



## **INSECTS**

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### **Two-Spotted Spider Mite**

The lack of rain and the warm temperatures experienced throughout many regions of Illinois over the past month have created conditions conducive for outbreaks of two-spotted spider mite, *Tetranychus urticae*. Under moist conditions, spider mites are generally not a problem because natural fungi keep the populations in check. However, when rainfall is insufficient, the natural fungal populations decline, allowing spider-mite populations to increase.

There are two types of spider mites that attack trees and shrubs in Illinois: warm-season and cool-season mites. Cool-season mites, which include the spruce spider mite, *Oligonychus ununguis*, are active in spring and late fall. During the summer months, they remain in the egg stage. Warm-season mites, such as the two-spotted spider mite, are primarily active during late spring to early fall.

Two-spotted spider mites feed on a variety of trees and shrubs, including rose, azalea, maple, elm, redbud, ash, euonymus, black locust, and poplar. They are green to greenish yellow with two lateral dark spots that are visible when the mite is viewed from above. The two-spotted spider mite can be found on all areas of plants but is often more numerous on older leaves. It primarily feeds on leaf undersides within plant cells and removes chlorophyll (green pigment) with its stylet-like mouthparts. Spider mites generally feed near the midrib and veins. The leaves appear stippled with small silvery-gray to yellowish speckles. Heavily infested leaves turn brown and eventually fall off.

Warm and dry conditions favor rapid spider-mite development and increased feeding and reproduction. The life cycle from egg to adult can occur in 5 days at 75°F. Females, which don't have to mate to reproduce, live 2 to 4 weeks and can lay 100 to 300 eggs. Two-spotted spider mites spend the winter in protected places, such as on weeds, in ground litter,

or in debris. They do not overwinter on plants, which means that applications of dormant oil sprays are not effective.

Two-spotted spider-mite management involves maintaining plant health and/or the use of pest-control materials. Reducing plant stress through proper watering and fertility minimizes potential problems with spider mites. For example, lack of sufficient moisture or overfertilizing plants, especially with nitrogen-based fertilizers, will result in higher spider-mite populations. Monitor for spider mites by knocking them off branches onto white paper, where they can be seen more easily. Plant-feeding spider mites produce a green streak when smashed, whereas predatory mites produce a red streak when smashed. A hard spray of water can be used to dislodge spider-mite eggs and live spider mites.

Pest-control materials recommended for managing spider mites include abamectin (Avid), bifenthrin (Talstar), dicofol (Kelthane), hexythiazox (Hexygon), insecticidal soap, and summer oil. Be sure to concentrate sprays on leaf undersides. Make spray applications before spider-mite populations are high and aesthetic injury is visible. Note that many of these pest-control materials are harmful to beneficial insects and mites that naturally feed on spider mites, so that continual use of these materials may be necessary. (Raymond Cloyd)

## **PLANT DISEASES**

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### **Dogwood Leaf Spots Got You Concerned?**

While Septoria leaf spot is fairly unimportant in terms of plant health, it's one of those late-summer diseases that often catches the attention of dogwood owners and enthusiasts. Why? Because it is a foliar disease that really stands out, and most folks who own or work with dogwoods are aware of a different, but far more destructive, disease called dogwood anthracnose. In issues No. 9 and 10 of the *Home, Yard & Garden Pest Newsletter*, Nancy Pataky did a wonderful job of describing three spring/summer dogwood foliar diseases: dogwood anthracnose, spot anthrac-

nose, and powdery mildew. This article is intended to describe yet another dogwood disease that causes concern, and it should help to complete the picture of dogwood foliage diseases in Illinois.

Septoria leaf spot is a fungal disease that typically appears in July but is usually not noticed until early to mid-August or later. As of this writing, several reports have come in from around the state, including The Morton Arboretum. Leaf lesions are fairly uniform in size, up to about 1/4 inch in diameter, somewhat angular in shape, and are limited by veins. At first, the lesions are brown, but they turn grayish to nearly white as they mature. While Septoria leaf spot symptoms may be a bit startling, the disease is *not* recognized as a threat to the health of dogwoods.

For more information about these dogwood diseases and much more, consult the previously mentioned *Home, Yard & Garden Newsletter* articles and the following sources:

- Virginia Tech's "Foliar Diseases of Dogwood" (Pub. #450-611; revised 5/2000) at [p://www.ext.vt.edu/pubs/plantdiseases/450-611/450-611.html](http://www.ext.vt.edu/pubs/plantdiseases/450-611/450-611.html)  
<http://www.ext.vt.edu/pubs/plantdiseases/450-611/450-611.html>.
- University of Tennessee's "Dogwood Working Group" Web site at <http://dogwood.ag.utk.edu/>. (Bruce E. Paulsrud)

### **Crown Gall**

When most people see a gall on a plant, they think of insects as being the cause. Crown gall may resemble insect galls but is a disease caused by a bacterial pathogen, *Agrobacterium tumefaciens*. The bacterium enters the plant through a wound, and the plant forms a gall in response to this infection. Actually, crown gall is an odd plant disease. The bacteria cause uncontrolled cell division in the host plant, resulting in gall formation. Genetic coding from the bacterium actually becomes incorporated into the host genetic coding. As you can imagine, this disease system has been studied and used extensively in research on genetic manipulation of plants.

Many plant species are susceptible to crown gall. We usually see the galls on creeping euonymus, but it may occur on rose, lilac, willow, honeysuckle, and other common landscape plants. The conifers are resistant to this disease.

The galls appear first as swellings on the stem near the soil line, thus the name, crown gall. Eventually galls may appear on the trunk, crown, roots, and outer stems of the host plant. Young galls are white or tan,

usually round, and are quite soft and spongy. As the gall ages, it develops an irregular, convoluted, rough, corky surface and a dark brown, hard, woody interior. These galls might be mistaken for insect galls. Cut into the gall to make the distinction. The galls from crown-gall disease appear as a mass of undifferentiated tissues, whereas insect galls have galleries or pockets with or without insects present. Abnormal growths on plants, sometimes called burls, can also resemble crown-gall infection. The bark of the host usually remains on the burls but is not present on galls of crown gall.

This disease is quite persistent because *Agrobacterium* can survive in the soil more than 5 years without a host. It is easily spread in soil water or rain splash but can penetrate plants only through fresh wounds. Such wounds might be made during pruning, cultivating, transplanting, budding, or grafting, or feeding by insects or other pests. If you let your dog run through the planting, enough wounding can occur to let the pathogen enter.

Control of this disease is very difficult. If you decide to remove plants and start over, you will need to use plants that will not host this disease. For instance, if you had a bed of creeping euonymus with crown gall, do not put healthy creeping euonymus back in that bed. They will become infected in time. If you are moving to a new site, inspect new plants for galls. Do not buy plants with galls. Because plants may have the crown-gall disease and remain symptomless, do not try moving seemingly healthy plants from your infected bed to the new site.

Some plants that are not reported to host crown gall include barberry, hornbeam, true cedars, ginkgo, golden-raintree, tuliptree, mahonia, spruce, linden, boxwood, catalpa, beech, holly, larch, magnolia, black gum, pine, Douglas fir, baldcypress, hemlock, birch, firethorn, redbud, smoke tree, sweetgum, deutzia, serviceberry, yellowwood, yew, and Zelkova. As previously stated, the conifers do not host crown gall, so you can replace infected euonymus ground cover with one of the recumbent junipers. For more information on crown gall, consult *Report on Plant Diseases (RPD)* No. 1006. (Nancy Pataky)

### **Cankers of Trees and Shrubs**

A canker is a dead area on the stem or trunk of a tree or shrub. The vascular tissue under the canker is dead as well. Cankers also appear on herbaceous plant material, usually as sunken dead areas on the stems. The term *canker* is a general term referring to a

**Table 1. Comparison of dogwood foliage diseases in Illinois**

	<i>Dogwood anthracnose</i>	<i>Spot anthracnose</i>	<i>Septoria leaf spot</i>	<i>Powdery mildew</i>
When symptoms are first noticed	spring/early summer	spring/early summer	summer/early fall	summer
Lesion diameter	1/4" or larger, often enlarge, become irregular in shape and merge, causing leaf blight	Circular, typically less than 1/8"	Slightly angular, typically 1/4", restricted by veins	<u>Symptoms:</u> White fungal growth on leaves may be difficult to see. Leaves may be stunted, reddened, and curled or puckered by mid-season. Plant may appear water-stressed.
Lesion color	Dark brown with purplish margin	Whitish center with purplish border. Lesion center often falls out later in season.	Dark brown with purplish margin. Center turns grayish to nearly white with age.	
Damaging?	Yes! While not common in Illinois, it does occur. It's most common in shaded/protected areas.	Generally not	Generally not, since it occurs late in the season.	Repeated, severe infection will weaken tree.
Host resistance	Resistant cultivars of both flowering and Kousa dogwood are available.	Unknown	Unknown	Resistant cultivars of both flowering and Kousa dogwood are available.

symptom on the plant but does not indicate cause. Cankers may be caused by injuries (hail, mowers, insect feeding, etc.), environmental stress (cold, heat, scald, etc.), chemicals, or pathogens. They are common on a variety of trees and shrubs, typically occurring on trunks, older branches, or injured plant areas on smaller twigs.

If the canker itself goes unnoticed, the newest leaves are usually the first clue to a problem. As the canker girdles the stem, leaves begin to wilt, turn yellow, and then brown. Some young twigs may curl downward. Bark on the younger twigs may lose color or blacken, depending on the canker or plant involved. The cankers produced by fire blight are often black on pear and brown on apple. If a canker girdles the stem, the twig will die from that point to the tip. If the stem is not girdled, the stem may show one-sided death or some leaves will be affected while others are green. Cankers usually take months, sometimes years, to enlarge enough to girdle twigs, branches, and trunks. Canker appearance may be swollen, sunken, cracked, discolored, or may bleed sap or moisture. Fungi are usually the causal organisms involved in canker development, but occasionally we find a bacterial canker. The fungal cankers often contain fruiting bodies of the fungus. These appear as pin-

head-sized black specks embedded in the bark. Often these fruiting bodies appear as small bumps covering the cankered area. In wet weather, they may exude colorful spore tendrils. Bacterial cankers do not contain fruiting bodies.

Although we find a pathogen in association with many cankers, the pathogens are usually opportunistic fungi. They do not cause problems on healthy trees. They only infect trees under stress. For this reason, canker fungi are known as stress pathogens. Canker pathogens enter through environmental injuries such as sun scald (summer or winter) or through injuries caused by insects, diseases, pruning, animals, mechanical and chemical sources, or through weakened tissue caused by poor growing conditions, transplant shock, excess or deficient soil moisture, rapid temperature changes, nutritional imbalance, extensive defoliation, and so on. Because stress is the actual predisposing factor for cankers, the first step toward disease management is identification of the source of stress. Once the stress is identified, correct or modify the site, soil, or surrounding plants to make the conditions less conducive to cankers. This might involve diverting drainage away from the plant, pruning surrounding plants to allow better air flow, fertilizing the tree, providing water in drought, and so on.

Reduce risk of cankers by using plants adapted to your area. Buy vigorous, healthy-looking plants. Plant at the proper depth. Space plants based on mature size. Grow plants in well-drained, fertile soils with the needed soil pH for best plant growth. In other words, avoiding cankers is one of the major reasons for following all of those good horticultural practices we have all learned.

Once a canker problem is noticed, you have the option of leaving the canker alone or trying to remove the affected area. If it is on the trunk, you may opt to leave it alone or remove as much of the decayed wood as possible so that the tree can more readily callous over the injured area. Prune out stem cankers where aesthetically unappealing or where it is obvious that they will soon girdle the stem. Some cankers, such as anthracnose on sycamore, cannot be removed without removing most branches. Leave these on the tree and take measures to promote tree health.

When pruning out cankers, keep in mind that this wood is infected with a pathogen. Remove affected wood from the site. Disinfect pruning shears between cuts when possible. Always try to prune in dry weather to prevent pathogen spread. With oaks, we only prune in the dormant season to avoid attracting beetles that might bring the oak wilt fungus to the tree. A

report on cankers and dieback diseases of trees is available in *RPD* No. 636. (Nancy Pataky)

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