

Disease-Resistant Cultivars of Crapemyrtle and Dogwood

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Severity of powdery mildew (*Microsphaera penicillata*) and spot anthracnose (*Elsinoe corni*) was assessed from 1995 through 1997 in a simulated landscape planting of 37 selections or cultivars in five dogwood (*Cornus* sp.) taxa. Concurrently, susceptibility of 43 cultivars of three crapemyrtle (*Lagerstroemia* sp.) taxa to powdery mildew (*Erysiphe lagerstroemia*) and Cercospora leaf spot (*Cercospora lythracearum*) was recorded. Selected cultivars of both crapemyrtle and dogwood were resistant to both diseases and would be excellent candidates for low maintenance landscapes and nursery production.

INTRODUCTION

Brightly colored blooms and brilliant fall color have made crapemyrtle and dogwood important plant materials for southern landscapes. Diseases, such as powdery mildew and Cercospora leaf spot on crapemyrtle as well as spot anthracnose and powdery mildew on flowering dogwood often mar the beauty and value of these popular woody plants (Alfieri, 1969; Alfieri, 1976; Jenkins and Bitancourt; 1948, McRitchie, 1994). Disease resistance is an effective, inexpensive, and often pesticide-free means of producing and maintaining landscape plantings of dogwood and crapemyrtle. Recently, cultivars of crapemyrtle with resistance to powdery mildew have been released (Knox et al., 1992). However, the resistance of most cultivars of dogwood, particularly the flowering dogwood, to common foliar diseases is not well documented (Ranney et al., 1995). The objective of these studies was to determine resistance to common foliar diseases of selected cultivars of dogwood and crapemyrtle.

MATERIAL AND METHODS

Bareroot dogwood and crapemyrtle liners approximately 0.6 to 1.0 m (2 to 3.3 ft) tall were planted in March 1993 in a Marvyn loamy sand on 2.4-m (7.9-ft) centers in rows spaced 3.7 m (12.2 ft) apart. Cultivars of crapemyrtle and dogwood are listed in Tables 1, 2, 3, and 4. A trickle irrigation system with two emitters per plant was installed at planting and trees were watered as needed. In March and May each year, 80 g of 13N-13P-13K fertilizer was distributed around each plant. In 1996, all plants were mulched with 5 to 7 cm (2 to 2.8 inches) of aged pine bark. Disease rating scales are described and included in the tables.

RESULTS

Overall, cultivars of *Lagerstroemia indica* proved more susceptible to powdery mildew than those in the two other crapemyrtle taxa (Tables 1 and 2). Mildew ratings for the hybrid *L. indica* × *L. fauriei* cultivars and the single cultivar of *L. fauriei* were similar in all 3 years. Incidence of Cercospora leaf spot was lowest in

all 3 years with the single cultivar of *L. fauriei*, than among cultivars of the other two *Lagerstroemia* taxa; resistance among cultivars of the other two taxa were similar (data not shown). Sizable year to year variations in powdery mildew ratings were observed among most cultivars of *L. indica*. Lowest disease ratings were recorded over the 3-year test period for 'Cherokee' and 'Glendora White'. Moderate to severe disease incidence was noted in at least 1 year on the remaining 18 cultivars of *L. indica* (Table 1). Moderate to heavy spotting of the leaves along with varying levels of defoliation due to *Cercospora* leaf spot were observed in at least 1 year on all cultivars of *L. indica* except 'Dodd #1', 'Glendora White', and 'Velma's Royal Delight'.

Powdery mildew levels on most of the hybrid *Lagerstroemia* cultivars were very low (Table 2). Light to moderate outbreaks were seen only on 'Zuni' and 'Pecos'. For most remaining hybrid cultivars and the single selection of *L. fauriei* 'Fantasy', this disease was limited to a few widely scattered fungal colonies on the foliage. Only 'Caddo' was mildew free in all 3 years. On most hybrid crapemyrtle cultivars, *Cercospora* leaf spot caused heavy leaf spotting and premature leaf drop. Damage on the leaf-spot-resistant cultivars 'Tonto', 'Tuscarora', and *L. fauriei* 'Fantasy' was limited to light spotting of the leaves around the base of each plant.

Among the five dogwood taxa, *Cornus florida* (flowering dogwood) and *C. 'Eddie's White Wonder'* (*C. nuttallii* × *C. florida*) were more susceptible to both powdery mildew and spot anthracnose than the other three dogwood taxa (Table 3). Low spot anthracnose and powdery mildew ratings for the *C. kousa*, *C. controversa* (giant dogwood), and *C. ×rutgersensis* (*C. kousa* × *C. florida*) hybrids clearly illustrates their high level of resistance to these two diseases (data not shown).

Incidence of powdery mildew and spot anthracnose varied significantly among cultivars of flowering dogwood and often from year to year on a given cultivar (Table 4). Only 'Cherokee Brave' remained almost mildew-free over the 3-year evaluation period. In 2 of 3 years, powdery mildew on 'Super Red', Cherokee Chief^{PP} eastern dogwood; Cherokee DaybreakTM eastern dogwood; and 'Springtime' was light and unobtrusive. Cultivars of flowering dogwood that suffered the least spot anthracnose damage to both the bracts and leaves were 'Super Red', Cherokee Chief^{PP} eastern dogwood; 'Cherokee Brave'; 'Weaver' (syn. 'Weaver's White'); Cherokee SunsetTM eastern dogwood; and 'Bay Beauty', Welch Bay BeautyTM eastern dogwood (syn. 'Welch Bay Beauty'). Moderate to severe outbreaks of powdery mildew and spot anthracnose were seen in at least 1 of 3 years on all remaining cultivars of flowering dogwood and the hybrid 'Eddie's White Wonder' (Table 3).

Little or no powdery mildew and spot anthracnose were noted on the foliage of nearly all cultivars of *C. kousa*, 'Eddie's White Wonder', and giant dogwood (Table 3). Noticeable powdery mildew development was noted in only 1 year on the hybrid cultivars Aurora® hybrid dogwood and Galaxy® hybrid dogwood. With the exception of the cultivars Ruth Ellen® hybrid dogwood and Constellation® hybrid dogwood, leaves of the *C. kousa* and hybrid dogwoods were nearly free of spot anthracnose. Although the above dogwood taxa have excellent disease resistance, they may be much more sensitive to winter injury than *C. florida* (data not shown). By May 1997, few individuals of *C. kousa*, hybrids, or giant dogwood remained healthy, while similar levels of tree death were not observed among the cultivars of flowering dogwood.

Table 1. Susceptibility of cultivars of crapemyrtle (*Lagerstroemia indica*) to powdery mildew and *Cercospora* leaf spot.

Cultivar	Powdery mildew ¹			<i>Cercospora</i> leaf spot ²		
	1995	1996	1997	1995	1996	1997
Carolina Beauty	2.3 ³	1.6	1.2	5.8	6.3	5.8
Catawba	0.7	0.1	1.2	3.6	4.6	3.0
Centennial Spirit	1.6	0.0	0.8	2.2	4.8	5.0
Cherokee	0.0	0.0	N.R. ⁴	2.3	4.0	N.R.
Country Red	2.8	2.5	0.9	4.0	4.6	5.0
Dodd #1	0.1	0.1	0.5	3.3	2.7	1.9
Dodd #2	0.4	0.2	0.9	N.R. ⁴	6.3	3.2
Glendora White	0.4	0.4	0.5	2.3	3.7	3.8
Gray's Red	2.2	0.8	1.0	3.5	3.9	4.3
Hardy Lavender	1.1	1.1	1.8	4.2	5.1	5.0
Hopi	0.2	0.0	1.7	3.9	5.7	5.4
Majestic Beauty	1.7	1.0	1.0	3.7	5.3	5.0
Near East	0.3	0.0	1.3	5.0	5.4	4.7
Orbin Adkins	2.4	0.7	1.2	5.8	6.7	6.8
Peppermint, (Peppermint Lace ^{PP} crapemyrtle)	1.7	1.0	1.6	4.0	5.6	4.9
Potomac	1.8	0.3	0.9	2.7	4.5	3.6
Powhatan	1.3	1.1	1.8	3.4	5.5	5.5
Raspberry Sundae	3.1	1.5	1.5	4.6	5.7	5.3
Regal Red	0.6	1.2	1.3	2.1	4.0	4.2
Seminole	0.8	0.3	2.2	3.3	5.6	4.5
Velma's Royal Delight	1.2	0.6	1.4	2.0	3.3	3.7
Wm. Toovey	1.9	1.3	1.8	3.7	4.4	3.6
Wonderful White	2.4	1.5	1.3	5.0	6.8	6.8
LSD (P = 0.05)	0.7	0.5	0.6	1.1	0.9	0.6

¹The severity of powdery mildew was assessed on a scale of 0 to 4 where 0 = no disease, 1 = 1% to 25%, 2 = 26% to 50%, 3 = 51% to 75%, 4 = 76% to 100% of the leaves damaged or colonized by *Erysiphe lagerstroemia*.

²*Cercospora* leaf spot was evaluated using the Barratt and Horsfall System: 1 = 0%, 2 = 0% to 3%, 3 = 3% to 6%, 4 = 6% to 12%, 5 = 12% to 25%, 6 = 25% to 50%, 7 = 50% to 75%, 8 = 75% to 87%, 9 = 87% to 94%, 10 = 94% to 97%, 11 = 97% to 100%, 12 = 100% of leaves diseased or lost prematurely due to leaf spot.

³Mean separation within columns according to Fisher's protected least significance (LSD) test (P 0.05).

⁴N.R. = not rated.

Table 2. Susceptibility of cultivars of crapemyrtle (*Lagerstroemia indica* × *L. fauriei* and *L. fauriei*) to powdery mildew and *Cercospora* leaf spot.

Cultivar	Powdery mildew ¹			<i>Cercospora</i> leaf spot ²		
	1995	1996	1997	1995	1996	1997
<i>Lagerstroemia indica</i> × <i>L. fauriei</i>						
Acoma	0.0 ³	0.0	0.1	5.3	6.3	6.2
Apalachee	0.2	0.0	0.2	2.7	2.8	1.3
Basham's Party Pink	0.2	0.2	0.4	2.8	2.5	1.7
Biloxi	0.4	0.3	0.8	4.4	5.3	4.0
Caddo	0.0	0.0	0.0	2.4	2.9	4.6
Choctaw	0.0	0.1	0.3	4.5	4.6	3.5
Comanche	0.0	0.0	0.4	5.6	6.6	4.9
Lipan	0.3	0.0	0.0	2.9	5.1	2.6
Miami	0.1	0.0	0.7	3.5	4.7	3.2
Muskogee	0.2	0.0	0.6	4.7	4.8	4.2
Natchez	0.0	0.1	0.0	4.3	4.6	2.6
Osage	0.0	0.0	0.4	2.8	4.0	1.3
Pecos	0.4	0.1	1.3	2.8	5.1	2.6
Sarah's Favorite	0.0	0.0	0.1	3.5	3.8	3.3
Sioux	0.1	0.0	0.0	4.3	5.2	1.3
Tonto	0.1	0.0	0.0	2.3	1.3	1.2
Tuscarora	0.5	0.0	0.4	1.7	2.4	1.8
Tuskegee	0.1	0.4	0.2	1.8	1.5	1.3
Wichita	0.3	0.0	0.8	2.8	3.6	2.6
Yuma	0.4	0.0	0.4	4.9	5.0	5.2
Zuni	1.3	0.3	1.8	4.8	4.4	3.5
<i>Lagerstroemia fauriei</i>						
Fantasy	0.4	0.0	0.2	1.4	1.1	1.7
LSD (P 0.05)	0.7	0.5	0.6	1.1	0.8	0.6

¹The severity of powdery mildew was assessed on a scale of 0 to 4 where 0 = no disease, 1 = 1% to 25%, 2 = 26% to 50%, 3 = 51% to 75%, 4 = 76% to 100% of the leaves damaged or colonized by *Erysiphe lagerstroemia*.

²*Cercospora* leaf spot was evaluated on using the Barratt and Horsfall System: 1 = 0%, 2 = 0% to 3%, 3 = 3% to 6%, 4 = 6% to 12%, 5 = 12% to 25%, 6 = 25% to 50%, 7 = 50% to 75%, 8 = 75% to 87%, 9 = 87% to 94%, 10 = 94% to 97%, 11 = 97% to 100%, 12 = 100% of leaves diseased or lost prematurely due to leaf spot.

³Mean separation within columns according to Fisher's protected least significance (LSD) test (P 0.05).

Table 3. Susceptibility of several dogwood taxa to powdery mildew and spot anthracnose.

Cultivar	Powdery mildew ¹		Spot anthracnose ¹		
	1995	1996	1997	Bracts	Leaves
<i>Cornus nuttalli</i> × <i>C. florida</i> hybrid dogwood					
‘Eddie’s White Wonder’	1.3	0.5	1.9	2.0	N.B. ²
<i>C. kousa</i>					
<i>f. chinensis</i> ‘Milky Way’	0.3	0.0	0.0	0.0	0.0
‘Satomi’	0.0	0.0	0.0	0.0	0.0
<i>f. chinensis</i> ‘Milky Way Select’	0.0	0.3	0.0	0.0	0.0
‘National’	0.0	0.0	0.0	0.0	0.0
<i>C. xrutgersensis</i> (<i>C. kousa</i> × <i>C. florida</i>)					
Stardust® hybrid dogwood	0.2	0.0	0.4	0.0	0.7
Ruth Ellen® hybrid dogwood	0.1	0.1	0.2	1.1	0.9
Galaxy® hybrid dogwood	0.1	0.0	0.8	0.0	0.5
Constellation® hybrid dogwood	0.0	0.1	0.0	1.0	1.8
Stellar Pink® hybrid dogwood	0.0	0.0	0.0	0.0	0.3
Aurora® hybrid dogwood	0.0	0.0	0.8	0.0	0.8
<i>Cornus controversa</i>	0.0	0.0	N.R. ³	N.B.	N.R.
LSD (P 0.05)	0.8	0.9	0.7	0.9	1.0

¹Severity of powdery mildew and spot anthracnose was assessed on a scale of 0 to 4 where 0 = no disease, 1 = 1% to 25%, 2 = 26% to 50%, 3 = 51% to 75%, and 4 = 76% to 100% of leaves damaged or diseased.

²N.B. = no blooms.

³N.R. = not rated.

Table 4. Susceptibility of cultivars of flowering dogwood (*Cornus florida*) to powdery mildew and spot anthracnose.

Cultivar	Powdery mildew ¹						Spot anthracnose ¹									
	1995		1996		1997		1996		1997		1995		1996		1997	
White bracts																
'Dwarf White'	3.0	0.0	0.0	2.0	2.0	4.0	2.0	4.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0
Wonderberry® eastern dogwood	2.2	0.5	1.8	1.8	2.2	1.8	2.2	2.2	0.4	0.6	2.1	0.4	0.6	2.1	2.1	2.1
'World's Fair'	1.9	0.8	1.8	1.8	2.0	2.0	1.9	2.0	0.0	1.8	1.8	0.0	1.8	1.8	1.8	1.8
'Bay Beauty', Welch Bay Beauty™ eastern dogwood	1.8	0.8	1.1	1.1	0.9	0.3	0.9	0.3	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.2
'Ozark Spring'	1.8	1.2	2.0	2.0	2.3	2.8	2.3	2.8	0.2	2.0	2.9	0.2	2.0	2.9	2.9	2.9
'Fragrant Cloud'	1.8	1.0	1.3	1.3	1.3	1.7	1.3	1.7	0.0	1.3	2.1	0.0	1.3	2.1	2.1	2.1
Cloud 9 ^{PP} eastern dogwood	1.7	1.3	1.4	1.4	2.6	2.3	2.6	2.3	0.0	2.6	2.4	0.0	2.6	2.4	2.4	2.4
'Barton White'	1.5	0.7	1.6	1.6	3.3	2.5	3.3	2.5	1.0	2.7	2.0	1.0	2.7	2.0	2.0	2.0
'White Princess', Cherokee Princess® eastern dogwood	1.5	1.1	1.8	1.8	2.3	2.3	2.3	2.3	0.0	1.3	2.1	0.0	1.3	2.1	2.1	2.1
Double White	1.5	0.5	1.2	1.2	0.5	0.8	0.5	0.8	0.5	1.3	2.2	0.5	1.3	2.2	2.2	2.2
'Weaver' (syn. 'Weaver's White')	1.1	1.0	1.4	1.4	1.1	1.5	1.1	1.5	0.0	0.8	1.1	0.0	0.8	1.1	1.1	1.1
'Springtime'	0.8	0.3	1.0	1.0	2.3	2.4	2.3	2.4	0.0	2.3	2.6	0.0	2.3	2.6	2.6	2.6
White bracts/variegated leaves																
'Autumn Gold'	2.9	0.7	1.8	1.8	N.B. ²	N.B.	N.B. ²	N.B.	0.7	1.4	1.8	0.7	1.4	1.8	1.8	1.8
'First Lady'	2.1	0.6	2.4	2.4	1.8	2.0	1.8	2.0	0.3	1.5	2.2	0.3	1.5	2.2	2.2	2.2
'Rainbow'	1.6	1.3	1.1	1.1	2.0	1.9	2.0	1.9	2.8	3.0	3.7	2.8	3.0	3.7	3.7	3.7
Cherokee Daybreak™ eastern dogwood	0.9	0.0	1.5	1.5	3.0	1.7	3.0	1.7	0.5	1.1	1.4	0.5	1.1	1.4	1.4	1.4

Pink bracts									
'Pink Beauty'	2.6	1.5	2.8	1.6	2.4	0.0	1.1	1.8	
'Pink Flame'	2.5	1.2	2.7	2.0	1.5	0.0	1.2	2.0	
<i>f. rubra</i> (syn. 'Rubra Pink')	2.0	1.6	2.0	0.5	1.5	0.3	1.1	2.0	
'Welch's Junior Miss', Junior Miss TM eastern dogwood	1.7	0.9	2.2	1.3	1.3	0.0	0.9	1.1	
'Stoke's Pink'	1.5	1.8	2.6	1.5	2.8	0.0	0.9	0.2	
Red bracts									
Red Beauty TM eastern dogwood	2.0	1.4	1.8	1.0	0.8	0.3	1.4	2.0	
'Purple Glory'	2.0	1.3	2.3	1.5	2.0	0.0	1.0	1.1	
'Super Red', Cherokee Chief ^{PP} eastern dogwood	1.4	0.6	1.6	0.7	1.0	0.0	0.6	1.3	
'Cherokee Brave'	0.2	0.0	0.0	1.0	1.1	0.0	0.6	1.5	
Red bracts/variegated leaves									
Cherokee Sunset TM eastern dogwood	1.3	0.5	2.4	0.0	0.5	0.2	0.9	1.4	
LSD (P 0.05)	0.8	0.9	0.7	0.9	1.0	0.6	0.6	0.8	

¹Severity of powdery mildew and spot anthracnose was assessed on a scale of 0 to 4 where 0 = no disease, 1 = 1% to 25%, 2 = 26% to 50%, 3 = 51% to 75%, and 4 = 76% to 100% of leaves or bracts damaged or diseased.

²N.B. = no blooms.

DISCUSSION

The production, marketing, and establishment of disease-resistant cultivars of dogwood and crapemyrtle make good economic and environmental sense for nursery producers, as well as retail outlets, landscape managers, and homeowners. Disease resistance allows the nursery producer to grow a quality and attractive container- or field-grown dogwood or crapemyrtle with fewer costly pesticide and labor inputs. For consumers and landscape managers, disease-resistant dogwoods and crapemyrtles are a welcome addition to the growing list of low maintenance landscape shrubs and trees.

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