Pest e-alerts

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Controlling Large Patch of Zoysiagrass in Oklahoma

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For those of you with clients who have Zoysiagrass, you know that large patch can be a pretty significant problem. While the symptoms of large patch are typically observed in Oklahoma in the spring during green up, now is the time to treat for the disease. I often get questions on what fungicides work best to control large patch and when should those products be applied. To address these questions, I'm going to present some data from two fungicide evaluations that examined the efficacy of various products and also the timing of fungicide application for several of those products. The first trial was established in the fall of 2009 (rated for symptoms, spring 2010) and the second trial was established in the fall of 2010 (rated for symptoms, spring 2011).

For both trials, plots were 3 ft wide and 5 ft long with 2-ft alleys between plots. The turfgrass used was a mature stand of Zoysiagrass ('Meyer') established on a Norge loam soil. The experimental design was a randomized complete block with eight replicates. Recommended maintenance and irrigation practices were followed throughout the growing season. However,

irrigation and nitrogen inputs were increased after infestation to encourage disease. Plots were infested with the fungus *Rhizoctonia solani* on 22 Sep 2009 (2009 trial) or 1 Oct 2010 (2010 trial). Fungicides were applied with a CO_2-pressurized wheelbarrow sprayer equipped with TX8008 flat fan nozzles and calibrated to deliver 87 gal/A or 2 gal/1,000 ft^2. One, two, or three fungicide treatments were applied. For treatments with two applications of fungicide, spray intervals over the two trials were 14-, 21-, or 28-days. For treatments with three applications, the first two sprays were made in the fall and the third applications made in the spring after the initiation of "green up" (10% green-up or when disease noted in checks). First application of fungicide was based on soil temperature. In Oklahoma we recommend applying fungicide when the 4" under-sod soil temperatures average around 72° F. This results in a "preventative" application of fungicide. Evidence suggests that the large patch subgroup of *Rhizoctonia solani* becomes active at soil temperatures less than or equal to 70° F. So by applying fungicide at 72° F, it is assumed that the fungicide is present in and on the plant, before the fungus become active.

Specific spray dates for both years are as follows:

Fall 2009
Single applications: 18 Sep (4" soil temperature = 73° F)
14-day interval: 18 Sep, 2 Oct
21-day interval: 18 Sep, 10 Oct
28-day interval: 18 Sep, 16 Oct

Fall 2010
Single applications: 30 Sep (4" soil temperature = 72° F)
21-day interval: 30 Sep, 21 Oct
28-day interval: 30 Sep, 28 Oc.
Additional spring applications at 10% green up: 22 Mar 2011
Additional spring applications when disease in non-treated checks noted: 26 Apr 2011

Ratings of disease severity (percent of plot with symptoms of large patch) and turfgrass quality (scale of 1 - 9 where 1 = no turf present, 5 = unacceptable turfgrass, 6 = acceptable turf, 9 = dense, dark color, thick stand of turfgrass) where made on 21 May 2010 (fall 2009 trial) and 6 May 2011 (fall 2010 trial).

During the 2009 trial, weather conditions were unseasonably cold with extended snow cover during the dormant period. Conditions during spring green-up were wet and mild. In the 2010 trial, weather conditions were abnormally dry prior to the onset of turfgrass dormancy in the fall of 2010 and during the dormant season. Weather conditions during spring green-up were also unseasonably dry but temperatures were mild.

For ratings on 21 May 2010, highest levels of disease severity were recorded in plots treated with OSU EXP, which was not significantly different from plots treated with Endorse WP, one application each of Prostar 70WG and Chipco Triton 70WDG, and the non-treated control (Fig

1). All plots treated with Disarm 480SC exhibited no disease symptoms. Plots treated with two applications of Prostar 70WG and Chipco Triton 70WDG had levels of disease that were similar to plots treated with Disarm 480SC, but were not significantly different from the non-treated control. Turf quality was lowest for plots treated with OSU EXP, Endorse WP, one application each of Prostar 70WG and Chipco Triton 70WDG, and the non-treated control (Fig 2). All other plots treated with fungicide had significantly higher turf quality compared to the non-treated control with the exception of plots treated with Prostar 70WG (21-day interval), Chipco Triton 70WDG (21-day interval 0.45 oz/0.3 oz), and Chipco Triton 70WDG (21-day interval 0.45 oz). No symptoms of phytotoxicity were observed in this trial.

Because of the dry conditions in the fall of 2010 and spring of 2011, disease severity on 6 May 2011 was lower than in the previous trial; however, there was significant disease severity in the non-treated control plots (Fig 3). Highest levels of disease severity were recorded in plots not treated with fungicide (76% severity). No symptoms of large patch were recorded in plots treated with fungicide, with the exception of a small amount of disease (1% severity) in the treatment composed of Prostar at 2.2 oz/1000 ft^2, followed by Triton FLO at 0.5 oz/1000 ft^2, and a third application of Triton FLO at 0.75 oz/1000 ft^2 applied in the spring. Turfgrass quality in the non-treated plots was considered unacceptable, while quality in plots that received fungicide was high (Fig 4). No Symptoms of phytotoxicity were observed in this trial.

Considering the results over these two studies, it is apparent that disease is strongly dependent on moisture levels in the fall. If it is unseasonably dry, infections may be fewer in quantity or the duration that infections could occur might be less, resulting in fewer fungicides required to control disease (see 6 May 2011 ratings). However, in years when it is “wet” in the fall, it is apparent that infections may occur at a higher frequency or over a longer period of time resulting in the need for two applications of fungicides (see 21 May 2010 ratings). However, the duration between the two applications of fungicides does not seem to have an effect of disease control, just as long as two applications were applied. One exception exists with Disarm 480SC (fluoxastrobin) where only one application was needed for complete control of large patch. This product is a Strobilurin fungicide (same class as Heritage) and has been very effective for controlling large patch in our trials. In general this class of fungicides works marginally better (often not statistically significant) than other classes of fungicides (DMIs or carboximides) in large patch trials in Oklahoma. As for a third spray in the spring, we observed no improved control by adding this extra spray (and expense).

Dr. Richard Grantham
Director, Plant Disease and Insect Diagnostic Laboratory

Fig 1.

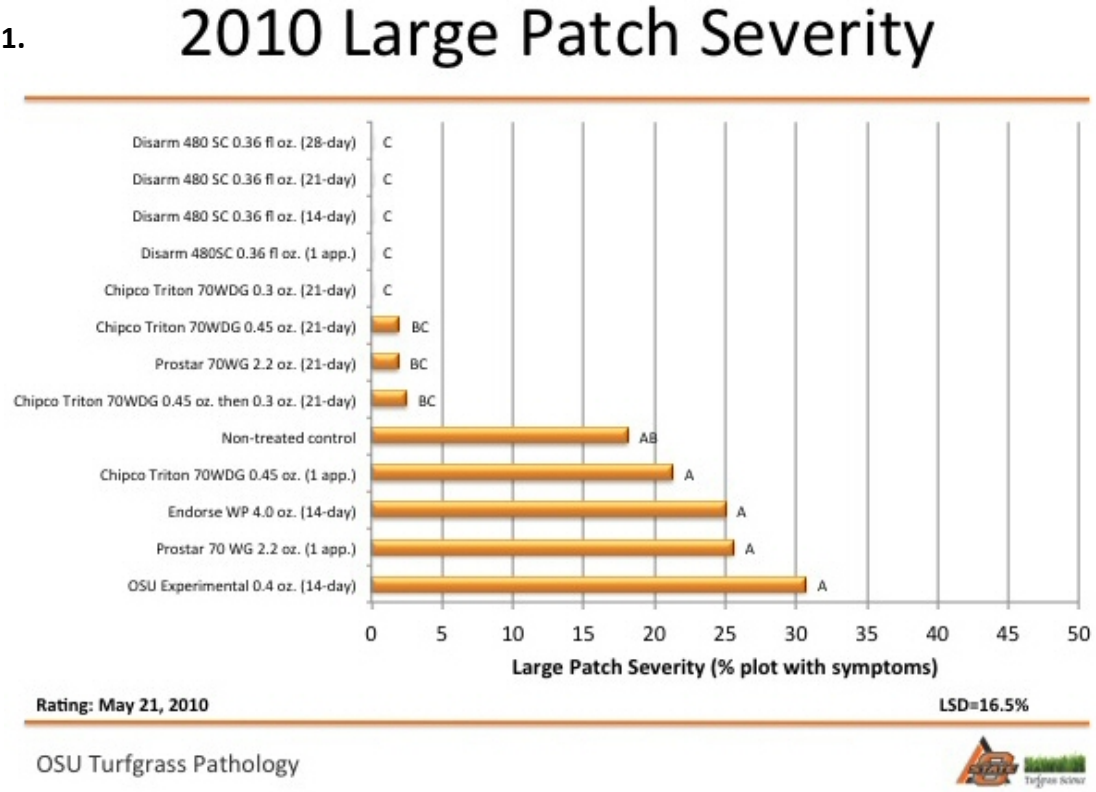

2010 Large Patch Severity
Disarm 480 SC 0.36 fl oz. (28-day) C
Disarm 480 SC 0.36 fl oz. (21-day) C
Disarm 480 SC 0.36 fl oz. (14-day) C
Disarm 480SC 0.36 fl oz. (1 app.) C
Chipco Triton 70WDG 0.3 oz. (21-day) C
Chipco Triton 70WDG 0.45 oz. (21-day) BC
Prostar 70WG 2.2 oz. (21-day) BC
Chipco Triton 70WDG 0.45 oz. then 0.3 oz. (21-day) BC
Non-treated control AB
Chipco Triton 70WDG 0.45 oz. (1 app.) A
Endorse WP 4.0 oz. (14-day) A
Prostar 70 WG 2.2 oz. (1 app.) A
OSU Experimental 0.4 oz. (14-day) A
0 5 10 15 20 25 30 35 40 45 50
Large Patch Severity (% plot with symptoms)
Rating: May 21, 2010
LSD=16.5%
OSU Turfgrass Pathology

Fig 2.

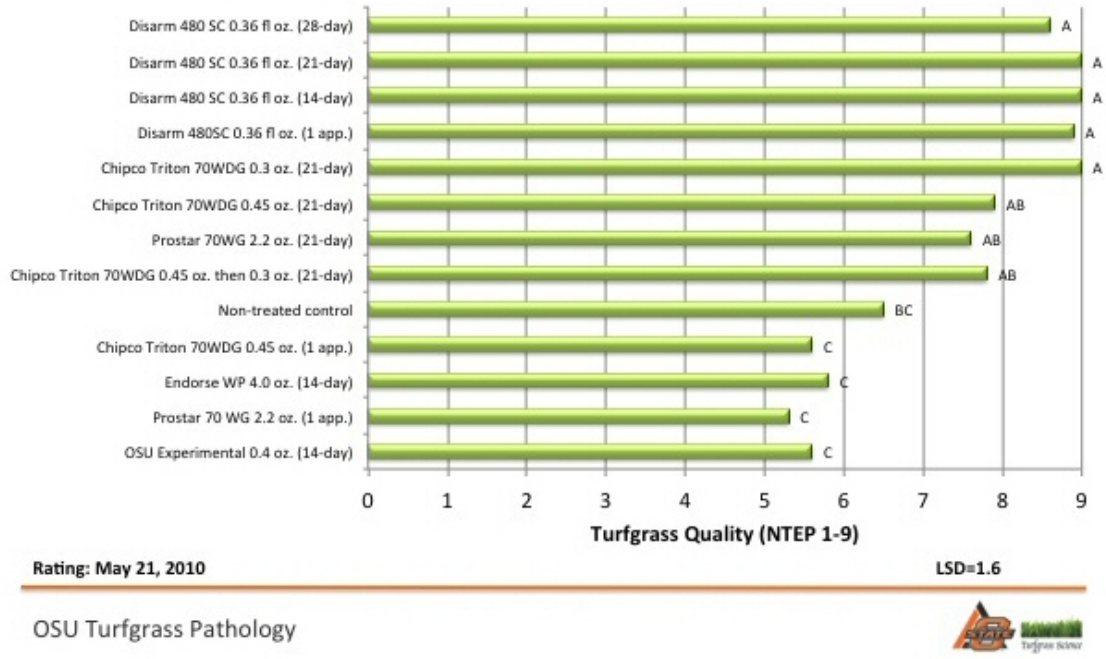
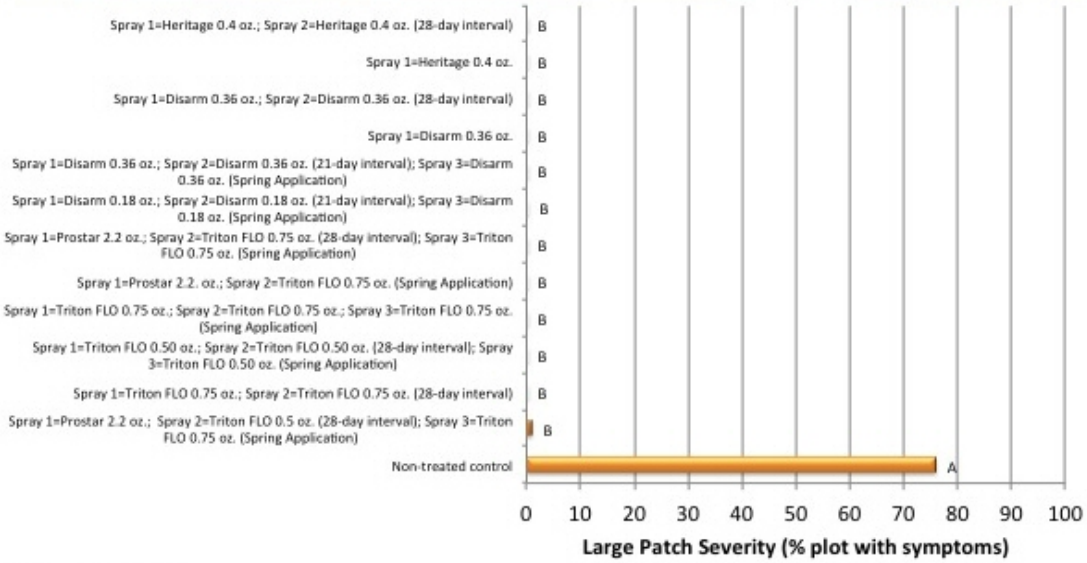

2010 Turfgrass Quality
Disarm 480 SC 0.36 fl oz. (28-day) A
Disarm 480 SC 0.36 fl oz. (21-day) A
Disarm 480 SC 0.36 fl oz. (14-day) A
Disarm 480SC 0.36 fl oz. (1 app.) A
Chipco Triton 70WDG 0.3 oz. (21-day) A
Chipco Triton 70WDG 0.45 oz. (21-day) AB
Prostar 70WG 2.2 oz. (21-day) AB
Chipco Triton 70WDG 0.45 oz. then 0.3 oz. (21-day) AB
Non-treated control BC
Chipco Triton 70WDG 0.45 oz. (1 app.) C
Endorse WP 4.0 oz. (14-day) C
Prostar 70 WG 2.2 oz. (1 app.) C
OSU Experimental 0.4 oz. (14-day) C
0 1 2 3 4 5 6 7 8 9
Turfgrass Quality (NTEP 1-9)
Rating: May 21, 2010
LSD=1.6
OSU Turfgrass Pathology

Fig 3.

2011 Large Patch Severity

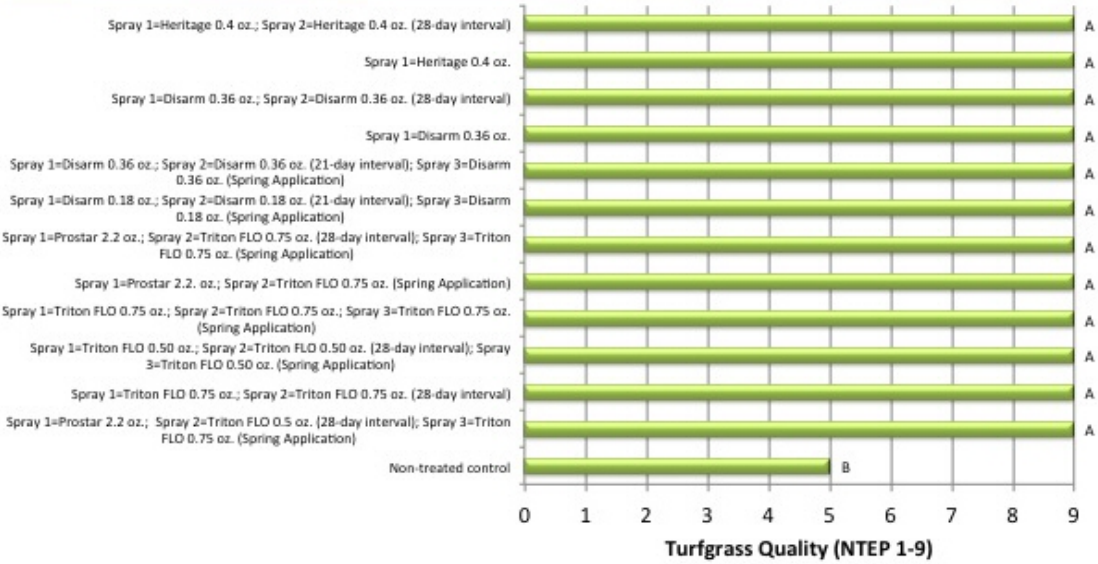


Rating: May 6, 2011 **LSD=13.0%**

OSU Turfgrass Pathology

Fig 4.

2011 Turfgrass Quality



Rating: May 6, 2011 **LSD=0.6**

OSU Turfgrass Pathology