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Nursery License Renewal

You should have received your nursery license renewal form in the mail in June. Most of you have returned the application and we thank you for your quick reply. For those of you who have not yet paid, please do so as soon as possible.
Leaf Spots Can Damage English Ivy
by John Hartman, Extension Plant Pathologist

There are two important English Ivy (Hedera) leaf spot diseases in Kentucky, one caused by a bacterium, and one by a fungus. The two diseases are sometimes difficult to distinguish. The warm weather and periodic thundershowers of recent weeks have favored ivy leaf spot diseases.

Bacterial leaf spot is favored by periods of warm, wet weather typical of summer in Kentucky. Bacteria living on the leaf surface may be splashed from plant to plant and driven into the leaf through open stomata during daytime thundershowers. This disease, caused by the bacterium Xanthomonas campestris pv. hederae, is especially damaging now to ivy growing in many landscapes. The bacteria invade leaves, shoots, and stems through stomata and wounds causing, on the leaves, a greenish-brown angular spot 1/4 to 1/2 inch or larger in size. The spots sometimes appear greasy and may have a yellow margin; as they age, spots turn dark brown and may crack as they dry.

The disease is diagnosed in the laboratory by observing bacterial streaming under the microscope. However, the disease is so active now that county agents or landscape industry specialists can also diagnose the disease in the field in the same way. Cut through several leaf spots with a sharp knife and place small infected leaf pieces on a glass slide. Add a drop or two of clean water to the infected tissue and cover with a small glass cover slip. After a few minutes to an hour, bacterial streaming can be seen just by holding the glass slide up to the light and observing the milky color of the water near the dissected leaf spot.

Growers should avoid planting diseased plant material, and avoid sprinkler irrigation which splashes bacteria from diseased to healthy plants. Copper-based fungicides which also serve as bactericides can be used to slow the spread of bacterial leaf spot.

Fungal leaf spot (anthracnose) appears as large, irregularly shaped tan or brown spots having numerous pimple-like fungal fruiting structures in the dead tissues. The causal fungus is Glomerella cingulata, however, the imperfect fungal state, Colletotrichum, is normally observed now. Close examination with a hand lens may show spine-like formations associated with the fungal fruiting structures. There are other fungal leaf spot diseases of English Ivy which also produce fungal fruiting structures; these distinguish them from bacterial spot, which produces none.

Fungal spots do not produce bacterial streaming as described above. Spores of the fungi causing leaf spots may be splashed from plant to plant by rainfall.

Controls for anthracnose and fungal leaf spots are similar to controls for bacterial leaf spot, except that fungicides such as thiophanate-methyl [Cleary's 3336] (cleared for anthracnose of landscape plants) and mancozeb [Fore] (used for fungal leaf spots of ornamentals and which can be tried on unlabeled ornamental plants) are also available.

What Was That Big Yellow, Orange & Black Thing?!?
By Mike Potter, Extension Entomologist

Cicada killers are now flying, prompting several calls from homeowners. Despite their menacing appearance (up to 2 inches long with rusty red head/thorax, amber-yellow wings, and black and yellow striped abdomen), the wasps seldom sting unless handled or otherwise molest.

Cicada killers do not live in communal nests like hornets or yellowjackets. They overwinter as larvae within cocoons, deep in the soil, emerging as adults during July. The females feed, mate, and excavate burrows in the ground about « inch in diameter, ending in a series of brood chambers. Excess soil is pushed out of the burrow, leaving a small, U-shaped mound of dirt at the entrance. Each female excavates numerous burrows and provisions them with adult cicadas which she ambushes, paralyzes with her venom, and stuffs into individual brood chambers. She then lays an egg on top, backs out, and seals the cell behind her. The egg hatches within a few days and the hungry larva devours the offering, eventually transforming into a pupa the following spring.

Management - Cicada killers seldom sting and the females normally do not defend their burrows. The males, while incapable of stinging, sometimes dive-bomb passers-by, or hover menacingly nearby. Insecticide treatment may be warranted where the soil burrows become unsightly. Individual burrows can be effectively dusted or sprayed with most yard insecticides (e.g., Sevin, diazinon, Bayer Advanced Lawn & Garden Multi-Insect Killer) or a wasp & hornet aerosol spray. Large numbers of nests may need to be treated with a broadcast application to the surface of the turf.
Velvet Ants Pack Punch  
By Lee Townsend, Extension Entomologist

Velvet ants, also known as “cowkillers” are large and furry like a bumble bee, but are marked with red and black or orange and black. Actually they are a type of wasp with a very long stinger and a potent venom. The “cowkiller” name refers to the pain of a sting.

Velvet ants can be seen running around in the yard during late summer. They are parasites of bees and wasps that nest in the ground. Velvet ants prefer bare areas in sandy soil where their prey are most likely to be found. There is no effective control measure for them. If they are particularly abundant in an area, it may be helpful in the long run to overseed to get a better grass cover. This would discourage the ground nesting bees and wasps on which the velvet ants feed.

Iron Chlorosis  
Ohio State University Extension Fact Sheet, by Elton M. Smith

Iron is necessary for the formation of chlorophyll, which is responsible for the green color in plants and is the source of plant food and energy. When the amount of iron available to plants is inadequate for normal growth, leaves become pale green, yellow or white and eventually brown, particularly between the veins. Mildly affected plants become unsightly and grow poorly. Severely affected plants fail to grow flower or fruit and may even die from lack of iron.

Iron chlorosis occurs most often in pin oak, white oak, white pine, magnolia, holly, sweet gum, dogwood, azalea and rhododendron.

Iron chlorosis may occur as a result of one or a combination of causes. The condition is often due to high pH, which makes it possible for other elements to interfere with the absorption of iron, rather than to a lack of iron in the soil. This occurs in neutral to alkaline soils when the pH is above 6.5.

Chlorosis may be caused by an actual deficiency of iron or by application of excessive amounts of lime or phosphate to certain soils. It may be caused by over-watering, poor drainage or high levels of certain mineral elements in the soil such as manganese, copper or zinc.

The visual symptoms are often confused with other conditions such as a deficiency of magnesium, manganese or boron, or possibly other non-nutrient related problems.

Control

If overwatering or poor drainage are possible causes, they should be corrected. Poor drainage is quite common in much of the silt and clay loam soils in Ohio, and tile lines may have to be installed near valuable trees.

The pH, particularly in central and western Ohio, is quite often above 7. For permanent control, this must be lowered by annually applying to the soil ammonium sulfate, aluminum sulfate or sulfur. Ammonium sulfate is used at the rate of 10 pounds per 1,000 square feet and sulfur at 25 pounds per 1,000 square feet per pH unit to be lowered and aluminum sulfate at higher rates.

A soil sample and leaf sample should be taken and forwarded to the REAL Laboratory at OARDC. The report that is returned will give soil pH reading and levels of as many elements as the sender specifies. This will reveal if elements are deficient or in excess and, therefore, interfering with iron uptake.

Once these other possible causes have been corrected, applications of iron may not be needed. If, however, plants remain chlorotic, iron can be supplied to plants in different forms.

The two principal types of iron-containing materials are iron chelates, organic in nature, and inorganic compounds in soluble form such as ferrous sulfate. Iron chelates are marketed under various trade names and in various formulations. The iron in chelates remains available to plants when the chelates are placed in the soil. Some formulations of iron chelate can be applied to the foliage; however, this approach is usually not as permanent as soil applications. Follow the manufacturer’s recommendations for amount of use. Some fertilizers contain iron chelates, and use of these with plants susceptible to iron deficiency is recommended.

Ferrous sulfate can also be applied to the soil or foliage. For foliar application, use 2 1/2 ounces of ferrous sulfate in 3 gallons of water. This treatment will probably require reapplication a number of times. A convenient way to determine how much ferrous sulfate is needed for soil application is to measure the diameter of the periphery of the tree at the drip line (ends of branches). If the treatment is made when the trees or shrubs are dormant, use 1 gallon of ferrous sulfate solution (1 pound of ferrous sulfate per gallon of water) for each foot of the diameter of the periphery. If the treatment is made during the growing season, use 1/2 gallon per foot diameter. The solution can be applied over the surface of the soil; however, it's more effective if holes are drilled and the solution poured in. Drill holes 3 feet apart around the periphery and deep enough to hold 1/2 to 1 gallon of solution.

Injections of liquid iron sulfate into tree trunks under pressure have also been effective for one to two seasons.

Encapsulated ferric ammonium citrate inserted into pin oak trees around the base of the trunk will prevent iron chlorosis for up to three years and is usually more effective than either foliar or soil treatment. The small wounds caused by drilling and capsule insertion should close in one season. The capsules are available from garden centers.

Generally, trees that are chlorotic from a lack of iron will respond to one of the above treatments. Some plants may require a combination of above treatments for two or more years to completely cure the problem. Annual fertilizer treatments, as outlined in the Extension fact sheet “Fertilizing Trees” (HYG-1002-96), help to maintain
healthy growth and should always be applied in conjunction with iron treatments.

When leaves of plants become chlorotic, always determine the primary cause and then take the necessary steps to prevent further damage.

**Locust leafminer**
By Monte Johnson, Extension Specialist

It seems like most years we will see black locust leaves turning brown about this time of the summer. In some years, such as this one, it is quite noticeable. The culprit that typically is causing this unsightly problem is the locust leafminer, *Odontota dorsalis*. In its adult stage, this insect is a ¼ inch-long beetle that is brownish-orange with a black stripe down the back and black legs, head and antennae. After overwintering as an adult, the beetles emerge and start feeding on black locust developing foliage, and so will lay eggs on the undersides of the leaves. Flattened, yellowish-white larvae can be seen tunneling inside the leaves forming a mine that looks like an irregular blotch. After pupating in the mine, adults emerge and begin to skeletonize the undersurface of the leaves and will lay eggs for a second generation. The combined feeding of larvae and adults may destroy much of the foliage and result in seriously stressed trees. Other host plants listed for this beetle include false indigo, bristly locust, *Sophora japonica* and golden chain tree. Adults will feed on a variety of foliage including dogwood, elm, oak, beech, cherry, wisteria, hawthorn as well as several herbaceous plants. If control measures are needed, a variety of insecticides are labeled for this pest, including Dursban, Lindane, and Talstar. Timing is important to control the adults and larvae before they enter the leaves.

**Powdery Mildews on Ornamental Plants**
Ohio State University Extension Fact Sheet, by Stephen Nameth and Jim Chatfield

Almost all landscapes have plants that become diseased with one of the powdery mildew fungi. Although the fungi that cause powdery mildew are usually different on different plants, all of the powdery mildew diseases are similar in appearance. In most cases, prompt recognition and control actions can prevent severe damage to plants from powdery mildew diseases.

**Symptoms**

Powdery mildews, as the name implies, often appear as a superficial white or gray powdery growth of fungus over the surface of leaves, stems, flowers, or fruit of affected plants. These patches may enlarge until they cover the entire leaf on one or both sides. Young foliage and shoots may be particularly susceptible. Leaf curling and twisting may be noted before the fungus is noticed. Severe powdery mildew infection will result in yellowed leaves, dried and brown leaves, and disfigured shoots and flowers. Although it usually is not a fatal disease, powdery mildew may hasten plant defoliation and fall dormancy, and the infected plant may become extremely unsightly. On roses, uncontrolled powdery mildew will prevent normal flowering on highly susceptible cultivars.

**Hosts**

Powdery mildew fungi infect almost all ornamental plants. They are commonly seen only on those plants more naturally susceptible to the disease. Susceptible woody plants include some deciduous azaleas, buckeye, catalpa, cherry, a few of the flowering crabapples, dogwood, English oaks, euonymus, honeysuckle, horse chestnut, lilac, privet, roses, serviceberry, silver maple, sycamore, tulip tree, some viburnums, walnut, willow and wintertree. Powdery mildews are also common on certain herbaceous plants, such as chrysanthemums, dahlias, delphiniums, kalanchoes, phlox, Reiger begonias, snapdragons and zinnias. Remember that each species of powdery mildew has a very limited host range. Infection of one plant type does not necessarily mean that others are threatened. For example, the fungus that causes powdery mildew on lilac does not spread to roses and vice versa.

**Environment Favoring Powdery Mildews**

Most powdery mildew fungi produce airborne spores and infect plants when temperatures are moderate (60 to 80 degrees F) and will not be present during the hottest days of the summer. Unlike most other fungi that infect plants, powdery mildew fungi do not require free water on the plant surface in order to germinate and infect. Some powdery mildew fungi, especially those on rose, apple, and cherry are favored by high humidities. Overcrowding and shading will keep plants cool and promote higher humidity. These conditions are highly conducive to powdery mildew development.

**Control of Powdery Mildews**

Before using fungicides you should attempt to limit powdery mildews by other means. The following cultural practices should be beneficial for controlling powdery mildews.

Purchase only top-quality, disease-free plants of resistant cultivars and species from a reputable nursery, greenhouse or garden center. Horticulturists in the green industry and Extension offices should be consulted concerning the availability and performance of resistant varieties.

Prune out diseased terminals of woody plants, such as rose and crabapple, during the normal pruning period. All dead wood should be removed and destroyed (preferably by burning). Rake up and destroy all dead leaves that might harbor the fungus.

Maintain plants in a high vigor.

Plant properly in well-prepared and well-drained soil where the plants will obtain all-day sun (or a minimum of 6 hours of sunlight daily).
Space plants for good air circulation. DO NOT plant highly susceptible plants, such as phlox, rose, and zinnia in damp, shady locations.

Do not handle or work among the plants when the foliage is wet.

Water thoroughly at weekly intervals during periods of drought. The soil should be moist 8 to 12 inches deep. Avoid overhead watering and sprinkling the foliage, especially in late afternoon or evening. Use a soil soaker hose or root feeder so the foliage is not wetted.

Chemical Control of Powdery Mildews

In many cases, powdery mildew diseases do little damage to overall plant health, and yearly infections can be ignored if unsightliness is not a major concern. For example, lilacs can have powdery mildew each year, with little or no apparent effect on plant health. On some plants, powdery mildews can result in significant damage. Thus, fungicides must be used to achieve acceptable control. For best results with fungicides, spray programs must begin as soon as mildews are detected.

Spray on a regular schedule, more often during cool, damp weather. Use a good spreader-sticker with the fungicides. Be sure and cover both surfaces of all leaves with the spray. Fungicides generally recommended for powdery mildew control include: Triadimefon (Bayleton, Strike); Triforine (Funginex), Thiophanate-methyl (Cleary’s 3336, Domain) and Propiconazole (Banner).

Slugs

James R. Baker, Extension Entomologist
North Carolina Cooperative Extension Service, NC State University

Adult slugs are soft, slimy, slender animals more closely related to clams and octopuses than insects. Slugs have stalked eyes and two small feelers. Some species grow to 3 or more inches long. Slugs have various spots and stripes. Slug eggs are oval and up to 3 mm long. They are clear or cream or yellow and are usually laid in masses sometimes in a gelatin-like substance.

Biology

Slugs are found throughout the United States and Europe. Slugs feed on the leaves and flowers of many ornamental, vegetable and field crops. They are most damaging to tender, young crops in spring. Slug damage on foliage usually appears between the veins and on leaf margins. Small slugs rasp away the leaf or petal surface. Medium slugs often cat holes. Large slugs consume whole leaves, petals and sometimes entire plants if the plants are small. A silvery slime trail is left behind.

Greenhouse slugs tunnel through soil and feed on roots. Slugs are active at night and during cloudy, warm weather. During bright warm weather, slugs usually hide under boards, stones, debris or tunnel into the soil. At night, especially in warm, humid weather, slugs feed on decaying organic matter and succulent plants. Their mouthparts resemble tiny rasps, and they rasp away plant tissue and suck up the residue. Slugs feed on many kinds of plants but they tend to stick with one plant, often consuming it entirely before moving on.

Mature slugs lay eggs anytime throughout the growing season. Eggs are laid in batches of 20, 30 or more under boards, pots or in the soil. Eggs are resistant to drying out and their development may be delayed until sufficient moisture is available. Young slugs develop relatively slowly. Slugs may take up to a year to mature.

Control

Sanitation - Slug populations can be reduced by eliminating their breeding and hiding places. Remove rotting boards, logs, pots and other debris from the area. Compost or destroy plant refuse and properly stack or store flats, boxes, etc., which provide shelter for slugs. Trim tall grass and weeds along fences and ditches in the vicinity of susceptible crops.

Traps - In small plant beds and gardens, place boards or other flat objects on the soil. These traps should be at least 6 by 6 in. Each morning remove the slugs from beneath the traps and destroy them.

Pesticides - Before using a pesticide in a vegetable garden, check to be sure it is labeled for that use. In some instances, the molluscicide (slug-killing agent) should be used only at the ends of the garden or in walkways. For best control, apply the molluscicide on a warm, clear night under boards or traps. Two or more treatments at 5 to 7 day intervals may be necessary to obtain adequate control. In the list below are pesticide formulations labeled for slug control in North Carolina. Because there is considerable variation in the percentages of pesticides included in various brands, it would pay to shop comparatively.

Baits
carbaryl (Sevin)
methaldehyde 2 to 3.3%
carbaryl (Sevin)4 to 5% + metaldehyde 1 to 3.25%

Sprays And Aerosols
carbaryl (Sevin) 5% + malathion 12.5%
methaldehyde 4% liquid ready to use
metaldehyde 20% emulsifiable concentrate
methiocarb (PT 1700 Methiocarb) 1% aerosol
methiocarb (Mesurol) 75% wettable powder

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