

Evaluation of Fungicides for the Control of Powdery Mildew and Spot Anthracnose of Dogwood

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ABSTRACT

Flowering dogwood (*Cornus florida*) is a popular ornamental plant in containerized or field nurseries as well as forestry and landscape settings. Leaf spots disease such as powdery mildew, caused by *Erysiphe pulchra* and spot anthracnose caused by *Elsinoe corni* can generate cosmetic damage on flowering dogwood trees. These leaf spots can also affect plant growth by attacking tender shoots and leaf surfaces as well as causing premature defoliation. Both of the pathogens can overwinter in diseased plant material and spores are carried by wind and splashing water to susceptible tissues throughout the growing season. In this current study, several fungicides were evaluated for their effectiveness in managing both powdery mildew and spot anthracnose of dogwood. *C. florida* cv. 'Cherokee Princess' plants that were exhibiting powdery mildew and spot anthracnose disease symptoms developed from natural inoculum were subjected different fungicide treatments at 14-days intervals. The severity of powdery mildew and spot anthracnose on foliage and phytotoxicity were evaluated using a scale of 0-100% foliage affected. The area under the disease progress curve (AUDPC) was calculated according to the formula: $\sum\{[(x_i + x_{i-1})/2](t_i - t_{i-1})\}$, where x_i is the rating at each evaluation time and $(t_i - t_{i-1})$ is the number of days between evaluations. Powdery mildew and spot anthracnose disease pressure were low, with mean disease severity percentage values of the non-treated control plants showing 27.5% and 43.3% respectively. All treatments significantly lowered powdery mildew and spot anthracnose disease severity and AUDPC compared to the non-treated control. There were no significant height increases among the treated and non-treated control plants. Phytotoxicity was not observed in any of the treated plants. Treatments identified in this study can be applied in a rotation plan to manage powdery mildew and spot anthracnose diseases of dogwood.

INTRODUCTION



Spot Anthracnose of Dogwood

- Powdery mildew, caused by *Erysiphe pulchra*, and spot anthracnose caused by *Elsinoe corni* are two major leaf spot diseases that affect the esthetic value of the popular ornamental plant, flowering dogwood (*Cornus florida*).
- Powdery mildew infected leaves display yellowing and marginal leaf scorch with white patches that consist of mycelia and conidia of the fungus. Older leaves develop reddish or purplish irregular blotches on upper surfaces.
- Spotting and distortion of bracts ("petals") and circular or angular dark purple areas are characteristic symptoms of spot anthracnose of dogwood.
- Disease management requires adherence to proper cultural tactics, use of tolerance or resistant cultivars and regular application of fungicides.

OBJECTIVE

To identify fungicides products that are effective in managing powdery mildew and spot anthracnose of dogwood

MATERIALS AND METHODS



Powdery Mildew of Dogwood

- *C. florida* cv. 'Cherokee Princess' plants with natural powdery mildew and spot anthracnose disease symptoms were treated with fungicide treatments using a backpack CO₂-pressurized sprayer at 30 psi.
- Treatments were applied on a 14-day interval and severity of powdery mildew, spot anthracnose and phytotoxicity was determined on a 7-day interval.

- Area under the disease progress curve (AUDPC) was calculated using the following formula,

$$\text{AUDPC} = \sum\{[(x_i + x_{i-1})/2](t_i - t_{i-1})\}$$

x_i is the rating at each evaluation time and $(t_i - t_{i-1})$ is the number of days between evaluations.

Table 1. Efficacy of treatments for the management of powdery mildew and spot anthracnose of dogwood.

Treatment and rate	Application dates*	Spot anthracnose		Powdery mildew		Height increase (in.)
		% Mean severity	AUDPC	% Mean severity	AUDPC	
Eagle 20 EW 8 fl oz/100 gal	1, 2, 3	8.8 b**	128.6 b	1.8 b	30.3 b	1.1 a
Pageant Intrinsic 10 oz/100 gal	1, 2, 3	4.6 b	106.5 b	2.7 b	50.2 b	1.8 a
Mural 7 oz/100 gal	1, 2, 3	5.2 b	87.5 b	1.3 b	26.3 b	2.0 a
KleenGrow 0.25 fl oz/gal	1, 2, 3	9.2 b	202.4 b	3.7 b	62.4 b	1.7 a
Non-treated control	-	43.3 a	681.9 a	27.5 a	478.6 a	1.5 a
P-value	-	<0.0001	<0.0001	<0.0001	<0.0001	0.9

*Application dates: 1 = 30 Jun; 2 = 14 Jul; 3 = 28 Jul.

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

RESULTS

- Powdery mildew disease pressure was low in this trial, with mean disease severity of the non-treated control plants being 27.5%.
- Spot anthracnose disease pressure was low to moderate by the end of the trial with non-treated control plants showing 43.3% disease severity.
- All treatments significantly lowered powdery mildew and spot anthracnose disease severity and AUDPC compared to the non-treated control plants.
- Plant height increase was not significantly different among treated or control plants.
- Phytotoxicity was not observed in any of the treated dogwood plants.

ACKNOWLEDGMENT

We would like to thank Dow AgroSciences LLC, BASF Corp., Syngenta Crop Protection and PACE 49, Inc. for their support.

