UNIVERSITY OF ILLINOIS EXTENSION
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First Issue for 2005

We will publish biweekly in April; weekly in May and June; biweekly in July, August, and September; and finish with monthly issues in October and November, for a total of 20 issues. Although the newsletter has been available without charge on the Internet for the past few years, there will now be a $20 fee to access it. Once your payment has been processed, your password will be activated to access the site, www.ag.uiuc.edu/cespubs/hyg/. Paper subscriptions by mail are available for $46 by calling (800)345-6087 or by accessing the Web site; those subscriptions will also include Web access. Payment can be made by Visa, MasterCard, and check. Fees pay for editing and designing, as well as posting the online version and printing and mailing the paper subscriptions.

The authors are always interested in comments about the articles that they write. Information on how to contact them is located at the end of the printed newsletter and by clicking on the author's name at the end of each article online. General comments about the newsletter should be sent to me, the newsletter coordinator. *(Phil Nixon)*

PLANT DISEASES

Plant Clinic Update

This year, the University of Illinois Plant Clinic will be open May 2 through September 16. There will be no lab service before that time, so please do not send samples until May. Your local Extension office may be able to help with your problem. Before May 2, commercial growers, consultants, and landscapers may obtain information concerning specialist contacts on the University of Illinois campus from their local Extension offices. For details about the Plant Clinic and its services, as well as links to related information, consult the Web page at http://plantclinic.cropsci.uiuc.edu/. A list of Illinois Extension offices can be found at http://web.extension.uiuc.edu/cie2/offices/findoffice.cfm. *(Nancy Pataky)*

What is Happening with Sudden Oak Death?

Sudden oak death, also called Ramorum blight or dieback, has been in the news since its spread to 22 states in 2004. Two good summaries about this disease can be found in *Home, Yard, and Garden Pest Newsletter* issues no. 1, 16, and 20 of 2004. Another good starting point is the United States Department of Agriculture Animal and Plant Health Inspection Service, USDA APHIS. Their Web site on this disease can be found at http://www.aphis.usda.gov/ppq/ispm/pramorum/. The big question is whether the disease has been found in Illinois; and the answer is *not yet*. Yes, sudden oak death could make its way to Illinois. If it does, trees in the oak family could be infected and killed. Many shrub species could also be affected. In the United States, this disease originated on the West Coast. Quarantines, destruction of infected plant material, and inspections of exported host species are measures currently in place to help prevent further spread of the causal pathogen, *Phytophthora ramorum*.

In response to the threat of this disease, Illinois Extension specialists formed the Illinois *Phytophthora ramorum* (SOD) Task Force in July 2004. This group includes representatives from the Illinois green industry, as well as regulatory agencies. Plant pathology and horticulture specialists in the Department of Crop Sciences and the Department of Natural Resources and Environmental Sciences serve as the Illinois contact with national educational efforts. The task force mission is to organize and inform the primary stakeholders in Illinois and to develop an Illinois detection and response plan. Several meetings were organized in 2004, primarily for internal education. Training for green industry professionals and Master Gardeners was available on March 7, 2005. Information on disease symptoms, hosts, spread, and detection and response protocol for Illinois was presented at that statewide teleconference and training session. That PowerPoint presentation and the Illinois response plan can be downloaded from the Master Gardener Web site at http://www.extension.uiuc.edu/mg/. Watch this newsletter for updates. *(Nancy Pataky)*

Crabapple Scab Sprays

The first issue of this newsletter usually coincides with questions about proper timing for control of apple scab on crabapples. This information may be most beneficial to growers in northern counties, where the disease is just beginning. Scab is caused by the fungus *Venturia inaequalis*. It is very common on crabapples and apples. Look for olive green leaf spots in the spring. These spots quickly become black, surrounded by leaf yellowing, and then extensive defoliation of susceptible varieties by late June. For details, refer to *Report on Plant Disease*, no. 803, available in your Extension office or on the Web at http://www.ag.uiuc.edu/~vista/horticul.htm. Scroll down to apple and crabapple scab.

Scab is present every year in Illinois. Its intensity depends on the weather. Primary infection is via a type of spores called ascospores that are present on last year's leaves, currently on the ground in the garden, neighborhood, or nursery. These spores will be ready to infect foliage until the end of petal fall. If you have a susceptible cultivar, when might you expect fungal infection to occur? The apple scab fungus infects under a wide range of temperatures but requires a wetting period to become established on a tree. The minimum wetting period on the leaves is only about 6 hours if temperatures stay near the optimal 60˚F. If cooler, the wetting period must be longer. In a normal spring, scab symptoms might start to show on the leaves from 8 to 18 days after infection. Under cool, dry conditions, this incubation period might be longer.

If you have a susceptible variety and are not able or willing to replace it, then spraying with fungicides might be your course of action. Fungicides are used as protectants, before infection occurs: You cannot wait until symptoms show. University recommendations say that the first spray should be applied when leaves just begin to emerge from buds, to protect new leaves. Sprays must be continued according to label intervals until 2 weeks after petal fall to give maximum protection against ascospore infection. The *2005 Commercial Landscape and Turfgrass Pest Management Handbook* lists 30 possible products to use; on page 79, a table lists these products and their mobility. If possible, choose a systemic product. A systemic fungicide provides a bit of curative (kickback) action and will not be washed off by rains once absorbed by the leaves. Keep in mind that nearly all systemic fungicides will only move upward and outward toward new growth. Homeowners can refer to the *2004 Home, Yard, and Garden Pest Guide* for fungicide options.

For commercial applicators needing more details on exactly when to spray for maximum benefit, this information from Extension plant pathology specialists Mohammad Babadoost and Bruce Paulsrud might be helpful. They suggest that for controlling apple scab on crabapples, one should make the first application between green tip and 1/2" green (target 1/4" green). Particularly for this application, they suggest the use of a systemic fungicide to provide curative ("kickback") activity. The second application should be made between tight flower cluster stage and pink flower bud stage. Additional, later applications (at labeled intervals) may be needed, depending on the year and client expectations. We cannot be any more specific because each product has slightly different recommendations. You really do need to read the label.

The question we often receive is how long it takes for the tree to move from one growth stage to the next. That depends on the weather, as well as the location and variety, but Dr. Babadoost offers this approximation to help with your application choices:

- Silver tip
- +7 days to green tip
- +5 days to 1/4" green
- +5 days to 1/2" green
- +10 days to tight flower bud cluster
- +10 days to pink flower bud
- +10 days to bloom
- +10 days to petal fall

Paulsrud provides these references showing stages:

http://web1.msue.msu.edu/fruit/applgrw.htm
http://orchard.uvm.edu/uvmapple/hort/99budstage/BudStageCriteria.html
http://www.nysaes.cornell.edu/pubs/fls/OCRPDF/58a.pdf

Many crabapple cultivars have resistance to scab, and resistance is definitely the long-term solution to infection. If you are planting new crabapples this year, look for varieties with resistance to scab, rust, fire blight, and powdery mildew. A publication that may help is this reference by U of I professors Dave Williams and Gary Kling: *Recommended Crabapples for Illinois Landscapes*. Look for it on the Web at http://www.extension.uiuc.edu/IPLANT/plant_select/trees/Selecting_Crabapples.pdf. *(Nancy Pataky)*

INSECTS

Pest Watch

One of the earliest signs of spring is the blooming of saucer magnolia, *Magnolia x soulangiana*, an important phenology plant, as utilized in Don Orton's book *Coincide*. This excellent book is available from L of L C, 468 S. President, Suite 103 Carol Stream, IL 60188-2894, (630)668-8597; $23 plus $3 shipping.

Following are insects and mites that should be susceptible to control at the following phenological stages of *M. x soulangiana*.

Pink bud
Hemlock eriophyid mite
Spruce eriophyid mite
European pine shoot moth
Pine bark adelgid
Cooley spruce gall adelgid
Eastern spruce gall adelgid
Spruce needle miner

Pink bud to early bloom
Eastern tent caterpillar
Leaf crumpler
Spruce spider mite
Zimmerman pine moth

Blooming
Ash plant bug
Fall cankerworm
Spring cankerworm
Fletcher scale
Juniper webworm

Dropping petals
European pine sawfly
Gypsy moth
Hawthorn mealybug
Honey locust pod gall
Spruce budworm
Willow aphid

Realize that phenology is an excellent way to avoid calendar date problems with warm and cool springs but is not meant to be a method to time blanket pesticide applications. Before any pesticide or other control efforts are made, scout to make sure that the pest is present in a susceptible stage and that sufficient numbers are present to justify control. *(Phil Nixon)*

Why and How Insects and Mites Feed on Your Plants and Flowers

Insects and mites that feed on plants have different feeding behaviors, which include chewing, piercing-sucking, mining, boring, or galling. The majority of insect and mite pests that attack ornamental plants growing outdoors have piercing-sucking or chewing mouthparts. Insects with piercing-sucking mouthparts include aphids, whiteflies, mealybugs, soft scales, and thrips. These insects insert their mouthparts into the vascular tissues of plants, primarily in the food-conducting tissues (phloem), and withdraw plant fluids. This results in plant wilting, stunting, and leaf distortion. A number of insects, including certain leafhoppers and spittlebugs feed within the water-conducting tissues (xylem). Insects with chewing mouthparts include beetles, caterpillars, grasshoppers, weevils, and earwigs (although not considered insects, snails and slugs have chewing mouthparts). Chewing insects physically remove portions of leaves or flowers directly, or consume entire plant parts.

The reproductive portions of plants are attractive to most plant-feeding insects because these portions are more nutritious due to the relatively high levels of protein. However, these portions may contain high levels of secondary metabolites (defensive compounds), which may influence acceptability. Plant leaves usually provide the greatest biomass for insects and are the best food nutritionally—next to reproductive portions. Nitrogen is the primary plant nutrient needed by insects with piercing-sucking and chewing mouthparts. Nitrogen (in the form of protein and amino acids) is very important for insect growth, development, and reproduction. Nitrogen levels are usually higher in younger tissue than in older leaves, and levels decline as plants mature. Nitrogen level is a factor that can limit insect growth and development. In general, plants tend to lack nitrogen in the form that insects can utilize. The dry weight of most insects is between 8 and 14% nitrogen; however, plants overall contain only 2 to 4% nitrogen. The phloem contains only 0.5% or less, and the xylem contains 0.1% or less nitrogen. Reproductive portions (flowers and seeds) and leaves contain from 1 to 5% or more nitrogen. Nitrogen is an important component of protein; however, protein concentrations can vary depending on plant type, age, and nutritional status of the soil. Protein is generally higher in reproductive portions, and leaves and stems.

Plants that are overfertilized, especially with nitrogen-based fertilizers, produce succulent growth, increasing susceptibility to plant-feeding insects and mites. The higher levels of amino acids, which are the primary food source used by insects and mites, can increase their reproductive ability. In addition, plants that receive excessive levels of fertilizer may have thinner leaf cuticles, which are easier for insects and mites to penetrate with their mouthparts. Variegated plants, those with white, yellow, or red coloration along with green portions are typically fed upon more by insects because the variegated areas contain more nutrients and fewer defensive compounds than the green portions. Additionally, variegated portions are softer and easier for insects to penetrate with their piercing-sucking mouthparts or to consume.

Insects with piercing-sucking mouthparts that feed in the phloem may produce large quantities of honeydew, a clear, sticky liquid. Free amino acids, essential in the production of protein, are very important to phloem-feeding insects. These insects require protein (in the form of amino acids) for development and reproduction. To obtain the necessary quantities of amino acids, insects must consume large amounts of plant sap, which contains an assortment of other materials in larger quantities than amino acids. The excess is excreted as honeydew. Also, phloem-feeding insects possess carbohydrases such as amylase and a pectin-hydrolyzing enzyme that break down the middle lamellae of plant cell walls. Insects that feed within the phloem (such as aphids, mealybugs, whiteflies, soft scales, and certain plant bugs) tend to exhibit a high degree of host specificity because certain plant-specific chemical compounds tend to serve as important host selection cues. This is why, for example, that aphids may prefer certain cultivars of chrysanthemum to others.

Insects that feed in the xylem, such as true bugs (Order: *Hemiptera*), must cope with negative tension and very low concentrations of nutrients in the xylem fluid. As a result, these insects feed faster as the water potential becomes more negative, and they extract extremely large quantities of plant fluids, which is one reason why xylem-feeders tend to be larger than phloem-feeders (I bet you didn't know that!!).

Insects with piercing-sucking mouthparts that feed within the food-conducting tissues are susceptible to systemic insecticides applied to the leaves, stem, or soil. Systemic insecticides are generally very water soluble, which allows them to be distributed into roots and leaves. Also, plants do not readily metabolize systemic insecticides. In general, the active ingredient is taken up and moved throughout the plant (translocated) in the xylem, the phloem, or both. Additionally, once inside the plant, the active ingredient may move back-and-forth from the water-conducting tissues to the food-conducting tissues or vice versa. As an insect feeds, it takes up a lethal dose of the insecticide and is killed. Systemic insecticides include acephate (Orthene/Precise) and imidacloprid (Merit).

Insects with piercing-sucking mouthparts that feed primarily on the underside of leaves, such as whiteflies, are susceptible to insecticides with translaminar properties or local systemic activity. These materials penetrate leaf tissues and form a reservoir of active ingredient within the leaf. This provides residual activity against plant-feeding insects. Examples of insecticides with translaminar properties include abamectin (Avid), acephate (Orthene), and spinosad (Conserve).

Leafminer larvae feed between the leaf surfaces in the mesophyll layer of cells. Generally, this protects the larvae from applications of contact insecticides; however, products with translaminar properties are effective, as they are capable of entering the leaf.

Spider mites, including twospotted spider mite, *Tetranychus urticae*, do not feed in the vascular tissues. Twospotted spider mites primarily feed on leaf undersides within plant cells and obtain food by removing chlorophyll (green pigment) with their styletlike mouthparts. Because spider mites don't feed in the vascular tissues, they are not susceptible to systemic insecticides; however, spider mites are susceptible to insecticides/miticides with translaminar properties, such as abamectin (Avid) and etoxazole (TetraSan).

Chewing insects, in general, are nonselective in their feeding behaviors—they typically ingest macerated whole-leaf tissue. However, some are more selective. Chewing insects are typically not controlled with systemic insecticides. Insecticides with contact and stomach-poison activity are more effective in controlling insects with chewing mouthparts. *(Raymond A. Cloyd)*

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 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.

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