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INSECTS

Pests and Vanhoutte Spirea Phenology

Many insect events correlate with the blooming of Vanhoutte spirea, *Spiraea x vanhouttei*, which is occurring in central Illinois. The book *Coincide* by Don Orton covers this topic very well and was written primarily from data collected in Illinois. Published by Plantsman Publishing, it is available for about $25 through the Illinois Arborist Association in Downers Grove; call (630) 960-5922. It can also be ordered through bookstores. Any company responsible for insect control on trees and shrubs should have this book. The following information from *Coincide* should help practitioners plan scouting activities.

Birch leafminer: Look for small mines when blooming starts.
Pine needle scale: Red crawlers are active when blooming starts.
Taxus mealybug: Nymphs are active during blooming.
Lilac/ash borer: Egg hatch begins in full to late bloom.
Oystershell scale (brown race): Crawlers hatch and are active in full to late bloom.
Oystershell scale (gray race): Crawlers hatch when blooming finishes.
Black vine weevil: Look for feeding notches as blooming finishes.
Bronze birch borer: Egg hatch begins when blooming finishes.
Elm leaf beetle: Feeding damage begins when blooming finishes.

(Phil Nixon)

Scouting Watch

Continue to watch for cankerworms, eastern tent caterpillar, European pine sawfly, and spruce spider mite. Cankerworms can be scouted by forcefully striking branches of crabapple, elm, honey locust, hackberry, and other host trees. The caterpillars will drop off and hang below the branch on silk threads. Eastern tent caterpillar is easily identified by its silk tents in the twig crotches of crabapple, hawthorn, mountainash, and other hosts.

Watch for European pine sawfly and spruce spider mite on needled evergreens. European pine sawfly occurs as groups of greenish caterpillar-like insects with black heads on scotch, mugo, and other pines. Spruce spider mite and other mites that feed on needle evergreens can be scouted by forcefully striking branches above a sheet of white paper and then looking for signs of the tiny, crawling mites. Slow-moving mites that make green streaks when they are smashed are usually pest mites; fast-moving mites that make red streaks are likely to be beneficial predatory mites.

Honeylocust plant bugs and ash plant bugs are present in northeastern Illinois. It usually takes one to two honeylocust plant bugs per compound leaf to result in damage. At that level, you should be able to see several of the pinhead-sized green bugs running across a cluster of leaves when they are disturbed. Ash plant bugs will cause numerous light spots or stippling on the leaflets, which may turn brown later in the year. This pest is usually not treated unless the tree is located in an obvious part of the landscape and has low limbs where the damage will be easily noticed. Consult the *Illinois Commercial Landscape and Turfgrass Pest Management Handbook, 1998–1999* for control recommendations. *(Phil Nixon and The Morton Arboretum)*

New Entomologist

Raymond Cloyd, a new faculty member at the University of Illinois, is an ornamental entomologist/Extension specialist in urban integrated pest management (IPM). This specialization includes greenhouses, landscapes, nurseries, turfgrass, interiorscapes, and conservatories (the green industry). His educational background includes an associate's degree in ornamental horticulture from Monterey Peninsula College in Monterey, California; a bachelor's degree in ornamental horticulture with a minor in plant protection/pest management from California Polytechnic

State University; and master's and doctoral degrees in entomology from Purdue University.

Cloyd's background and training are primarily in integrated pest management of ornamental pests, with an emphasis on managing insect/mite pests of greenhouse, nursery, and landscape crops. He is available to assist individuals associated with the green industry in dealing with ornamental pests. Write to Raymond A. Cloyd, Department of Natural Resources and Environmental Sciences, 228 ERML, 1201 West Gregory Drive, Urbana, IL 61801. He can also be reached by phone, (217) 244-7218; fax, (217) 333-4777; or e-mail, rcloyd@uiuc.edu.

Pest Management in Greenhouses Workshop

The Pest Management in Greenhouses workshop will be held June 24 from 10 a.m. to 3 p.m. at the Ornamental Research Farm on Lincoln Avenue between Florida Avenue and Windsor Road, across from the Dairy Science Research Farm in Urbana.

Discussion topics will include developing an effective scouting program, the Food Quality Protection Act (FQPA), ways to maximize/enhance pesticide performance, and an update on new materials. There will also be a question-and-answer session. For more information, call Raymond Cloyd, (217) 244-7218, or Susan Witt, (217) 333-1965.

Using *Bacillus thuringiensis* Effectively

Bacillus thuringiensis (*Bt*) is a soilborne bacterium that is widely used in landscapes, nurseries, and greenhouses to control a variety of ornamental insect pests. Different insect pests are controlled by different strains of the bacteria. The common *Bt* strains and the insect groups that they work on include *Bt kurstaki* (butterflies and moths), *Bt israelensis* (mosquitoes and flies), and *Bt tenebrionis* (beetles). Unlike fungi, bacteria must be ingested to be active. This means that thorough coverage is essential when using *Bt* products so that the target organism will eat the bacteria. Once the bacteria is consumed, it produces an endotoxin crystal that attacks the gut membrane and creates pores, causing leakage and swelling. The swelling continues until cells burst, which allows the gut contents to leak into the insect's blood, disrupting the blood pH and resulting in paralysis and death within 24 to 72 hours.

It is important to understand the following characteristics of *Bt* products in order to maximize their effectiveness when they are used to manage ornamental pests.

Selectivity. In contrast to conventional pesticides, *Bt* products don't have broad-spectrum activity. Because they generally have little impact on non-target organisms, including natural enemies, we see fewer problems, such as target pest resurgence and secondary pest outbreaks, which may occur with the use of broad-spectrum insecticides. Currently registered *Bt* products have no activity on sucking insects and mites such as aphids, whiteflies, and spider mites. An alternative material must be used if sucking insects or mites are the primary pest.

Timing of application. *Bt* products must be applied when young insect stages are present. Because of their small size, insects at these stages don't have to consume as much plant material before the bacteria is effective. They are also killed before they cause severe plant injury and before they reach the reproductive phase. If *Bt* is applied too late, insects have to consume much more plant material containing the bacteria in order for the product to be effective. This results in greater plant injury because it takes longer to kill the insect. In addition, the insect may switch from the growing phase to the reproductive phase before it has consumed enough of the bacteria. If this occurs, less material will be consumed and there is a higher probability of adult survival, which means a new generation of insects will be produced in the future.

Residual activity. *Bt* products don't remain in the environment long because they are subject to breakdown by sunlight (ultraviolet light degradation) and removal by rainfall. Repeat applications may be necessary.

Speed of activity. Because *Bt* products are slower-acting than conventional insecticides, they must be applied before pest populations reach damaging levels.

Safety. The mode of action of *Bt* products is specific to insects. There is no effect on mammals and humans.

Storage life. *Bt* products must be stored under cool conditions (50°F to 60°F) to prolong its shelf life. Avoid exposing the product to extremes in cold and hot temperatures, which may cause breakdown of the bacteria.

Water quality. Alkaline water (pH greater than 8) can reduce the effectiveness of the *Bt* toxin, so the water solution must be adjusted to a pH of 7 or lower.

Bacillus thuringiensis products can be used as part of an integrated pest management program to manage ornamental insect pests; however, it is essential that

their advantages and limitations be understood in order to use these materials effectively. *(Raymond A. Cloyd)*

PLANT DISEASES

Cool-Weather Turf Diseases

Although most of the important (very damaging) turf diseases happen during the warmer parts of the growing season, there are a few that do quite well under prolonged cool, wet weather. Among the most difficult cool-weather diseases to identify are Fusarium patch (also called pink snow mold or Microdochium patch) and yellow patch (also called cool-weather Rhizoctonia). Both are foliage pathogens that have been observed in Illinois over the last month or so, and they are easily confused with each other.

Fusarium patch (not to be confused with summer patch or Fusarium blight, which are root diseases!) is common and can be troublesome any time of the year during cool to cold, wet weather. In fact, in 1997, this disease was active into early June. The pathogen affects a wide range of turfgrass species but may be particularly damaging on annual bluegrass, bentgrasses, Kentucky bluegrass, and ryegrasses. The disease first appears as roughly circular, water-soaked spots, 1 to 3 inches in diameter, which soon turn yellow or reddish to dark brown. With continued cool, wet weather, these patches may enlarge to a foot or more in diameter. You may notice small amounts of white or pale pink fungal growth within or at the leading edge of the patch, particularly following any snow melt or cold, rainy weather. Fusarium patch is often most damaging when there is prolonged snow cover or when the turf remains moist through much of the winter and early spring.

Fungicide applications at this point are probably not warranted because the damage is already done and warmer, drier conditions, which will shut down the pathogen, are sure to return. However, some management practices will reduce the potential damage of this disease in the future. In fall, it is important to continue to mow the turf until it stops growing. In addition, maintain adequate phosphorus (P) and potassium (K) soil-test values, but avoid overstimulation with any source of nitrogen. Research indicates that high soil pH (alkaline) increases disease potential. Where the disease continues to be a perennial problem, resistant varieties of ryegrasses, fine-leaf fescues, and bentgrasses should be considered. Although no varieties are available that are considered highly resistant to this disease, some level of resistance is better than none.

If all else fails to provide adequate results, preventive fungicide applications may be justified, beginning in the fall. Rather than using a "blanket approach," the applications should target perennial problem areas. Refer to page 14 of the *Illinois Commercial Landscape and Turfgrass Pest Management Handbook, 1998–1999* for a listing of labeled fungicides and application information. For more information on Fusarium patch, consult *Report on Plant Disease* No. 404.

Yellow patch is caused by the fungus *Rhizoctonia cerealis,* which is related to the Rhizoctonia brown patch pathogen, *R. solani*. However, yellow patch is a much less destructive species, which operates at cooler temperatures. Like Fusarium patch, yellow patch can be troublesome any time of the year during cool to cold, wet weather. The pathogen can affect a wide range of turfgrass species but is most commonly associated with bluegrasses and bentgrasses. The tan, to yellow, to bronze patches are often larger (a few inches to several feet in diameter) than that of Fusarium patch and appear in a variety of forms such as concentric rings, crescent shapes, or frog eyes (green turf in the center of the patch). Unlike Rhizoctonia brown patch, you will not see a smoke ring surrounding the patch; you may, however, see tan to white fungal growth down in the turf canopy. At the edge of patches, leaves of Kentucky bluegrass often have a reddish to purple appearance, beginning at the leaf tip. Damage is usually not severe, but there is often a thinning of the turf during prolonged cool, wet weather. A diagnostic feature for both species of Rhizoctonia is the presence of minute (1/4 mm to 2 mm), dark brown to black bulbils (sclerotia) on the surface of diseased grass tissues near the crown. If you've ever washed potatoes and noticed the very tiny, black pieces of "dirt" stuck to the skin, you have seen what I'm talking about here.

For the same reasons given above, fungicide applications at this point are probably not warranted. To reduce the potential damage of this disease in the future, maintain adequate phosphorus (P) and potassium (K) soil-test values, but avoid overstimulation with any source of nitrogen. In addition, reduce any excess thatch to 1/4 inch to 1/2 inch thick. Information about resistant varieties is limited. If all else fails to provide adequate results, preventive fungicide applications may be justified in the fall. Yellow patch is one of the more difficult diseases to control chemi-

cally, but Prostar is reported to be somewhat effective. Again, focus only on the perennial problem areas. For more information on yellow patch, consult *Report on Plant Disease* No. 411.

Have You Tried These Test Kits Yet?

As a turfgrass manager, you may want to consider investigating a newer tool that is useful for difficult-to-identify turf diseases, such as yellow patch. Neogen Co. has been marketing ELISA test kits for a number of years now. You can find them on the Internet at http://www.neogen.com, or phone (517) 372-9200. The test kits are relatively quick (about 15 minutes) and easy to perform, and they can be used to positively identify the presence of turf pathogens such as *Rhizoctonia* (both *R. solani* and *R. cerealis*), Pythium (many species), and dollar spot (many species of *Sclerotinia*). Each kit is disease-specific, costs $100, and contains enough materials to conduct four individual tests. It's not cheap, but it is very useful for doing your own "calibrating" a few times during the season. *(Bruce Paulsrud)*

Anthracnose Disease of Trees

Each spring, we see spotting and blighting of the leaves, buds, and sometimes stems of sycamore, ash, maple, oak, elm, walnut, and several other tree species. This disease is anthracnose, caused by one of many fungi that are present in cool, wet conditions as tender leaves are first developing from the bud. Certainly not all of the trees just mentioned are affected, but anthracnose will show its ugly head on susceptible trees that happen to put out new leaves in cool, wet conditions. The disease is most prevalent in the spring because the cool, wet conditions that prevail then are conducive to fungal development while slowing plant tissue development. Leaves that emerge in warmer, drier conditions usually escape the disease.

Recently, the Plant Clinic has received reports and samples of anthracnose on ash trees. Initial leaf expansion was great. The leaves looked healthy for about two weeks; then a tremendous amount of leaves with brown to black spots and blotches fell from the tree. Usually, the trees still appear healthy but thinner. Yes, this is probably anthracnose; and, no, we don't recommend a fungicide.

Unless anthracnose fungi have repeatedly hit a tree in the past, we do not recommend the use of fungicides. Anthracnose diseases do not kill trees. Some defoliation may occur, but refoliation with healthy leaves follows in warmer weather. Concentrate on boosting tree vitality, which will promote new growth. Remove dead or dying branches, water in periods of drought, and mark calendars now to fertilize affected trees in the fall.

Central Illinois has also experienced the usual amount of sycamore anthracnose. That species is not really as slow to leaf out as some might think. Look closely at the leaves to see that many are already brown, dry, and dead. Don't fret—most of these trees are huge, old trees that will outlive most of us. Sycamore anthracnose takes several forms including leaf blight, bud blight, shoot blight, and cankers.

For more on anthracnose diseases of shade trees, consult *Report on Plant Disease* No. 621. *(Nancy Pataky)*

Volutella Blight of Pachysandra

The Plant Clinic has had reports of the fungal disease pachysandra, the popular shade ground cover. Kentucky has been experiencing this disease for two weeks, and reports have come from the southern part of Illinois as well. I usually see this disease in my Champaign garden, but that has not yet happened. Keep an eye out for this disease soon, particularly if wet conditions persist in your area.

The disease may begin as brown blotches on leaves, but it progresses through stems and stolons, causing cankers that girdle and kill the stems. Look for wilted pachysandra plants with brown blotches on the leaves. Push back the leaves to find the blotches and cankers on stems. One diagnostic feature to look for is pink-to-orange spore masses on the underside of leaves or on stems. Look particularly for Volutella blight in dense plantings where heavy mulch has been used and where conditions are warm and moist. The disease often follows some type of stress, such as winter injury, insect infestation, sun scald, or recent shearing. Remove and destroy any severely infected plants—when plants are dry, if you can wait.

Chemicals may be used as protectants; repeat applications are necessary at 10- to 14-day intervals, depending on the product and weather conditions. Chlorothalonil, copper fungicides, Duosan, Fore, mancozeb, and Zyban are registered for this use on pachysandra. If you have had problems with this disease in the past, consider chemical applications now. Effective nonchemical controls include keeping insects under control and mulching pachysandra with a material that does not hold moisture. Pruning any surrounding plants for better air movement in the area may also help manage this fungus. Consult *Report on Plant Disease* No. 649 for more information. *(Nancy Pataky)*

Rhizosphaera Needle Cast of Spruce

This fungal needle disease of spruce is a particular problem on Colorado blue spruce, but it may also infect other spruce species as well as some pines. If you have had a problem with this disease in the past, it's time to take action now. How do you know you have had problems? For one thing, the disease causes first-year needles to turn brown to purple in the fall. (Keep in mind, however, that many environmental stress factors cause these symptoms.) On trees with Rhizosphaera needle cast, the affected needles may stay attached until the next summer or fall. The newest growth (buds now opening) will be green and healthy, but the rest of the needles will be brown on the affected branches. So how do you know this fungus is the problem rather than environmental stress? When infected needles are moist, the fungal pathogen will form pinhead-sized fruiting structures (pycnidia) in neat rows on the needles. To test for pycnidia, place affected needles in a plastic bag with a wet paper towel. If the fungus is present, pycnidia should develop in one or two days. These pycnidia actually protrude from the needle surface and are readily visible, especially with a hand lens.

The pattern on the tree is the appearance of holes in the canopy. The holes are not in the trunk; they are in areas of the tree canopy from which needles have dropped. The needles will be cast from the tree—thus, the name "needle cast." Because spruce trees are not able to form new needles where the old ones dropped, the holes in the canopy will stay with the tree for its entire life. The disease will not kill the tree, but it will harm its beauty. For this reason, preventive fungicides are recommended for Rhizosphaera needle cast. As long as entire branches are not killed, the new growth at the branch tips can be protected from infection. As tips continue to grow, new growth may mask the defoliation that has occurred on older needles near the center of the tree.

Chemical options are listed in the usual commercial and homeowner pest management guides. Fungicides are used to protect healthy new growth, so two sprays are recommended—one when new needles are half grown and another when new needles are fully expanded. The critical factor here is knowing when to apply the chemical. The spruce buds in central Illinois are open now, and needles are beginning to expand. Watch your trees carefully for needle growth in your specific site to know when to spray. It may be any day now.

We do not have a *Report on Plant Disease* that discusses Rhizosphaera needle cast. Refer to *Diseases of Trees and Shrubs* by Sinclair, Lyon, and Johnson. *(Nancy Pataky)*

Correction: Worker Protection Standard Resources

The last issue of this newsletter (April 28, 1999) contained an article about the Worker Protection Standards. It stated that, "The provisions do not apply to landscape maintenance operations, home gardens, or greenhouses." This is true, except that it should have read, "home gardens and greenhouses where plants are grown for personal use." The provisions *do* apply to production/commercial greenhouses.

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