DAT	% Change
Untreated Control	33% ^a	28% ^a	5% ^c	16% ^a	16% ^a	-1% ^a
Primer 604 (liquid) 125mls/100m ² Single application	41% ^a	5% ^a	36% ^a	18% ^a	19% ^a	1% ^a
Primer 604 (liquid) 125mls/100m ² Weekly applications	39% ^a	14% ^a	24% ^{ab}	12% ^a	15% ^a	3% ^a
Product A (liquid) 190mls/100m ² Single application	39% ^a	21% ^a	17% ^{bc}	12% ^a	12% ^a	0% ^a
Product A (liquid) 190mls/100m ² Weekly applications	25% ^a	5% ^a	20% ^{bc}	18% ^a	20% ^a	2% ^a
Product B (granular) 1.8kg/100m ² Single application	41% ^a	20% ^a	21% ^{ab}	13% ^a	14% ^a	1% ^a
Product B (granular) 1.8kg/100m ² Weekly applications	47% ^a	16% ^a	31% ^{ab}	12% ^a	12% ^a	0% ^a
LSD _{0.10} =	n/s	n/s	15	n/s	n/s	n/s

* Values that have the same letter are not significantly different from each other at the 90% confidence level.

Discussion

The objective of this test was to determine if it was possible to eliminate LDS with multiple applications of wetting agent. From this short term study it would appear that this was not possible and in fact, multiple applications were no more effective than single applications.