Plant Health Care Report

The Morton Arboretum

Scouting Report of The Morton Arboretum

May 17-23, 2008 **Issue 2008.06**

Our report includes up-to-date disease and insect pest reports, as well as color images, for northeastern Illinois. You'll also find a table of accumulated growing degree days throughout Illinois, precipitation, and plant phenology indicators to help predict pest emergence.

Over the last two weeks the plant clinic has been getting reports of many different types of galls being spotted. Why so many galls? This is not an unusual occurrence. In this report alone we have three types of galls. Galls usually form and grow rapidly in the spring as new plant growth is developing.

This past Sunday May 18th, 2008, kicked off Emerald Ash Borer (EAB) Awareness Week. We need to continue to raise awareness about this insect; the emerald ash borer has killed over 25 million ash trees and continues to threaten billions more!!

Quick View

What Indicator Plants are in Bloom at the Arboretum?

Pagoda Dogwood (*Cornus alternifolia*) are in early bloom.

Accumulated Growing Degree Days (Base 50): 215.0

Insects

- Gypsy moths
- Spruce spider mite
- Slugs
- Leafhoppers
- Caterpillars and sawfly larvae
- Linden looper
- Oak leaftier
- Copper underwing
- Wooly fold gall on oak
- Globular hickory leaf gall
- Oak apple gall
- Galls on linden

Diseases

- Oak leaf blister
- Rhizosphaera

Miscellaneous

- Squirrel damage

Sightings Elsewhere

- Downy mildew

Degree Days and Weather Information

As of May 22, 2008, we are at 215 growing degree days. As of May 22 we are 13 days behind the historical average (1937-2006) and 18 days behind last year.

Location	Growing Degree Days through May 22	Precipitation between May 17 to 22 in inches
The Morton Arboretum (Lisle, IL)	215.0	0.25
Chicago Botanic Garden (Glencoe, IL)*	204.0	0.27
Chicago O-Hare Airport*	212.5	0.39
Aurora, IL	213.0	
Bloomington, IL	269.0	
Champaign, IL	292.5	
DuPage County Airport (West Chicago, IL)	229.5	
Midway Airport	256.0	
Danville, IL	366.5	
Decatur, IL	335.5	
DeKalb, IL	222.5	
Moline, IL	289.0	
Palwaukee Airport (Wheeling, IL)	207.5	
Peoria, IL	325.0	
Peru, IL	346.5	
Pontiac, IL	272.5	
Rantoul, IL	347.0	
Rockford, IL	246.5	
Romeoville, IL	239.0	
Springfield, IL	343.5	
Waukegan, IL	137.0	
Madison, WI	176.0	
Milwaukee, WI	124.0	

**Thank you to Mike Brouillard, Green Living, Inc. and Chris Yooning, Chicago Botanic Garden for supplying us with this information.*

We obtain most of our degree day information from the Virtual Arborist web site. For additional locations and daily degree days, go to http://virtualarborist.com/.

This Week's Sightings

Gypsy moths

We have received reports that gypsy moth larvae have hatched, though not on our grounds. Gypsy moth caterpillars are serious defoliators that feed on over 450 species of trees and shrubs. A mature caterpillar can eat one square foot of foliage per day. Their favorite trees are oak, crabapple, birch, linden, willow, and hawthorn. Although deciduous trees that are defoliated can put out a new set of leaves, the trees use a lot of resources to do so. Trees that suffer a lot of defoliation (approximately greater than 50%) several years in a row may die. Severe defoliation also makes trees more susceptible to other problems such as Armillaria root rot. Needle- bearing conifers, including spruces and pines, cannot re-foliate and therefore may die after one season of attack. In addition, gypsy moths create a lot of frass (scientific word for insect poop) which drops into yards and patios and is quite a nuisance.

A bit on insect growth: Insects have exoskeletons (a thick skin that serves as a skeleton) on the outside of their body. As they grow and get larger, they outgrow their exoskeleton. Through a process called molting, their exoskeleton splits apart and the insect wiggles out. The new skin soon dries and hardens to become a new exoskeleton. Each stage of the insect between molts is called an instar.

The first instar of gypsy moth caterpillars is black, hairy, and only about 1/4 inch long. Their head is black, shiny, and large compared to the rest of the body. The second instar has a brown stripe down its back. By the third instar, the caterpillar develops orange spots. Mature gypsy moth larvae (fourth, fifth, and, if females, sixth instars) have five pairs of blue spots on one end and six pairs of red spots on the other end. This has been described as stop lights on one end and go lights on the other end which makes it easier to remember. OK, I know that "go" lights are green, not blue, but cut me some slack here. All instars are hairy. By the time they reach their last instar, the caterpillars are two to two and a half inches long.

Each gypsy moth caterpillar eats a lot of leaves for about six weeks. They then pupate at the end of June for one to two weeks, emerging as adults in mid-July through mid-August. The adults mate, lay eggs on the lower 20 feet of the tree, and die. For more information about gypsy moth egg masses, read the Plant Health Care report, issue 2008.01.

Control: The gypsy moth is attacked by a number of natural predators and pathogens. The insecticidal bacterium, *Bacillus thuringiensis* var. *kurstaki* (*Btk*), can control young larvae but is not as effective against mature larvae. Other natural enemies include an introduced fungus, *Entomophaga maimaiga*, which builds up in gypsy moth infested areas and has led to major gypsy moth reductions in the East during wet weather.

Gypsy moth eggs are killed in winter when the temperature reaches -20° F. or colder for at least three consecutive days. In this area, we haven't achieved those conditions since the mid-1980s. However, some plants can also suffer damage when the temperature dips that low for that long.

Knowing some gypsy moth biology is helpful in control. The first three instars remain in the tops of trees, but mature larvae (fourth instar and later) feed at night and crawl down from the tops of trees to hide during the day in protected spots. A homeowner can trap gypsy moth caterpillars by wrapping a layer of burlap around an infested tree trunk with the top folded over. The folded flap captures the caterpillars as they ascend the tree, and they can then be discarded into a container of soapy water. The burlap also traps female moths as they climb trees to lay eggs (females moths don't fly).

Barrier bands act similar to burlap. They consist of double-sided sticky tape or a sticky material such as Tanglefoot™. Tanglefoot™ discolors bark when applied directly to it and so should be applied to the surface of material such as duct tape or tar paper that is wrapped around the trunk. Duct tape alone does not work as the stickiness is washed off in the rain (we tried this). Both the burlap and the barrier bands should be removed after August. The bands should not be so tight as to girdle the tree.

If you travel in an infested area such as Michigan or Wisconsin during the egg-laying period (July and August), take care to examine the bumpers and underside of your vehicles for egg masses. Scrape off any you find.
If you find gypsy moth caterpillars, it's critical to first verify their identification at your county extension office and then call the Illinois Department of Agriculture at 815-787-5476 for further instructions. The Department of Agriculture is tracking the pest's movement in Illinois.

Good websites:
http://www.na.fs.fed.us/spfo/pubs/fidls/gypsymoth/gypsy.htm
http://www.fs.fed.us/ne/morgantown/4557/gmoth/
http://web.aces.uiuc.edu/urban/gypsymoth/

Spruce spider mite

Spruce spider mite damage.

Spruce spider mites (*Oligonychus ununguis*) have been found on black spruce (*Picea mariana*). Spider mites are very tiny (you need a hand lens to see them clearly) and have eight legs. Spider mites have needle-like mouth parts which they use to suck up cells. They can cause severe stippling of spruce needles. Badly infested needles appear bronze and fall off the tree. Spruce spider mites prefer cool temperatures in the 60s to low 70s F and become inactive during the hot summer months, unlike two-spotted spider mites that prefer warm weather. Damage from spruce spider mites often becomes visible later in the season after the mites are gone. In addition to spruce, arborvitae is a frequent host. Juniper, hemlock, pine, Douglas fir, Fraser fir, and larch can also be attacked by this pest.

Remember that not all spider mites are pests. Some mites are predacious mites, that is, they eat the bad spider mites. So, how can you tell the difference between the pests and the predators? Shake a branch vigorously over a blank, white piece of paper. If the tree has mites, you will see tiny dots running around on the paper. If you crush them with your finger (we call this the "smoosh" test), they will be either green or yellowish orange. The green ones have been eating plants, but the yellowish orange ones have been eating other spider mites. Predaceous mites also move faster and generally have longer legs. Having a lot of predaceous mites reduces your need to use chemicals.

C*ontrol*: There are many predators of spruce spider mites, including ladybird beetles (aka ladybugs). Sometimes a strong spray of water can blast spider mites off the tree. Applying insecticidal soap can be effective. Horticultural oils also kill mites, but will remove the blue color on blue spruce. Other chemicals are not warranted unless you have severe outbreaks. For information about chemicals to use for serious infestations, refer to the CPM if you are a commercial applicator or the HYG if you are a homeowner.

Good Websites:
http://woodypests.cas.psu.edu/FactSheets/InsectFactSheets/html/Spruce_Spider_Mite.html
http://ohioline.osu.edu/hyg-fact/2000/2012.html

Slugs

It's early but we are already getting a lot of reports in the plant clinic of holes in hosta leaves caused by slugs. Slugs are a common pest in wet weather or if landscapes are watered. They are mollusks, not insects, and are related to oysters, octopi, and clams. Slugs secrete a slimy substance to help them move about. They need moisture to create this "slime", so they are highly dependent on soil moisture. Slugs feed at night when humidity is high, so the best time to see them feeding on our plants is to check the plants at night with a flashlight. They feed on many plants in the landscape, including annuals, perennials, bulbs, ground covers, trees and shrubs, preferring succulent foliage and fruit lying on the ground. Slug damage on leaves appears as irregularly shaped holes or tattered edges. Insects also eat leaf margins, but large holes in leaves are more indicative of slug feeding.

Damaged hosta leaves from slugs.

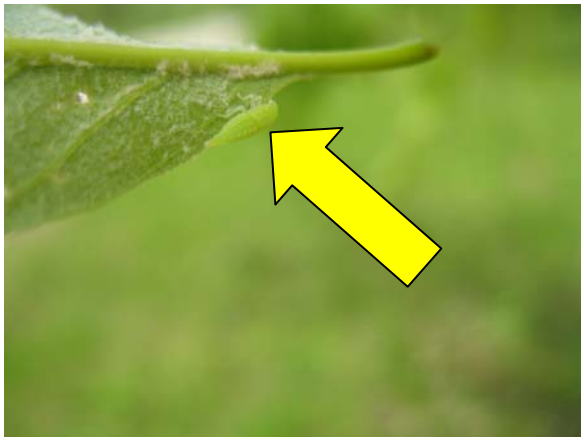
The gray garden slug is the most common slug in our area. They average about ¾ inches long, but may reach up to 1 ½ inches. They have two pairs of tentacles on the front end of their body. Most slugs overwinter as eggs in debris. When they hatch in spring, the young slugs begin to feed immediately.

Control: Hostas with thick leaves are much less likely to suffer from slug damage. A combination of strategies is necessary to combat slugs. They can be handpicked and placed in a jar of soapy water. They are not strong swimmers and drown in the jar. Temporary traps of rolled, wet newspaper and boards placed near damaged plants provide shelter for the slugs during the day. Check the boards and papers in the morning. The slugs can then be collected and destroyed. The key to this is collecting and destroying – if you skip this step, you are aiding and abetting the slugs. Slug hideouts, such as excessive mulch piles and weeds, should be eliminated. Watering late in the day should be avoided because the moist conditions make slug movement easier. Some gardeners place shallow pans of beer (cheap beer works fine, save the good stuff for yourself) in slug-infested areas. The slugs are attracted to the yeast and drown in the beer. Thin strips of copper bands placed around the bases of shrubs and trees repel slugs by giving them an electric shock when their bodies touch the copper. Make sure the slugs are not inside the copper bands when setting them out. Insecticides are not effective against slugs because they are not insects. Registered commercial slug baits are available. For more information, refer to the CPM if you are a commercial applicator or the HYG if you are a homeowner.

Good web site:
http://www.ext.colostate.edu/PUBS/INSECT/05515.html

Leafhoppers

Leafhoppers are feeding on various woody plants. This is just the beginning of a long season of leafhopper activity, as there are thousands of species that infest woody and herbaceous plants. They will be active throughout the growing season.



Leafhoppers have piercing/sucking mouthparts and feed on leaf sap causing yellow-white stippling and leaf curling. The stippling is similar to spider mite damage but more noticeable. Damage on some plants shows up as stunted shoots and distorted leaves, while on other plants appears more like stippling on the leaves. Leafhoppers attack several host trees, with red maples showing the most damage. Feeding on maples produces stunted tree shoots and leaves with brown edges that curl downward. Potato leafhoppers do not overwinter in this area and are blown here from fields farther south.

Leafhoppers are vectors of several woody plant diseases including elm yellows, aster yellows, and bacterial scorch diseases. Controlling the vector helps to control these diseases.

Most leafhopper species overwinter as eggs in the bark of host plants or among fallen host plant leaves. Eggs hatch in the spring and five nymphal stages are passed through before the adult stage is reached. Adults are generally less than 3 mm long.

Control: Remove and destroy leaf debris in the fall. Keep trees healthy and vigorous by keeping them mulched and watering during drought periods to lower tree stress. In severe infestations, insecticides can be used and should be applied when hoppers are visible on the foliage but before leaves begin to curl. For further information on chemical controls refer to the CPM and HYG.

Web site:
http://www.inhs.uiuc.edu/~dietrich/Leafhome.html

Caterpillars and sawfly larvae

We're seeing a number of different caterpillars and sawfly larvae. How can you tell the difference between the two? It is important to distinguish between them, especially if you're using some kind of chemical or biological control. Like adult insects, both caterpillars and sawfly larvae have three body parts: the head, thorax and abdomen. Hard, jointed legs are attached to the thorax, and a set of fleshy, unjointed prolegs (hind legs) is attached to the abdomen. If there are six or more pairs of prolegs, the critter is a sawfly larva. If there are five pairs or less, it is a caterpillar.

Have you ever tried to pick a caterpillar off a branch and it seemed to stick to it? Caterpillars have hook-like structures called crochets at the end of their prolegs, while sawfly larvae do not. Crochets are difficult to see. A good hand lens is necessary to see them.

As far as control is concerned, when control is necessary, we prefer hand picking of both caterpillars and sawfly larvae. However, *Bacillus thuringiensis* var. *kurstaki* (*Btk*) can be sprayed on the young larvae of caterpillars, but will not kill mature larvae. ***Btk* does not kill sawfly larvae.**

The following chart may be helpful:

	Caterpillars (photo B)	Sawfly larvae (photo C)
Number of pairs of prolegs	5 pairs or less	6 pairs or more
Presence of crochet hooks on prolegs	Yes	No
Adult stage	Generally moths and butterflies (Lepidoptera)	Wasp-like (Hymenoptera)

Linden looper

Linden looper (*Erannis tiliaria*) larvae are feeding on American linden (*Tilia americana*). Feeding by young larvae causes small holes in expanding leaves. Older larvae consume the entire leaf, except midribs and major veins. Serious infestations may result in defoliation. The larvae have rusty-brown heads and yellow bodies, with thin, wavy black longitudinal lines on their backs. They reach 1.5 inches at maturity. Preferred hosts of the linden looper include maple, linden, oak, apple, birch, elm, hickory, crabapple, and hawthorn.

Control: Infestations are rarely severe so control is generally not warranted. For severe infestations, *Bacillus thuringiensis* var. *kurstaki* (Btk) is effective against young larvae and should be applied now.

Good web site:
http://www.forestpests.org/hardwood/lindenlooper.html

Oak leaftier

The larva of the oak leaftier (*Croesia semipurpurana)* has been found on the white oak (*Quercus alba*). The leaftier in a serious infestation can be an early defoliator of many oak trees. The eggs overwinter on oak branches and hatch in the spring. The full-grown larvae are dirty white to light green with black bars on the sides of its pale head capsule. Newly hatched larvae feed in unopened or recently opened buds in April and early May. Older larvae feed on open leaves tied together with silk. In late May the mature larvae spin down to the ground and pupate in the soil litter for 1 to 2 weeks. Only one generation per year has been reported.

Control: This is a minor pest with infrequent outbreaks. Treat only if infestation level is high and serious damage imminent. Spray should be applied now. For more information, refer to the *2007 Commercial Landscape & Turfgrass Pest Management Handbook* (CPM) if you are a commercial applicator or the *Home, Yard & Garden Pest Guid*e (HYG) if you are a homeowner.

Good web sites:
http://www.forestpests.org/northeast/oakleaftier.html
http://www.na.fs.fed.us/spfo/pubs/pest_al/oakleaf/oakleaf.htm

Copper underwing

The copper underwing caterpillar (*Amphipyra pyramidoides*) was found on the American linden (*Tilia Americana*). It is an unusual looking but handsome blue-green caterpillar with creamy spots all over and a white and yellow stripe on each side. The copper underwing can be found feeding on the undersides of leaves of many woody plants including, apple, lilac, maple and oak trees. Female moths lay eggs well into November, which then overwinter. There is one generation with mature caterpillars from May through June.

Good website:
http://www.entomology.ualberta.ca/searching_species_details.php?s=2325

Wooly fold gall on oak

The wooly fold gall made by the gall fly *(Cecidomyia* sp.) has been found on white oak (*Quercus alba*). These light green galls form on the top side of oak leaves. A white fuzzy pubescence appears on the leaf with a pouch that contains the larval stage of the fly. Galled leaves are deformed but the overall health of the tree is not adversely affected.

Control: Controlling gall insects are difficult, and at present there are no insecticides registered for this use by homeowners. Any treatment applied after galls are already present is useless, because galls will not go away even if the parasite is killed. The vast majority of galls are not particularly injurious; it is more of an aesthetic issue. Most plants can support a large number of galls and continue to grow normally. Pruning out heavily galled portions of a plant is sometimes feasible and

may help reduce populations of the gall insects. When this is not possible, it is best to accept galls as curiosities of nature.

Good web site:
http://www.ipm.uiuc.edu/landturf/insects/plant_galls/index.html

Globular hickory leaf gall

A species of phylloxeran insects (there are at least 29 that attack various species of hickory) is feeding on the developing leaves of hickory (*Carya* sp.) causing galls to form. The galls are round, varying in size, and color.

Phylloxera, an aphid-like insect, overwinters as eggs in bark cracks and crevices and in the crevices of old galls. Nymphs hatch in early spring; crawl into expanding buds and feed on the tissue which induces gall formation. When mature, the phylloxera lay their eggs inside the galls from which more phylloxera hatch. As the galls age, they dry out, darken, and split open releasing another generation of phylloxerans that emerge from the gall to lay eggs and continue the cycle.

Control: Damage is primary aesthetic and therefore treatment is not necessary.

Good web site:
http://www.hsu.edu/content.aspx?id=2151

Oak apple gall

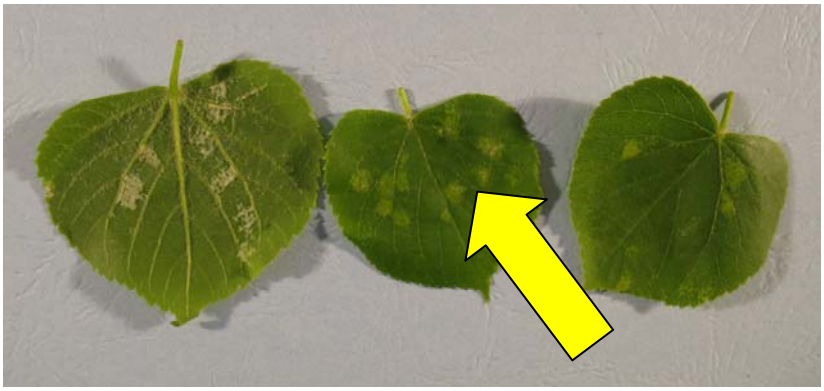
There are numerous types and forms of oak leaf galls. We are now seeing leaf stem and base galls, also referred to as spring galls because they develop while leaves are expanding. Fall galls will begin to appear on oaks in mid-summer when leaves are fully expanded.

Oak apple galls, caused by cynipid wasps, were brought into the plant clinic this week. The galls are globe shaped, 1-2 inches in diameter, and filled with a spongy mass, and they are usually found on the midribs of leaves. The adult cynipid wasp lays eggs in developing leaves and this causes adjacent plant cells to grow and engulf the egg, thereby providing it with food and shelter.

Control: Leaf galls rarely affect tree health so control is not required.

Good web sites:
http://www.jmu.edu/biology/k12/galls/oakapp.htm
http://www.fs.fed.us/r8/foresthealth/pubs/oakpests/p34.html

Galls on linden



Erineum galls, caused by the eriophyid mites, have appeared on little-leaf linden (*Tilia cordata*). Feeding by the mites induces formation of cream colored, velvet-like galls on the underside of leaves with pale yellow patches developing on the upper leaf surfaces.

Control: Despite the appearance and abundance of galls, they rarely affect the health of vigorously growing trees and shrubs. Generally galls do not cause enough damage to justify an insecticide or miticide. Furthermore, it is extremely difficult to achieve efficacy with chemical applications as precise timing of sprays is required. To be effective, sprays must be timed to coincide with initial insect/mite activity before gall formation begins. Once galls start to form, the insect or mite is concealed within the gall and is impervious to treatment.

Oak leaf blister

We are seeing early leaf blister symptoms caused by the fungus, *Taphrina caerulescens*, on bur oak (*Quercus macrocarpa*). In spring and early summer, leaves develop wrinkled, raised, pale whitish-yellow blisters on their upper surface and corresponding pinkish-gray depressions on the lower leaf surface. Blisters range from 1/10th of an inch to an inch in diameter. As they age and merge, the blisters turn red brown with pale yellow margins and the leaf may become distorted. Red oak (*Quercus rubra*) is the most susceptible species. Oak leaf blister, like other *Taphrina* diseases (e.g., peach leaf curl and plum pockets), usually develops only during cool, wet springs and is more homely than harmful to the oaks. Infected leaves become distorted and may prematurely drop. The disease usually dissipates during the summer.

Control: The fungus survives the winter on twigs and bud scales. On oak, leaf blister is more unsightly than harmful, so control is not a high priority. However, a single, dormant season application of fungicide can help. Fungicides applied after budbreak are useless. Refer to the CPM or HYG for chemical control information.

Good web site:
http://www.ag.uiuc.edu/~vista/abstracts/a663.html

Rhizospaera

The plant clinic has received several blue spruce (*Picea pungens*) branch specimens that showed symptoms of Rhizosphaera needle cast, a disease caused by the fungus *Rhizosphaera kalkhoffii.*

Rhizosphaera kalkhoffii infects needles on the lower branches first and gradually progresses up the tree. Although needles become infected in May and June, symptoms do not usually appear until late summer to late fall or the following spring. Infected needles initially yellow, and small dot-like fruiting bodies (pycnidia) can be seen (with a hand lens) erupting through the stromata. Later, the needles turn purple to brown and begin to drop. Although trees are not usually killed by this pathogen, branches which lose needles for 3 to 4 consecutive years may die. Colorado blue and Engelmann spruces are highly susceptible to Rhizosphaera needle cast. White spruce is moderately susceptible and Norway spruce is relatively resistant. Hosts in other genera include true firs, Douglas fir, and pines.

Control: Rake and dispose of infected needles to reduce the source of inoculum. Prune off lower branches, provide adequate spacing between trees, and control weeds and unwanted shrubs to improve air movement. Chemical controls are most effective if the disease is detected early. Fungicides should be applied when needles are half-grown (as soon as bud caps fall off) and again when fully elongated. Two years of applications are usually required. For further information on chemical controls refer to the CPM or HYG. Rhizosphaera is a disease common to plants grown outside their native ranges; it is inconsequential in natural forest. The best control for the future is to plant resistant species (natives!).

Good websites:
http://ohioline.osu.edu/hyg-fact/3000/3059.html
http://www.extension.umn.edu/yardandgarden/ygbriefs/p435rhizosphaera.html

Squirrels damage

We're finding a lot of small (three-inch long) elm leaf twigs on the ground. This is caused by squirrels chewing on the elm seeds and buds. They also chew on maples in the spring and oaks and walnuts in the fall. Prevention or control is almost impossible because squirrels are pretty smart animals. The harm to the tree is insignificant.

Downy mildew on Coleus

Sightings Elsewhere

Downy mildew

The Chicago Botanical Garden has reported downy mildew on crapemyrtle (*Lagerstroemia indica*). There are many fungi that cause downy mildew. The fungi are host specific, that is, a downy mildew fungus that infects roses won't infect grapes. Gray spots develop on the leaves which cause a dirty, almost fuzzy appearance, especially on the underside of the leaves.

Control: Infected plants should be bagged and removed from the area because spores can be blown onto susceptible plants. Removed plants should be destroyed and not composted. A fungicide can also be applied to healthy plants. For fungicide information, see the following web site: http://www.ipm.msu.edu/grnhouse06/G05-10-06.htm#3

Good web sites:
http://www.hort.uconn.edu/Ipm/greenhs/htms/downymlgh.htm

What to Look for Next Week

Next week we will be looking for apple scab, black spot on elm, and azalea sawfly.

Quote of the week: "Gardening requires lots of water - most of it in the form of perspiration." - Lou Erickson

The Plant Health Care Report is prepared by Trica Barron, Plant Health Care Technician, and edited by Donna Danielson, Plant Clinic Assistant; Fredric Miller, PhD, research entomologist at The Morton Arboretum and professor at Joliet Junior College; Doris Taylor, Plant Information Specialist, and by Carol Belshaw, Plant Clinic volunteer. The information presented is believed to be accurate, but the authors provide no guarantee and will not be held liable for consequences of actions taken based on the information.

The *2007 Commercial Landscape & Turfgrass Pest Management Handbook* (CPM), for commercial applicators, and the *Home, Yard & Garden Pest Guide* (HYG) for homeowners from the University of Illinois, are available by calling (800-345-6087). You may also purchase them online at https://pubsplus.uiuc.edu/ICLT-07.html (commercial handbook) and https://pubsplus.uiuc.edu/C1391.html (homeowners' guide). One further source is your local county extension office.

This report is available on-line at The Morton Arboretum website at http://www.mortonarboretumphc.org/.

For pest and disease questions, please contact the Plant Clinic at (630) 719-2424 between 10:00 and 4:00 Mondays through Saturdays or email **plantclinic@mortonarb.org.** Inquiries or comments about the PHC reports should be directed to Trica Barron at tbarron@mortonarb.org.