

## Foliar Diseases of Dogwood

Mary Ann Hansen, Extension Plant Pathologist, Department of Plant Pathology,  
Physiology and Weed Science, Virginia Tech

Fungal diseases can mar the foliage and bracts of Virginia's state flower, the native flowering dogwood, *Cornus florida*. The diseases, spot anthracnose and Septoria leaf spot, appear every year to some degree and in most years cause little damage. Discula anthracnose, on the other hand, can eventually kill a tree. Another relatively recently observed disease of dogwood, powdery mildew, can also be very destructive to the overall health of the tree. This publication attempts to distinguish the symptoms of these four major diseases of dogwood.

### Spot Anthracnose

#### Symptoms

Symptoms of spot anthracnose, caused by the fungus *Elsinoe corni*, first appear very early in the spring on the bracts, and later on the foliage. In general, white cultivars of dogwood are more susceptible than pink cultivars. The fungus causes uniformly tiny (less than 1/8" diameter), circular lesions with purple borders and lighter, almost white, centers on bracts and leaves (Figs. 1 and 2). These lesions are easily distinguished from leaf spots caused by other dogwood pathogens because of their small and uniform size. Later in the season, the centers of the spots often fall out, giving the leaf a shoeholed appearance. In seasons when environmental

conditions are conducive to disease, spots on bracts and foliage may be numerous, and leaves or bracts become puckered or distorted around the spots as the leaves expand. Spots similar to the leaf spots may also form on green branches and fruit; however, the fungus does not cause dieback. In cases of severe infection, buds may fail to open.

#### Disease Cycle

*Elsinoe corni* survives the winter on twigs, in buds, or on infected fruit and leaves that remain on the tree. New infections occur in early spring. In most years, spot anthracnose causes little damage; however, in very cool, wet springs, symptoms can be severe.

#### Control

In most years control is not necessary; however, if disease was severe the previous year or if a cool, wet spring is predicted, fungicides may be warranted. Spot anthracnose can be controlled preventatively with chlorothalonil (e.g. Daconil 2787), mancozeb (e.g. Fore or Dithane T/O), or thiophanate methyl + mancozeb (e.g. Zytan). Spraying should begin when buds begin to open and be repeated when bracts have fallen, four weeks after bract fall, and in late summer after flower buds have formed.

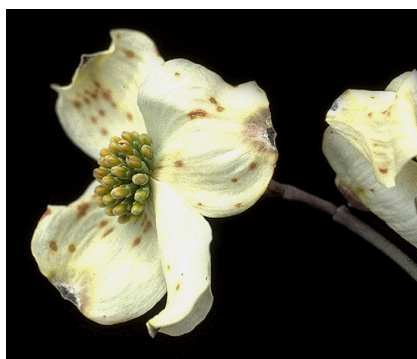


Fig. 1. Symptoms of spot anthracnose on bracts of flowering dogwood.



Fig. 2. Symptoms of spot anthracnose on leaves of flowering dogwood.

### Discula Anthracnose

#### Symptoms

*Discula destructiva*, the fungus that causes *Discula anthracnose*, not only causes leaf and bract symptoms on dogwood, but also branch dieback that can culminate in death of the tree. Foliar and bract symptoms include irregularly shaped, dark brown spots that vary from pinpoint-sized to 1/4 inch or more in diameter (Figs.

3 and 4). Margins of spots are purplish in color. Spots often coalesce and blight large portions of the leaf, and affected leaves cling to the tree over the winter. The fungus moves from the petioles into small twigs and then larger branches, causing dieback. Lower branches usually die first, and in the final stages of disease, only a few green branches may be left at the top of the tree (Fig. 5). Infection may proceed to the trunk where cankers can cause death of the tree (Fig. 6). The fungus can also invade the trunk directly through succulent water sprouts (young shoots that form directly on the trunk). Water sprouts are very susceptible to infection by the fungus.



Fig. 3. Symptoms of *Discula anthracnose* on bracts of flowering dogwood. (Photo by C. Hoysa)

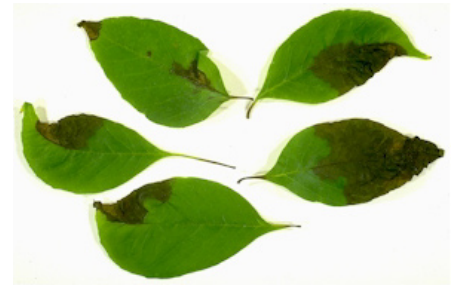


Fig. 4. Symptoms of *Discula anthracnose* on leaves of flowering dogwood. (Photo by C. Hoysa)

### Cycle

The fungus overwinters in stem cankers and leaves. It sporulates profusely on infected tissues during the spring and summer. Spores are spread by splashing rain. Prolonged, cool, wet weather in the spring or the occurrence of fogs favors disease. The disease is more severe at high elevations, perhaps because cool, wet conditions are more frequent in these areas. The disease is much less frequent in the lower elevations of the eastern part of Virginia where temperatures are generally higher.

### Control

Because *Discula destructiva* causes cankers, this disease is difficult to control. A combination of cultural and chemical methods is recommended for most effective control. Once cankering is severe on a tree, the tree can not be saved.

### Cultural Control

Avoid planting dogwoods in sites where leaves will remain wet for long periods of time. Sites along streams, lakes, or ponds, or areas where fog tends to collect are prime sites for disease development and should be avoided. The disease is more of a problem in shaded locations; thus, planting in sunny locations can help to prevent disease. Although dogwood is naturally an understory tree, trees that are properly cared for can do well in full sun. Trees should be mulched to a depth of 2-4 inches to help conserve soil moisture. Place mulch in a donut-shaped ring around the tree instead of piling it against the base of the trunk. Placing mulch in contact with the trunk causes bark to remain moist and become more susceptible to



Fig. 5. Lower branch dieback due to *Discula anthracnose*. (Photo by C. Hoysa)



Fig. 6. Trunk canker caused by *Discula destructiva*. (Photo by C. Hoysa)

decay. Water trees during drought and fertilize as needed to help trees remain vigorous. Avoid using fertilizers high in nitrogen, however, as they can stimulate succulent growth that is more susceptible to infection by *Discula*. Water trees with a soaker hose rather than a sprinkler to avoid prolonged leaf wetness.

Remove cankered branches and destroy them as soon as they are noticed. Make cuts well below cankers through healthy wood. Sterilize pruning tools between cuts with rubbing alcohol or a 10% solution of household bleach. Remove any plant debris that falls to the ground from infected trees. Also, avoid collecting and planting seed from wild dogwoods or transplanting dogwood seedlings from the woods because these plant materials may harbor the fungus.

### Chemical Control

Fungicides recommended for control of *Discula anthracnose* include propiconazole (e.g. Banner) and chlorothalonil (e.g. Daconil 2787). Propiconazole is a systemic fungicide that can be applied at 14-day intervals, whereas chlorothalonil is a foliar protectant that should be applied every 7-10 days. Fungicide applications should begin before or as soon as bract spots appear in the spring and continue throughout the season. It is important to begin treatment before or during bract or foliar infection but before the fungus invades the twigs. Once cankers have formed, fungicide treatment may not be effective.

### Resistance

Few cultivars of flowering dogwood have resistance to *Discula anthracnose*. Breeding programs to identify sources of resistance are ongoing. The 'Spring Grove' and 'Cherokee Sunset' cultivars of flowering dogwood have been reported to have resistance to *Discula anthracnose*; however, 'Cherokee Sunset' is very susceptible to powdery mildew. Chinese dogwood (*Cornus kousa*), also called Kousa dogwood, although not immune, has resistance to *Discula anthracnose*. Many cultivars of Kousa dogwood have high levels of resistance to *Discula anthracnose* (Table 1). Other cultivars with lower levels of resistance may develop leaf spots but do not develop cankers. Kousa cultivars with high levels of resistance are the best choice for mixed plantings of Kousa and flowering dogwood. If cultivars with less resistance are planted, they could develop leaf spots and serve as a source of fungal inoculum for nearby flowering dogwoods. Contact your nursery owner for the latest information on dogwoods with resistance to *Discula anthracnose*.

## Septoria Leaf Spot

### Symptoms

Septoria leaf spot, caused by the fungus *Septoria cornicola*, is a late-season disease of dogwood that is little cause for concern. Angular, dark brown leaf spots with purplish margins, bordered by leaf veins, are typical



Fig. 7. Leaf symptoms of Septoria leaf spot. (Photo by M.A. Hansen)

of this disease (Fig. 7). Leaf spots first appear in early July in Virginia, but leaf spotting does not become severe until later in the summer. Symptoms caused by *Septoria* could be confused with those of *Discula anthracnose*; however, *Septoria* leaf spots are much more uniform in size (up to about 1/4 inch in diameter) and angular. Also, *Septoria* does not cause a general blighting of the leaf.

### Disease Cycle

*Septoria cornicola* sporulates in tiny, pinpoint-sized fruiting bodies in the leaf spots. Spores are spread by wind and rain. The fungus overwinters in leaf debris.

### Control

Because the most severe symptoms of *Septoria* leaf spot occur late in the season when leaves are beginning to senesce naturally, no control is recommended. Removing fallen leaves may help reduce the amount of fungal inoculum available for infection the following season.

### Powdery Mildew

Powdery mildews comprise a group of related fungal species within the same family. Powdery mildew fungi are common on a wide variety of ornamental species. Symptoms and signs of powdery mildews on different plant species resemble one another; however, most species of powdery mildew fungi infect only one or a few closely related species of host plants. Although powdery mildews are common on other plants, the disease was not common on dogwood in Virginia until 1993. It is possible that the species that is now prevalent on dogwoods (*Microsphaeria pulchra*) was introduced just prior to that time.

## Symptoms

Mycelium of the powdery mildew fungus grows on leaf and bud surfaces, and appears as a white coating on these plant parts (Fig. 8). In the early stages of infection, the white fungal growth may be subtle and difficult to see; however, symptoms of infection can be severe. Leaves may be stunted, reddened, and curled or puckered by mid-season. Affected trees



Fig. 8. Powdery mildew on leaves of flowering dogwood.  
(Photo by R. E. Lyons, N.C. State Univ.)

appear water-stressed even if adequate water has been provided. The disease has been shown to cause stunting of roots and, after repeated years of infection, the tree may be stunted overall. Both flowering and Kousa dogwood are susceptible to this disease, although resistant cultivars of both species have been identified.

## Disease Cycle

The fungus survives as mycelium in infected buds and on leaves on the ground. Spores form in spring and are spread by air currents to newly developing leaves. Like other powdery mildew fungi, the dogwood pathogen is favored by warm days, cool nights, and high humidity. Frequent rainfall actually inhibits spore germination.

## Control

### Chemical Control

Several fungicides are available for control of powdery mildew on dogwood. These include triadimefon (e.g. Bayleton), myclobutanil (e.g. Systhane), trifloxystrobin (e.g. Compass), potassium bicarbonate (e.g. Remedy, First Step, Armicarb 100), and Neem oil extract (e.g. Triact 70). Triadimefon and myclobutanil act systemi-

cally; trifloxystrobin penetrates the leaf surface; potassium bicarbonate and Neem oil extract act at the leaf surface. Refer to the current Virginia Pest Management Guide for Home Grounds and Animals (VCE Publication 456-018) or the Virginia Pest Management Guide for Horticultural and Forest Crops (VCE Publication 456-017), <http://pubs.ext.vt.edu/456-017/>, for details on rates and timing of fungicide application for this and other diseases of dogwood. For information on the proper use of pesticides and fungicides, refer to any current VCE pest management guide.

## Resistance

Resistant cultivars of both flowering and Kousa dogwood are available. Because this disease has become so prevalent in recent years, resistant cultivars are a wise choice for new plantings. Refer to, Powdery Mildew-Resistant Woody Ornamentals (VCE Publication 450-616) for a list of dogwood cultivars resistant to powdery mildew.

**Table 1.**

Dogwood cultivars with resistance to *Discula anthracnose* (data from N. C. State University, 1996)

Cultivar Resistance	
Big Apple	Good
China Girl	Good
Elizabeth Lustgarten	Good
Gay Head	Good
Greensleeves	Good
Julian	Good
Milky Way	Good
Milky Way Select	Excellent
Steeple	Excellent
Temple Jewel	Good
Aurora**	Good
Celestial**	Excellent
Constellation**	Good
Ruth Ellen**	Good
Stardust**	Excellent
Stellar Pink**	Excellent

\*\* *Cornus florida* x *C. kousa* hybrid.

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