

IPM Series: Dogwood

Symptoms	Possible Causes	Notes
Leaf and Flower Spots	Dogwood Anthracnose, (<i>Discula</i>) Spot Anthracnose, (<i>Elsinoe</i>) <i>Septoria spp.</i> <i>Phyllosticta spp.</i> <i>Colletotrichum acutatum</i>	Spots on leaves and flower bracts; eventually expand (spring) Spots on leaves or flower bracts; spots 1/8" or smaller (spring) 1/4" angular spots on leaves (late summer to fall) 1/4" round spots on leaves (late summer to fall) Spots and blackened leaves and leaf drop (spring)
Leaf and Flower Blights	Dogwood Anthracnose <i>Botrytis cinerea</i> <i>Colletotrichum acutatum</i>	Blighted leaves and flowers Gray, fuzzy growth on terminal leaves and flowers Spots and blackened leaves and leaf drop (spring)
Leaf Yellowing	Calico Scale Cottony Maple Scale Oystershell Scale	Leaves may also have sooty mold No honeydew
White Coating on Leaves	Powdery Mildew	May be on upper and lower surfaces
Leaf Wilting	Club Gall Midge	Terminal leaves wilt and die, swelling on twigs
Leaves Eaten or Chewed	Dogwood Sawfly	Sawflies resemble caterpillars (often covered with white powdery material)
Early Fall Color	Drought Conditions Poor Site Conditions Crown Canker	General stress Peeling, cracked bark near base of tree
Failure to Flower	Dogwood Anthracnose	On lower branches
Twig Dieback	Dogwood Anthracnose Branch Cankers Dogwood Twig Borer Scale Insects Club Gall Midge	Lower branches Sunken, discolored areas on twigs Twigs may break off Leaf yellowing and stunting precede dieback Swelling near branch tips, terminals die prematurely
Branch Dieback	Dogwood Anthracnose Branch Cankers Dogwood Borer Flatheaded Apple Tree Borer Crown Canker	Lower branches Sunken, discolored areas on twigs Rough, knotty areas on trunk and large branches Cracked bark near base of young trees, large branch dieback Peeling, cracked bark near base of tree

Educating People To Help Themselves

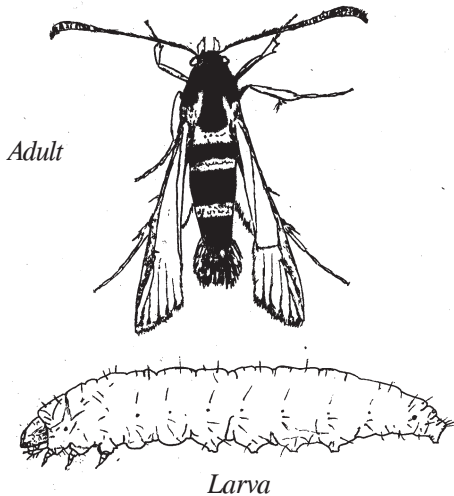
Local Governments - U.S. Department of Agriculture Cooperating

Culture

Flowering dogwood (*Cornus florida*) is a native forest under-story tree found growing in acidic, well drained soils in semi-shade. There are many cultivars available with pink or white flower (bract) colors and growth habits to choose from. Trees planted in poorly drained soils or fully exposed locations with limited moisture will be more prone to insect and disease problems. Dogwoods are poor choices for street trees because they do not tolerate heat and pollution stresses. The kousa dogwood (*C. kousa*), which has a longer bloom season and different growth characteristics, is more tolerant of dry conditions than the native flowering dogwood. There are several hybrids now available between the native flowering dogwood and the kousa dogwood that exhibit better disease resistance and longer bloom periods than the native species. Other trees or multi-stemmed shrubs in the same genus as dogwood, but less commonly seen in landscapes, include cornelian cherry (*C. mas*), red osier dogwood (*C. sericea*), and bigleaf dogwood (*C. macrophylla*).

Insects

Dogwood Borer (*Synanthedon scitula*)



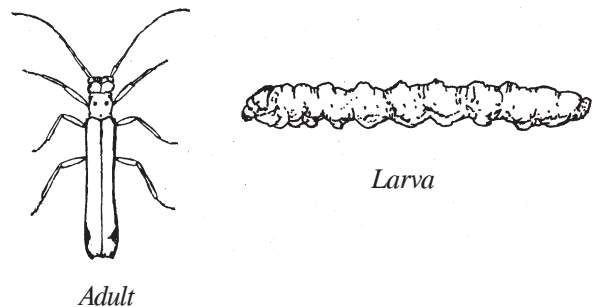
The dogwood borer is the major pest of dogwood. It most frequently attacks trees that are stressed or injured. The adult is a day-flying clearwing moth. It is about $\frac{3}{8}$ inch long, blue-black with two yellow bands around the abdomen, and resembles a wasp. Adults emerge from dogwood trees around mid-May, and continue throughout most of the summer. The female moth lays her eggs on the bark of the tree, and is particularly attracted to injured bark, scars and other rough areas on the trunk. Upon hatching, the young caterpillar finds a suitable place to enter the tree such as a wound, scar, woody gall or branch crotch. It will feed just under the bark in the cambium layer. The full grown caterpillar is white with a pale brown head, and about $\frac{5}{8}$ inch long. There is one generation a year. The caterpillar overwinters in its burrow under the bark and pupates in the spring. When the dogwood borer moth emerges, the brown pupal skin is frequently left behind in the exit hole, indicating the presence of this pest.

Small, wet areas on the bark, dead branches, adventitious growth (water sprouts on trunk and large branches), or sloughing and cracking of bark all can be symptoms of dogwood borer attack. Small trees or individual branches can be girdled and killed in one to two seasons. Larger trees with ongoing infestations often develop rough, knotty areas on the trunk and large branches, and may lack vigor.

The best control for dogwood borer is prevention. Keep trees healthy by fertilizing, watering and caring for wounds and pruning cuts. Place a barrier or mulch a wide around the base of the tree to avoid mower injury.

If control is warranted, beneficial nematodes have proved effective. Fall treatment is recommended to kill overwintering larvae. However, if the tree is heavily infested, the nematodes can be applied any time larvae are present (early spring through summer). The nematodes can be applied through a clean, compressed air sprayer. Follow label directions for dilution rates. Direct the spray at the borer gallery so that the maximum number of nematodes will make it into the gallery where the borers are. There are several commercial brands available such as "Biosafe", "Parasitic Nematodes Sc", "Hb Strain" (Garden's Alive), and others. Check with your local garden center or mail order supply company for nematodes that are available.

Dogwood Twig Borer (*Oberea tripunctata*)

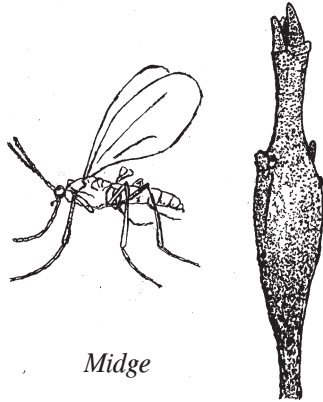


The dogwood twig borer is a less serious pest of dogwood. The adult is an elongate ($\frac{5}{8}$ inch) beetle with long antennae. This beetle has yellow/tan wing covers with a black line down the center and along the margins. There are two distinctive black dots just behind the head.

The adult beetle emerges from infested twigs in the spring and the female lays her eggs in healthy twigs. The yellowish larva that hatches from the egg begins tunneling in the pith, boring down the center of the twig, occasionally making a series of holes to the surface through which it expels boring dust. As the larva tunnels, the twig may break off or wilt behind it. There is only one generation each year, with the larva overwintering inside the twig.

To control dogwood twig borer, infested twigs should be clipped off several inches below the girdled or infested portion and destroyed. This should be done after wilting occurs and before adult emergence in the spring. This insect usually does not cause serious problems.

Dogwood Club Gall Midge (*Mycodiplosis calvula*)



Midge

The dogwood club gall midge is responsible for spindle shaped swellings near the tips of dogwood twigs. The adult midge is a small, delicate, brown fly. The adult midges emerge in May and the female deposits eggs in new terminal leaves. The newly hatched larvae, or maggots, work their way into the developing twig. As the yellow-orange maggots grow, the tissue swells around them forming the characteristic gall.

The first evidence of the presence of the club gall midge may be a wilted, deformed leaf. A light infestation will cause little harm, but a heavy infestation can stunt a tree. The galled twigs and terminals die prematurely and flowering is reduced. Prune out and destroy the galls in summer before the maggots drop to the ground to pupate in the fall. This insect usually does not cause serious problems.

Scale Insects

There are several scale insects, such as calico scale, cottony maple scale, and oystershell scale, that can become pests on dogwood. These insects attach themselves to branches or leaves where they suck juices from the tree. Heavy infestations may cause leaf yellowing, stunting and dieback. Calico scale and cottony maple scale are both soft scales and produce honeydew.

Calico Scale (*Lecanium cerasorum*)

Female calico scale insects are very conspicuous in May. They are large (1/4 inch long), black and white-spotted and swollen. They are found on twigs and branches. (Look above honeydew and sooty mold deposits.) By mid-June they die, shrivel and turn brown. Eggs hatch at this time and tiny white crawlers settle on leaf veins. These immature scales turn yellow and feed on the leaves during the summer. They move onto the bark to overwinter. This scale is usually controlled by beneficial insects and generally does not require spraying.

Cottony Maple Scale (*Pulvinaria innumerabilis*)

The cottony maple scale is easiest to find in May and June. During this time, 1/4 inch long white ovisacs may be found on branches and twigs. Ovisacs are white, cottony masses that contain eggs. Crawlers hatch in June and settle on leaves to feed. Examine the undersides of leaves for the flat, yellow, immature scales along the leaf veins. They will be found where honeydew and/or sooty mold are present. Adult female scales are 3/16 inch long, black, flat and oval. There is one generation a year and immatures overwinter on the twigs.

If it is necessary to control either calico scale or cottony maple scale, apply a horticultural oil (2% summer rate) or insecticidal soap spray during the summer. During the dormant season apply a horticultural oil (4% dormant rate) to control overwintering immature scales.

Oystershell scale (*Lepidosaphes ulmi*)

This is an armored scale and unlike the cottony maple and calico scales it does not produce honeydew. Heavy infestations of this scale may cause yellowing, wilting and eventually branch dieback. To monitor for this pest, look for tiny (1/8 inch long), oystershell shaped, brown to gray scale covers on the bark of wilting or dead branches. There may be one or two generations a year. Crawlers are present in May. They are about the size of a pin head and light colored. Look for the crawlers near the old scale covers. They do not settle on the leaves, but stay to feed on the twigs and branches.

Control: Prune out heavily infested branches. A dormant oil spray may be applied in late winter. Be sure to thoroughly cover all of the branches. A summer rate (2%) spray of horticultural oil may be used in summer. It is much easier to spray the trees for all of the scale insects listed in late winter to control the overwintering scales. Spraying during the dormant season also lessens the impact on beneficial insects that are present during the spring and summer.

Dogwood Sawfly (*Macremphytus tarsatus*)

The dogwood sawfly is an occasional pest of dogwood. The larvae feed on the foliage of several species of dogwood. The larvae resemble caterpillars and are most often seen covered with a white powdery material.

Adult sawflies emerge during late spring and early summer. The female lays eggs on the undersides of the leaves. Upon hatching, the young larvae feed together and skeletonize the leaf. As they grow, they will eat all of the leaf except the midrib. After the second molt, the larvae become covered with a white powdery material. After their final molt they lose the powdery covering and change color. The mature larvae are yellowish with a shiny black head and black spots. These mature larvae will wander about in search of an overwintering site,

generally in soft or decaying wood. There is one generation a year.

Control: is seldom needed. Hand picking is the easiest way to control this sawfly. However, if the infestation is heavy, they may be controlled with an insecticide registered for use on dogwood.

Flatheaded Apple Tree Borer *(Chrysobothris femorata)*

The flatheaded apple tree borer attacks a wide variety of shade and fruit trees. On dogwood it can be a serious problem on young trees that are planted too deeply and on stressed, older trees. The adult beetle is ½ inch long, oval, flattened, greenish bronze above and brassy below. The wing covers have wavy, light colored indentations. The adults may be seen running over the bark of trees and fly when disturbed.

Adults appear in summer and feed on the foliage of host trees. They lay eggs under bark plates or in bark crevices on the main trunk or larger branches. The larvae bore into the tree and feed in the phloem and outer sapwood. Larvae are called flatheaded borers because of the enlarged, flattened area behind the small, black head. They are creamy colored and excavate large, irregular tunnels in the phloem on the main trunk and larger branches which die back first. Mature larvae overwinter in cells in the outer wood and pupate in the spring. There is one generation per year.

The larvae may be found boring into the base of these trees. Small trees are often killed. Large trees are seriously injured from dieback of branches and loss of large patches of bark over mined areas on the trunk.

Control: The best control for flatheaded apple tree borer is prevention. Plant trees at the proper depth and in the best conditions possible. Maintain vigor and good cultural practices. It is essential that young trees receive adequate water during establishment.

Diseases

Dogwood Anthracnose *(Discula destructiva)*

This is the most serious disease of dogwoods in the landscape and our forests. The fungus involved causes dieback or even death of infected trees. The early symptoms begin in mid to late May as leaf spots with tan or purple borders. In wet weather these spots can rapidly enlarge and kill the entire leaf. These blighted, drooping leaves will remain hanging on the branches in wet weather. The disease will then spread from the infected leaves into the twigs and branches and cause dieback of the limbs. If the dieback reaches the main trunk the entire tree can be killed. To distinguish this disease from other leaf spots, examine the underside of the leaves for numerous small tan to brown dots, about the size of a printed period, scattered within the blighted tissue. These dots are the source of spores that will be washed by rain or dew and spread by insects to healthy leaves and neighboring trees.

Control: Both cultural and chemical control strategies are necessary. Prune out all dead or dying twigs and limbs during dry weather. All water sprouts or suckers on trunks and branches should also be removed at this time. In the fall, leaves should be raked up and removed. Remove any dead leaves still attached to the branches. Avoid over application of fertilizer that results in succulent new growth with greater susceptibility to disease. Avoid digging native trees from the woods and transplanting them into landscapes. This practice can introduce the disease into a neighborhood community that was previously disease free.

Fungicides can be utilized on trees in landscapes in the spring at bud break, followed by additional sprays every 10-14 days until leaves are fully expanded. Trees should also be sprayed once in the fall after the leaves have changed color, but before leaf drop.

In areas with severe disease, consider planting resistant dogwood species such as the flowering dogwood cultivar 'Appalachian Spring', kousa dogwood cultivars, (*Cornus kousa*), or hybrids between kousa and flowering dogwood such as 'Celestial', 'Milky Way', 'Stardust', 'Steeple', 'Stellar Pink' and others.

Crown Canker *(Phytophthora cactorum)*

This serious disease of dogwoods usually results from an injury to the bark near the base of the trunk that is then invaded by this fungus. Early symptoms include smaller than normal leaves, pale green leaves, and early red fall coloration, especially on individual branches along one side of the tree. Eventually, the entire tree may show these symptoms. When the canker completely girdles the trunk, the tree will die shortly thereafter. In the early stages, the canker can be hard to find, but if cut into, will reveal discolored wood under the bark. As the canker enlarges it will form a sunken area on the trunk and the bark will dry and crack, exposing the wood underneath.

Control: There are no chemical fungicide controls for this disease once symptoms are visible. Do not replant dogwood trees in the same spot that a diseased tree was growing. The best way to avoid this disease is to prevent wounds or damage to the trunk. Maintain a mulched, weed free area around dogwoods to prevent injury from mowers and string trimmers. Avoid buying trees with wounded bark from retail outlets. Bark injuries can occur when the plants are dug at the nursery, shipped or moved around within the retail sales yard.

Leaf and Stem Blight *(Colletotrichum acutatum)*

This is a relatively new disease of dogwoods in Maryland that begins as dark blotches on the leaves and petioles, twigs and fruit. These dark blotches quickly enlarge in size and run together causing the entire leaf or twig to turn black. As leaves become blighted and turn black, the entire tree can be severely defoliated.

Control: Prune out and destroy any diseased branches promptly and avoid over use of fertilizers that encourage excessive succulent new growth.

Powdery Mildew (*Microsphaera pulchra*)

In the past, this disease has occurred sporadically. However, in recent years the *Microsphaera* powdery mildew has become a more severe and wide spread problem. It appears as a powdery white coating on the leaves from early summer through fall. Under severe conditions, the new leaves can become twisted and distorted. Older infected leaves often develop purple blotches that progress to dead areas. Infections cause the loss of water and photosynthetic leaf area which weakens trees and reduces growth.

Control: When selecting new plants, choose powdery mildew resistant hybrid cultivars of flowering dogwood such as 'Cherokee Brave', 'Pink ', 'Sweet Water Red ', or Kousa hybrids such as 'Galaxy'. Other resistant dogwood species include; Pagoda (*C. alternifolia*), Bigleaf (*C. macrophylla*), Red osier (*C. sericea*), and Tartanian (*C. alba*). Pruning for better air circulation may help. Check the label registration on horticultural oil products for powdery mildew control listings.

Twig and Branch Cankers (*Botryosphaeria* sp.)

Although this disease is rarely serious it can cause limb die-back. Diseased sections on twigs and small branches begin as small discolored areas with sunken or cracked bark. The fungus *Botryosphaeria* appears to be more severe on pink flowering cultivars.

Control: Healthy trees are less susceptible to this fungal disease. Maintain healthy trees by irrigating during drought and avoiding over fertilization to prevent excessive succulent growth. There are no effective chemical controls for this disease once diagnosed, so prune out infected branches promptly.

Leaf and Flower Blight (*Botrytis cinerea*)

This fungal disease can be serious during wet spring weather. The symptoms range from a spotting of the flower bracts to a complete collapse of the bracts. Infected bracts eventually become covered with a gray fuzzy growth of fungus. This description of disease symptoms gives this fungal organism the common name 'gray mold'. Infected bracts that fall onto leaves can also cause leaf and twig infections.

Control: Generally, no chemical controls are needed for this disease because drier weather will stop disease progression before serious damage occurs.

Spot Anthracnose (*Elsinoe corni*)

This fungal disease can affect both flower bracts and leaves during wet spring weather. The symptoms are characterized by numerous small (1/8 inch) spots with purple borders. When numerous, these spots can cause bracts and leaves to become wrinkled and distorted.

Control: If spotting becomes severe, fungicides can be used in the spring at bud break followed by additional sprays every 7-14 days until leaves are fully expanded.

Leaf Spots (*Phyllosticta* and *Septoria* spp.)

These leaf spots appear in late summer and fall on the upper leaf surfaces, but rarely cause much damage. The dark spots are circular to angular in shape with purple borders and are about 1/4 inch in diameter. Occasionally, very small black dots are visible inside these spots that indicate where the infectious spores are formed. Under severe conditions the dogwood fruit may become discolored and shriveled.

Control: Generally, no chemical controls are needed for these late season diseases. Raking and disposal of leaves in the fall can reduce disease incidence.

Authors: Mary Kay Malinoski and David L. Clement, Regional Specialists, Home and Garden Information Center, University of Maryland at College Park and University of Maryland Eastern Shore.
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