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HOME, YARD & GARDEN PEST NEWSLETTER
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PLANT DISEASE

"Baking Soda" Update

Many readers have expressed an interest in the use of sodium bicarbonate (baking soda) as a preventive fungicide. As a result, we have devoted several articles to this topic. (See 1997 issue numbers 2 and 3 for further discussion and background.)

For some time now, both sodium bicarbonate and potassium bicarbonate have been registered with the Environmental Protection Agency as active ingredients for use as fungicides. The problem is that none of the registrants have taken the next critical steps: label approval, product formulation, and marketing. Just when I thought we may never see an actual product on the shelves, a June 5 *Federal Register* notice indicated renewed commercial interest. After making a few phone calls, I identified two potassium bicarbonate products of interest.

1. Within the last few months, Monterey Lawn & Garden Products Inc. began marketing the fungicide Kaligreen, a soluble powder formulation containing 82% potassium bicarbonate. The label and unit size (2-1/2 pounds) indicate that this is *not* a product for homeowner use. I only mention this product here because it was mentioned in previous articles. Monterey does offer many fungicides for use by homeowners, but the company's market focus is on the west coast.
2. In the near future, Bonide will begin marketing a product named Remedy. As I understand it, the registrant (H & I Agritech) is currently formulating the product (82% potassium bicarbonate) and securing state registrations. What does Remedy control and when can you buy it? As of June 19, I have not received the preliminary label, but I have been told it will have a broad homeowner landscape focus for use against a variety of leaf pathogens, particularly powdery mildew. If demand is sufficient, I expect retailers may carry this product next year. I've noticed that a few Illinois garden centers and retailers carry other Bonide products.

In the meantime, one strong reminder: Any product we (i.e., Extension employees) recommend to control a pest *must* be a registered pesticide. In other words, the product must be approved by the EPA and must bear an EPA registration number on the product label. Thus, we cannot recommend a "home remedy" to control a pest. Master Gardener volunteers working for Extension must also follow this guideline on product recommendations. *(Bruce Paulsrud)*

Cytospora Canker of Spruce

Probably the most popular ornamental plant species arriving at the Plant Clinic the last few weeks has been spruce. From a pathological standpoint, the only two concerns are Rhizosphaera Needle Cast (discussed in issue no. 2, 1998) and Cytospora canker.

Colorado blue and Norway spruces, especially 10- to 20-year-old trees, are very susceptible to Cytospora canker. Look for dead or dying branches, usually starting at the base of the tree and moving upward, at a rate of one or two branches per year. Occasionally the affected branches are scattered throughout the tree. The needles may drop early from affected branches or they could hang on for several months, leaving dry, brittle twigs. Cytospora canker can continue to spread until all branches or even the entire tree is dead. A white, sappy resin is usually associated with cankered branches. Look for this resin at the base of the branch or at axils of smaller branchlets. When the bark is cut away, the wood beneath will be brown, indicating infection by the fungus. Black pinhead-sized fruiting bodies (pycnidia) of the fungus form in the inner bark, often embedded in the resin, but these can be very difficult to find without the aid of a dissecting microscope.

Cytospora, like most canker diseases, is considered a stress pathogen. This means that the fungus only infects trees under stress. Technically, a stressed tree is one that is not growing under ideal conditions, so

the stress could include many factors: limited root zone, moisture extremes, root compaction, chemical injury, nearby construction, insect or mite problems, and more. There are no magical fungicide cures for this disease. As logic implies, disease management should focus on determining the source of stress and then trying to alleviate the stress. At the very least, remove dead wood, water the tree in periods of drought stress, and fertilize in the fall.

So how do you determine whether a tree is infected with Rhizosphaera needle cast or with Cytospora canker? Look at the overall damage pattern. Rhizosphaera occurs on scattered branches on the tree, while Cytospora tends to occur on lower branches and move up the tree. Also look at the pattern on a single branch. Rhizosphaera affects newest needles last; Cytospora girdles the stem and therefore causes newest needles to turn brown first. Finally, look for resin, which is present with Cytospora but not with Rhizosphaera. For more information on Cytospora canker of spruce, consult *Report on Plant Diseases* No. 604. *(Nancy Pataky)*

Tomato Leaf Diseases

Septoria leaf spot and early blight are fungal leaf diseases that will soon be present in vegetable gardens around the state. Because these diseases defoliate the plants, the tomato fruit is exposed to sunscald, which contributes to the development of anthracnose, another fungal disease, on the fruit. All three fungi can be controlled with the same practices.

Septoria leaf spot is a common disease in Illinois home gardens. The disease appears initially as small, water-soaked spots on the lower leaves. These spots soon become circular to angular, with dark margins and grayish white centers that often bear one or more tiny black specks called pycnidia (spore structures). The individual lesions are about 1/8 inch in diameter but are easy to spot because the leaf quickly turns yellow and drops from the plant. Defoliation starts at the base of the plant and can be severe during prolonged periods of warm, wet weather.

Early blight appears on tomatoes as they start to set fruit; consequently, we have not seen much of this disease yet. High humidity levels and persistent dews are favorable for development of early blight. Cool temperatures may also favor disease development. This fungal foliar disease is caused by *Alternaria* and is characterized by small brown leaf spots with a targetlike series of concentric rings within each lesion. As with Septoria leaf spot, lower leaves show symptoms first.

Early blight can cause economic loss, but sprays are not usually initiated until the spotting occurs. Generally, sprays are started at first bloom; however, some of the newer tomato varieties may be more susceptible to this fungal blight, so sprays might be needed earlier on those varieties. Therefore, it is important to scout for this disease on a regular basis, especially in wet weather. Dry weather is not favorable for development of early blight.

Anthracnose ripe rot causes lesions about 1/2 inch in diameter on the ripened fruit of the tomato. Concentric rings may appear within these lesions. Although fruit lesions are the most common anthracnose symptom, this disease may appear on other plant parts as well.

Commercial growers often need to rely on chemical control of these three diseases. Chemical control may be obtained with Bravo, mancozeb, or Quadris on a seven- to ten-day schedule after the first sign of disease or after the first fruits form. A soil-surface spray of mancozeb after the last cultivation improves anthracnose control. In areas of high rainfall, growers will need to stay with the shortened intervals. Home growers should concentrate on keeping all ripe fruit picked off plants, improving air circulation in the garden, mulching to avoid fruit rots, and removing tomato vines and unharvestable fruit at the end of the season. It is also suggested that a two- or three-year crop rotation will reduce losses from these diseases. Chemical options for home growers are listed in the *Illinois Homeowner's Guide to Pest Management.* For more information, consult *Report on Plant Diseases* No. 908. *(Nancy Pataky)*

Pine Wilt

It’s about that time of year when this devastating disease of pines begins to become more apparent. We saw fewer cases of pine wilt this spring than in most years, but it will be interesting to see whether the near-continual rains over most of the state will delay the appearance of this perennial problem. Pine wilt is caused by the pinewood nematode. It is vectored (spread) by the sawyer beetle and a few related long-horned beetles. Many readers are familiar with nematodes as soil- or root-related pathogens, but in this case the nematode lives in the wood of the tree. The nematode is microscopic and causes blockage of the water-conducting tissues—resulting in a wilt symptom much like the fungal wilt diseases. The nematodes are not visible with the naked eye, but symptoms are quite apparent.

Pine wilt causes a sudden decline and death of an entire tree within a few weeks or a few months after the first sign of disease. Symptoms occur in four stages: Needles initially appear light grayish green, then yellowish green, then yellowish brown, and finally completely brown. An affected tree shows this color change either branch by branch or over the entire tree. The exception may be on Austrian pine—we have documented positive cases of pinewood nematodes in Austrian pine that initially showed symptoms on branch tips only. Pines with root problems, water-related stress, or cold injury decline from the top downward, or starting at the bottom and moving up the tree, or possibly from the tips inward. Needle color, however, does not progress from gray green to brown. Instead, necrosis is fairly quick with these noninfectious problems.

Samples to be tested for pine wilt should be sent to the Plant Clinic or another lab where a nematologist is available. Our fee is $15. Branch samples should be one to two inches in diameter and long enough to put into a vise so that wood discs can be cut from both ends of the branch. The pinewood nematode is not uniformly distributed within a tree. We find that the most reliable samples are from branches that have brown needles still attached.

There are no known effective chemical controls for pine wilt or its vector. Affected trees should be burned or buried to reduce reservoirs of infection. (Recent research shows that it is probably safe to chip the trees for mulch. Still, you might want to compost the mulch before use or spread it out to dry before placing it near pines.) Prune dead branches from live trees to minimize attractiveness to beetle feeding. Beetles that emerge from the dead wood may carry the nematode and fly to healthy pines several miles away. When the beetle feeds on a healthy pine, it may transmit the nematode to the tree through feeding wounds. The nematode enters the resin canal and eventually clogs the water transport system of the tree.

Replace dead pines with Norway or blue spruce, Douglas-fir, cedar, hemlock, or other nonsusceptible species. Consult *Report on Plant Diseases* No. 1104 for details about this disease. *(Nancy Pataky)*

INSECTS

Scouting Report

Cottony maple scale has hatched in DuPage County in northeastern Illinois. These appear as gray specks on the leaves and stems. Many will be found along leaf veins, particularly on leaf undersides. Before spraying, check for twice-stabbed lady beetle larvae or adults. If these predators of the scale are numerous, insecticide use will be self-defeating.

Lecanium scale should be hatching in southern and central Illinois. A report during the week of June 12 indicated these insects were still in the egg stage. Sprays during the crawler stage or shortly after the reddish crawlers settle down should be effective.

Bagworms should be treated now. If the bags are over 1/2 inch long, use *Bacillus thuringiensis kurstaki* (*Btk*), trichlorfon, or a synthetic pyrethroid insecticide. Smaller larvae can be controlled with these and several other insecticides.

Peach tree borer adults are being picked up in pheromone traps at The Morton Arboretum. Treatment should be effective now in southern and central Illinois and can probably begin in about two weeks in northern Illinois. Peach tree borer attacks trees in the genus *Prunus*, such as flowering cherry and purple-leaf plum. *(Phil Nixon; Susan Grupp, Extension Educator)*

Redheaded Pine Sawfly

Redheaded pine sawfly larvae were found on Scotch pine in McLeansboro in southern Illinois on June 12. This sawfly feeds primarily on two- and three-needle pines, and is particularly common on Scotch, jack, and red pines. They can also feed on five-needle pines, Norway spruce, and larch growing near two- or three-needle pines.

The larva is about an inch long when fully grown, has a red head, and is yellow with several rows of black dots. As with all sawfly larvae, it has more prolegs than caterpillars have (caterpillars have five or fewer pairs of prolegs). This species has seven pairs of prolegs on its abdomen, as well as three pairs of true legs on the front end of its body. The larvae feed on the needles, defoliating branches or trees. Because all of the needles can be eaten, stripped branches or trees are likely to die.

Full-grown larvae drop to the ground where they pupate in a silk cocoon and emerge for a second generation in late August through September. In the southern U.S., three generations per year can occur. Winter is spent as a prepupa in a cocoon on or in the duff under trees. Thus, removing fallen needles and debris beneath infested trees in the winter should eliminate many of the mature larvae. The prepupae pupate in the spring to emerge as adults a few weeks later. Some prepupae may lie dormant through two or three seasons before emerging as adults.

This insect is spotty in occurrence and is usually found in the southern third of Illinois as well as in north central and northwestern areas of the state. Look for these larvae now in southern Illinois and be watchful in northern Illinois in about two weeks.

Control can be achieved with many chemical insecticides. Remember, this is not a caterpillar, and therefore will not be controlled with *Btk*. *(Phil Nixon)*

Slugs

With the rainy weather that we've had in many parts of Illinois, slugs are very numerous and causing heavy damage. Slugs, which are shell-less snails, are usually a problem on thin-leaved plants growing in shady areas—hosta, violets, and impatiens. With this summer's prolonged, heavy rainfall, slugs are also numerous in sunnier areas, feeding on a wide range of plants—including such bedding plants as petunias, chrysanthemums, daisies, and lobelia. They also like lilies, daffodils, narcissus, gentians, primroses, tuberous begonias, hollyhocks, irises, and strawberries.

The most common species is the gray garden slug, which is usually about 3/4 inch long but may be up to 1-1/2 inches long. Although called gray, they come in white, yellow, lavender, purple, or blackish with brown specks and mottled areas. A less common species in Illinois is the spotted garden slug, which can be seven inches long but is more commonly three to five inches in length. Although small individuals tend to be dark gray to black, large ones are handsome: yellow to brown with black mottling and three rows of black spots running down the posterior half of the body.

Depending on the species, slugs live from one to six years. They lay eggs in protected areas such as under dead leaves or pieces of bark mulch. Slugs are hermaphroditic, having both male and female sex organs. A slug can mate with itself if another isn't present; more commonly, a slug both provides and receives sperm while mating with another.

Slugs have two pairs of tentacles extending off the front end of the body. The upper, longer pair are optic tentacles with eyes on the tips. There is also a shorter pair near the ground that are sensory tentacles for feeling and smelling. Near the front of the body on the right side is a hole or slit called a pneumostome, which is the opening that leads to the slug's single lung. The largest structure is the foot, which runs the length of the slug. The underside of the foot is called the sole.

At the front of the sole, under the slug's head, is a gland that produces two types of slime or mucus. One mucus is very free-flowing; the other is more viscous. These two substances combine to form the slime trails that slugs are famous for. These slime trails remain in the morning and will glisten, reflecting the sunlight before they dry up. Mucus is produced in smaller quantities over the entire outside of the body. Different types of mucus are produced for moisture control, mating, and defense. When attacked, a slug produces an extra-thick mucus that makes the slug hard to pick up. The defense mucus is also capable of sealing the mouths of such predators as snakes and shrews and can cause dogs and ducks to gag.

Slugs feed by using a radula, a structure in the mouth that is covered with tiny teeth, which slugs use to scrape away the surface and then the plant material underneath. This feeding mechanism causes damage to appear most commonly as holes in the leaf, although windowfeeding (when slugs eat only partly through) on the leaf is common. On some plants or in heavy numbers, slugs will eat the leaf margins. Because chewing insects usually eat the leaf margins, large holes in the leaves are a good clue that slugs are present. You can verify that slugs are responsible by checking for their presence at night or on foggy mornings, or by searching the ground beneath the plants. Slime trails on the plant are also good scouting clues.

Slugs need a moist environment to survive, and they feed on decaying organic matter. The best long-term control involves reducing this supply. Under less rainy conditions, spacing plants farther apart or pruning them back allows better air circulation and creates drier conditions that are difficult for slugs. Eliminating fallen leaves, bark mulch, and other dead organic material will reduce slug numbers by reducing food sources.

Slug baits containing metaldehyde or mesurol are effective for controlling slugs. Mesurol can be used only around ornamental plants, not edible ones. Be careful using slug baits where dogs or cats are present. Slug-bait poisoning is a major source of calls to the National Animal Poison Control Center located in Urbana. Copper strips that extend an inch or more below and above the soil line will keep out slugs. The copper apparently generates an electrical charge that is large enough to deter slugs.

Most other slug remedies are not reliably effective. The mucus that slugs produce allows them to cross a razor-blade edge without harm, making the use of sharp gravel, broken glass, and cinders of dubious value. Beer in shallow dishes is effective sometimes, although my experience is that this method allows the harvest of slugs but doesn't actually control them. Diatomaceous earth is not very effective in the damp environment that slugs inhabit. Salt, lime, and other chemicals may disrupt the soil's fertility until nothing will grow, which defeats the purpose. Because slugs and snails are mollusks (very distantly related to insects and other arthropods), insecticides are not effective. *(Phil Nixon)*

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others. Karel Jacobs and Donna Danielson of The Morton Arboretum also provide information and articles.

Major authors are Phil Nixon, (217) 333-6650, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Kathy Robinson, all of Information Technology and Communication Services.*

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University of Illinois
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