



# The Flowering Dogwood

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Flowering dogwood (*Cornus florida*) is one of the best known harbingers of spring. The striking beauty of this easily recognized tree is the major reason it is one of the most commonly sold trees in Kentucky. Unfortunately, this popularity does not mean dogwoods are without problems.

Flowering dogwoods evolved in forests as understory trees. Understory trees fill a unique niche in a forest, coming between large, mature trees and the herbs and wildflowers below. In this microclimate, dogwoods receive filtered sunlight, high humidity, and protection from drying winds. Leaf litter that falls to the forest floor annually benefits the dogwood's shallow root system. The tree taps a nutrient-rich storehouse of soil high in humus.

Flowering dogwood is considered a desirable woody ornamental for residential landscaping because its relatively small size keeps it from dwarfing the house or getting into power lines. While this growth characteristic contributes to the dogwood's popularity as a residential landscape specimen, it is also responsible for many common problems associated with the tree. Dogwoods fit well into well-established, mature landscapes.

## Stress Factors Affecting Dogwoods

A home lot or commercial site is an environment far more stressful than the dogwood's natural forest habitat. For example, soil around construction sites is almost always

disturbed, with subsoil often being the only rooting habitat present. There is also reflected light and heat from brick walls and concrete, not to mention the absence of shade. Lacking a proper environment, flowering dogwoods are sometimes difficult to establish.

Even when successfully established, the dogwood's worst enemy can be landscaping equipment. Lawn mowers and string trimmers cause small lacerations or cracks in bark, sometimes chipping off large pieces. This girdling reduces the amount of conductive tissues that move water and nutrients from roots to leaves, and products of photosynthesis (sugars) from leaves to roots. To make matters worse, female dogwood borers lay their eggs in wounds. Larvae then cause further damage by moving into and taking up residence either laterally or vertically in the phloem tissue, thus plugging the tree's weakened conductive tissues.

Environmental stress factors such as sunscald (dogwoods are thin-barked trees), moisture deficiency, and temperature extremes also weaken dogwoods, making them prone to insect attack. It is important to maintain vigorous trees and to recognize and avoid activities or cultural practices that predispose trees to insect attack.

## Dogwood Borer:

### The Major Insect of Dogwoods

The dogwood borer, *Synanthedon scitula*, is the most common and destructive pest of flowering dogwoods in the landscape. Borer larvae tunnel and feed in living wood,



Figure 1. The dogwood borer

destroying vascular tissues and causing loss of vigor, structural weakness, branch dieback, or complete girdling and death of trees. Infestation sites may also provide entry points for disease. Trees in urban landscapes, which may already be under stress, are especially prone to borer attack. Because

borer-infested plants may not legally be sold, economic thresholds for borers in nurseries are very low.

The adult dogwood borer is a small, day-flying moth. It is blue-black with yellow bands and somewhat resembles a small wasp. The moth emerges and lays eggs, usually in May and June, near trunk wounds or in crevices in the bark. Young trees are usually attacked near ground level, often around lawn mower injuries. Infestation of older trees is likely to occur in the limb crotches or on main limbs in association with pruning scars, cankers, or cracked bark. Young borers hatch in one to two weeks and quickly tunnel into the tree. Once beneath the bark, borers are protected from insecticidal sprays and are seldom detected until serious damage has been done.

## Diagnosis and Control

Off-color foliage, wilting terminal shoots, and crown dieback are early symptoms of borer attack. Infestation sites are often marked by scars or callous formations, adventitious growth (suckering), or large areas of cracked or loose bark, particularly near the ground or where main branches join the trunk. Large branches may die or become weakened and prone to wind breakage. Old trees may persist in an unthrifty condition and be reinfested year after year.

Active borers expel coarse, brown, sawdust-like frass (fecal material and wood particles) that accumulates around holes or cracks in bark or at the base of infested plants. In some hosts, especially *Prunus* spp., frass may be mixed with gum. Empty, tan-colored pupal skins, left partially protruding from the bark

when adults emerge in the spring, are another sure sign that borers are present.

Lindane and Dursban (chlorpyrifos) are registered for control of chewing borers on lilac, dogwood, rhododendron, oak, ash, and flowering fruit trees. Lindane, Throdan, and Dursban provide good control of dogwood borer. Dogwood trees should be sprayed in late May (i.e., around the week of Memorial Day, or when hawthorn and liffleleaf lindens are blooming). This will leave an insecticidal residue on the bark that will kill young borers as they hatch and attempt to bore into the tree.

## Why Some Dogwoods Have Borer Problems

Some dogwood trees are more susceptible to borers than others. Trees planted in full sun are more likely to be infested than those in shade. Trees with trunk wounds are more likely to be infested than nonwounded trees. Feeding sites tend to be high in old trees.

Problems with borers may be reduced by proper site selection and tree management. The following guidelines can help prevent borer infestations in trees and shrubs.

### Reduction of Tree Stress

- Avoid planting native dogwoods (*Cornus florida*) in full sun.
- Select hardy, well-adapted cultivars. Avoid grafted trees that are cultivars with variegated leaves.
- Maintain tree vigor through proper watering and fertilizing and by controlling pests, such as scales, aphids, leaf miners, and caterpillars.



Figure 2. Dieback of the crown, an early symptom of borer attack, on a dogwood in full bloom.



Figure 3. Loose bark and partial girdling of dogwood trunk was caused by borers.

- Mulch around dogwoods to conserve moisture, keep soil cool, and keep lawn equipment away.
- Purchase only healthy trees, and avoid planting new, healthy trees near infested trees.

### Prevention of Bark Injuries

- Mulch around trees and remove grass by hand rather than risk bark injuries from a mower or string trimmer. Using dogwoods in mulched beds eliminates the need for grass control next to the trunk. Hand pull weeds in the area.
- Avoid pruning trees from April through June (prior to or during the moth's flight period).
- Avoid tree wraps at planting times. Studies suggest borers are more likely to infest wrapped trees. Disadvantages of wraps far outweigh advantages.

### Early Detection and Timely Treatment

- Inspect susceptible trees regularly for evidence of borers, and apply insecticides only during periods when borers are vulnerable (late May).
- Remove badly infested trees that serve as reservoirs from which borers emerge to reinfest other nearby trees.

## Dogwood Diseases

### Dogwood Anthracnose

Dogwood anthracnose, also called lower branch die-back, causes leaf spots, stem cankers, and shoot death. Eventually, infected trees may decline and die. This disease should not be confused with spot anthracnose. Dogwood anthracnose, caused by the fungus *Discula destructiva*, appeared in the northeastern and northwestern United States in the early 1980s and spread into the Appalachian states in the late 1980s. The disease is present in most eastern Kentucky counties and in many western Kentucky counties, both in the forests and landscapes. Some landscape infections occurred because infected trees were transplanted from the wild and from infested nurseries.

Initial symptoms are medium-large lesions that vary from small, circular spots to irregularly shaped blotches. The purple-bordered leaf spots and scorched tan blotches may enlarge to kill the entire leaf. Blighted leaves often cling to stems after normal leaf drop in fall. Trunk sprouts occur during latter stages of disease development. The fungus infects twigs and can grow down a limb and infect the main stem. Cankers that form on main stems can be detected when the bark is peeled back. Cankers have a distinct dark stain compared to healthy cambium tissue. Although dogwoods in the landscape often survive anthracnose disease, they may not look good.

### Conditions Favoring Disease Development and its Control

*Anthracnose sometimes appears in Kentucky on infected trees brought into the landscape from the forest and on nursery stock brought from an infected area of Kentucky or another state.*

- Do not transplant dogwood trees from the forest.
- Purchase only healthy trees from a reputable nursery.

*Dogwood anthracnose is favored by wet, rainy weather and slow foliage drying.*

- Select a good planting site to promote rapid foliage drying. A sunny exposure from the east to dry the tree early in the day is most helpful.
- Remove shade and overhanging branches when necessary. Dogwoods tolerate and prefer partly shaded locations, so if a choice can be made, remove shade on the east side of the tree.
- Avoid watering with sprinklers that wet the foliage.

*Trees having adverse growing conditions are more susceptible to and/or are more damaged by dogwood anthracnose disease.*

- Protect trees from drought by watering at least once a week during dry spells. Do not use overhead sprinklers.
- Maintain a 2- to 4-inch layer of mulch, such as wood chips, to help maintain soil moisture, reduce competition from grasses or ground covers, and remove the need to use string trimmers and lawn mowers around the base of the tree.
- Reduce nearby shade to promote greater photosynthesis, but not so much as to cause heat and moisture stress.
- Diagnose and treat insect and other disease problems appropriately.

*The *Discula* fungus greatly damages the tree if it enters the trunk via sprouts and bark injuries.*

- Prune trunk sprouts in the fall.
- Avoid mechanical injuries such as those caused by lawn mowers or string trimmers.

*Some trees have genetic resistance to dogwood anthracnose.*

- Oriental dogwood (*Cornus kousa*) is anthracnose-resistant and should be considered for high-risk sites such as those with heavy shade and nearby diseased trees. Some of the hybrid dogwoods (*C. kousa* x *florida*) are reported to be susceptible.
- Pink dogwoods appear to be more susceptible than white-flowered trees.

*Left unchecked, the *Discula* fungus and the disease it causes will, under the right conditions, continue to develop in the tree.*

- Prune out and destroy dead wood and leaves as they occur. Rake up and destroy fallen leaves in autumn.
- If the tree is valuable enough, fungicide sprays may be warranted. The active ingredients chlorothalonil, mancozeb, maneb, propiconazole, and thiophanate-methyl or mixtures such as chlorothalonil + fenarimol and mancozeb + thiophanate-methyl are effective protectant fungicides. Fungicides should be applied beginning at bud break in the spring and continued biweekly until hot, dry summer weather. Thorough coverage is essential. Without proper equipment, protection from anthracnose with fungicides will not be effective.

### Dogwood's Future

It is likely that dogwood anthracnose will continue to be a serious problem in Kentucky. During certain parts of the growing season our weather favors disease development. Ultimately, the severity of dogwood anthracnose in Kentucky will depend on the weather and on how well we maintain our dogwoods in the landscape. Select dogwood trees and planting sites wisely, and be prepared to maintain them well. The U.S. Forest Service's color brochure *Growing and Maintaining Healthy Dogwoods* is available from the University of Kentucky Plant Pathology and Horticulture departments and from the Kentucky Division of Forestry.

## Powdery Mildew

Powdery mildew (causal fungus, *Oidium* spp.) seriously affects flowering dogwoods in many landscapes. Infected dogwoods show small, dark red splotches on upper surfaces of otherwise healthy appearing leaves. These splotches develop into brown, dead areas on the leaf. Affected trees may also show a yellow mottling and slight distortion of new leaves as well as yellowing of older leaves also infected with mildew. White, dusty fungal growth, the typical sign of powdery mildew, is not as obvious on dogwood as powdery mildews of most other plants in the landscape.

Powdery mildew infections reduce plant photosynthesis and increase leaf water loss partly through the mostly superficial fungal mycelium. Susceptibility of individual dogwood trees in landscapes varies greatly. Although wet leaves favor most landscape plant diseases, powdery mildew is an exception. Like other powdery mildews, dogwood powdery mildew is favored by relatively dry but humid weather.

**Control:** Avoid cultural practices that stimulate succulent growth and encourage powdery mildew. These include applying excessive nitrogen fertilizer, pruning heavily, and irrigating excessively. Continue good cultural practices, such as mulching over the root system, pruning out dead branches, and providing good air movement and light penetration by judicious pruning of nearby vegetation. If fungicide applications are being considered for preventing powdery mildew in valuable specimens, be sure that the product chosen has dogwood on the label. Thiophanate-methyl (Cleary's 3336) has a broad label for control of powdery mildew on many hosts, and propiconazole (Banner), labeled for dogwoods for anthracnose control, should also control dogwood powdery mildew. The fungicides will help prevent infections on healthy leaves, but they will not cure leaves already infected.

## Crown and Trunk Canker

The fungus *Phytophthora cactorum* causes a serious disease of transplanted flowering dogwood. Trees with low vitality, particularly those growing in poorly drained soil, are often infected. Leaves of infected trees are initially smaller and lighter green than normal. In late summer they turn red prematurely and may sometimes become scorched. Later, twigs and even large branches die back. This symptom can also be caused by borers, so diagnosis must be made by looking for a canker. The canker may be found on the lower trunk at or near the soil level where the fungus invades bark, cambium, and outer sapwood and causes discoloration of infected tissues. Cankers enlarge slowly for several years, and when they extend completely around the base of the trunk or root collar, the tree dies.

**Control:** Since the causal fungus appears to enter only through injured tissue, avoid wounding the trunk during transplanting and mowing around the tree. If the trunk is injured, trim back the bark around the wound, shaping it smoothly into an elliptical

form if possible. If a small canker is found, cut out the infected area. All diseased bark should be cut away as it appears. Trees with large cankers should be destroyed, and dogwoods should not be replanted in that spot for several years. Dogwood planting sites should be well drained. For poorly drained sites a better plant choice than flowering dogwood is pagoda dogwood (*Cornus alternifolia*) or shadblow, also called serviceberry (*Amelanchier canadensis*).

## Leaf Spot

The fungus *Septoria cornicola* infects leaves, causing angular grayish spots with dark purple margins. The disease is most common during wet seasons and in moist, shaded locations.

**Control:** Rake up and destroy infected leaves in the fall. If the disease has been severe the previous year, and if the specimen is valuable, preventive fungicide sprays applied at bud break may be warranted.

## Spot Anthracnose

The fungus *Elsinoe corni* causes spotting of flowers, leaves, stems, and fruit. Spots on bracts are reddish purple and may be as large as 1/10 inch in diameter. Spotting of bracts may be so severe that flowers are disfigured. Badly infected flower buds may never open.

Spots on leaves appear as circular to angular dark purple areas usually less than 1/25 inch in diameter. Diseased leaf tissues often drop out, leaving holes or ragged edges, and severely infected leaves may be reduced in size or killed. Spots on fruit and stems may be dark, and the spots are often slightly raised.

**Control:** If the disease has been severe the previous year and if the specimen is valuable, fungicides applied in early spring may prevent reinfection.

## Flower and Leaf Blight

The fungus *Botrytis cinerea* infects flowers at the end of their bloom period, causing irregular, brown, wrinkled patches on bracts. If the weather stays humid, these patches may be covered with a grayish mold. Infected bracts may fall on young leaves and cause leaf infections.

**Control:** This disease generally disappears in dry weather. When extremely wet weather occurs during bloom, thiophanate-methyl or iprodione sprays applied at bloom can be used to prevent the disease.

## Other Dogwood Problems

The major stress factors affecting flowering dogwood are unusually cold winters, wet springs, and hot, dry summers. While most flowering dogwood varieties are susceptible to these major stress factors, the kousa dogwood (*C. kousa*) appears to be resistant.

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