



# Evaluation of Fungicides for the Control of Powdery Mildew and Cercospora Leaf Spot of Hydrangea

Christina Jennings, Prabha Liyanapathirana, Terri Simmons, and Fulya Baysal-Gurel

Tennessee State University, Otis L. Floyd Nursery Research Center 472 Cadillac Lane, McMinnville, TN 37110.

[fbaysalg@tnstate.edu](mailto:fbaysalg@tnstate.edu)



## Abstract

Powdery mildew (*Golovinomyces orontii*) is able to infect a large variety of host. The pathogen is not considered fatal; however, it can cause plant damage if severe enough. If infected plants are outdoors, the pathogen can overwinter on the plant or in plant debris. If in the greenhouse, it can persist throughout the year. Cercospora leaf spot (*Cercospora hydrangea*) affects a large variety of hydrangea plants and can be seen most commonly from July to October. This pathogen rarely kills the plant but can stunt the plant through repeated defoliation. Plant debris serve as a way for the pathogen to overwinter. The purpose of this study was to evaluate the efficacy of the chosen fungicides in their control of both powdery mildew and Cercospora leaf spot. Big leaf hydrangea (*Hydrangea macrophylla*) developed both diseases from natural inoculum. After disease onset, plants were treated every 14 days or 7 days depending on the treatment and evaluated every 7 days. Powdery mildew and Cercospora leaf spot disease pressures were low to moderate with non-treated control plants showing 33.3% and 16.7% disease severity by the end of the trial, respectively. All tested fungicides, which were Mural, Cease and KleenGrow, significantly reduced disease severity compared to the non-treated control plants. Mural provided the best control of disease severity and area under the disease progress curve (AUDPC) for both powdery mildew and Cercospora leaf spot. All treatments would be beneficial to a treatment plan for powdery mildew and Cercospora leaf spot.

## Introduction

- Powdery mildew (*Golovinomyces orontii*) is an infectious disease that causes a powdery mildew on the surface of leaves.
- Cercospora leaf spot (*Cercospora hydrangea*) is a disease on hydrangea that presents itself initially as a purple spot that spreads and becomes an irregular shape with a tan or gray center.
- Both diseases can overwinter in leaf debris and be spread via plants having close proximity to one another. Overhead water splash may also be able to spread both diseases.
- For management, plants can be spaced apart, watered with drip application, cleaning of plant debris and regularly scouted to spot early onset of disease.
- Cultural practices plus rotational application of fungicides and biofungicides is one of the most effective methods of disease control in susceptible plants.

## Objective

The objective of this study was to test the efficacy of fungicides to control powdery mildew and Cercospora leaf spot of hydrangea.

*G. orontii* infected hydrangea



*C. hydrangea* infected hydrangea



## Materials and Methods

- Hydrangea (*Hydrangea macrophylla*) 'Nikko Blue' plants were naturally infected.
- Plants were placed in a completely randomized design with six single-plant replications per treatment.
- Treatments were applied every 14 (Mural and KleenGrow) or 7 (Cease) days as a spray using a CO<sub>2</sub>-pressurized sprayer.
- Plants were evaluated every 7 days for disease severity and phytotoxicity.
- One-way analysis of variance was performed using the general linear model's procedure with SAS v. 9.4 statistical software and means were separated using Fisher's LSD test.

## Results

Table 1. Efficacy of fungicides for the control of powdery mildew and Cercospora leaf spot of hydrangea.

Treatment and rate/100 gal	Application dates*	Powdery mildew		Cercospora leaf spot		Defoliation (%)	Height increase (in.)
		Mean severity (%)	AUDPC	Mean severity (%)	AUDPC		
Mural 45WG 6 oz	1, 3, 5	3.8 c	73.2 c	7.5 c	99.8 c	0.7 c	7.6 a
Cease 8 qt	1, 2, 3, 4, 5	12.9 b	202.1 b	12.1 b	159.5 b	6.0 bc	5.6 a
KleenGrow 0.25 fl oz/gal	1, 3, 5	10.8 b	135.3 bc	10.0 bc	127.8 bc	10.0 ab	6.4 a
Non-treated control	-	33.3 a	613.7 a	16.7 a	300.4 a	16.7 a	8.3 a
P-value	-	<0.0001	<0.0001	0.0008	<0.0001	0.001	0.5

\*Application dates: 1 = 25 May; 2 = 1 Jun; 3 = 8 Jun; 4 = 15 Jun; 5 = 22 Jun.

\*\*Values are the means of six replications; treatments followed by the same letter within a column are not significantly different at P≤0.05.

- All treated plants had significantly lower disease severity and area under the disease progress curve (AUDPC) compared to the non-treated control plants.
- Mural provided the best control of disease severity, AUDPC as well as defoliation in hydrangea plants with powdery mildew and Cercospora leaf spot disease symptoms.
- Non-treated control plants experienced the highest rate of defoliation with KleenGrow being similar.
- There were no significant differences in plant height increase among any of the treated and non-treated control plants.

## Acknowledgment

We would like to thank Syngenta, BASF Corp. and OHP Inc. for their support.