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## INSECTS

### Fungus Gnats

This article is a continuation of last week's article on fungus gnats. In this issue, I will discuss chemical and biological management strategies for controlling fungus gnats in greenhouses.

Even if proper cultural management practices have been implemented (see issue No. 15 of this newsletter), fungus gnats may still be a problem. However, a number of insecticides can be used to supplement cultural management strategies. These materials are

listed in Table 1. Insecticides listed in the table are categorized based on chemical class. In addition, the table notes the fungus gnat life stage (that is, adult or larva) that each insecticide works on and the restricted entry interval (REI). Be sure to read the label before using any of these materials.

Biological control is another option greenhouse managers have to manage fungus gnats. Biological control agents that have been shown to be effective with fungus gnats are the beneficial nematodes, *Steinernema feltiae* and *Steinernema carpocapsae*, and the soil predatory mite, *Hypoaspis miles*. All biological control agents are applied to the growing

Table 1. Insecticides used to manage fungus gnats in greenhouses.

Insecticides	Susceptible life stage	REI (hours)*
Organophosphates:		
Acephate (Orthene/PT 1300)	Adult	24
Chlorpyrifos (Duraguard)	Larvae	12
Diazinon (Knox Out)	Larvae	12
Pyrethroids:		
Bifenthrin (Talstar/Attain)	Adult	12
Cyfluthrin (Decathlon)	Adult	12
Permethrin (Astro)	Adult	12
Insect growth regulators:		
Azadirachtin (Azatin)	Larvae	4
Cyromazine (Citation)	Larvae	12
Diflubenzuron (Adept)	Larvae	12
Fenoxycarb (Precision/Preclude)	Larvae	12
Kinoprene (Enstar II)	Larvae	12
Pyriproxyfen (Distance/Pyrigro)	Larvae	12
Microbials:		
<i>Bacillus thuringiensis israelensis</i> (Gnatrol)	Larvae	4
Others:		
Potassium salts of fatty acids (insecticidal soap/M-Pede)	Adult	12
Horticultural oil (SunSpray Ultra-Fine)	Adult	4

\* REI = restricted entry interval

medium and attack fungus gnat larvae. They should be applied early before the fungus gnat population's buildup. For more information, contact a biological control supplier.

Scouting for fungus gnats can provide greenhouse managers with important information on the effectiveness of each management strategy. Scouting involves the use of yellow sticky cards for winged adults and potato wedges or sticks for the soil-inhabiting larvae. Monitor fungus gnat populations within the crop and underneath benches or floors.

Management of fungus gnats entails a combination of pest management strategies. However, it is important for greenhouse managers to understand the conditions that lead to fungus gnat problems. This will improve the effectiveness of cultural, chemical, and biological management strategies. (*Raymond Cloyd*)

### White Grubs

The larvae of Japanese beetle and the masked chafers, annual white grubs, hatched in central Illinois the first week of August. By the second week of August, these insects should be hatched throughout the state. It is too early to tell how high the numbers will be. Grubs collected on August 5 were still first and second instar larvae, about 1/4 inch long. If you have not applied imidicloprid (Merit) or halofenozide (Mach 2), you can probably still do it if you apply it immediately. Damage is unlikely to show up until about the third or fourth week of August, and these two chemicals take about three weeks to start killing grubs.

It is also the correct time to apply the shorter-acting insecticides for grub control in irrigated turf. Bendiocarb (Turcam), diazinon, or trichlorfon (Dylox, Proxol) can be applied at this time to kill the hatched grubs. Remember that diazinon is not labeled for application to golf courses and sod farms. Water in any insecticide with at least 1/2 inch of water.

Turf areas that are not irrigated or have not been irrigated regularly should be scouted for grub numbers. Cutting through the sod with a heavy knife and pulling back the sod reveals the white grubs in the root zone. If the soil is dry, the grubs may be a couple of inches deep into the underlying soil.

Ten to twelve or more white grubs per square foot are enough to cause turf injury, and treatment is warranted. Grubs are not only more likely in watered areas, but also in open areas away from trees and along sidewalks, driveways, streets, and other paved areas. (*Phil Nixon*)

### Elm Sawfly

Elm sawfly larvae are being found at this time in Illinois, particularly in the northern areas of the state. These yellowish to white larvae are thickbodied and approach 1-1/2 inches long when fully grown. They have yellowish heads and a black line running down the middle of their backs with a row of black spots on each side. They are usually curled up on a leaf when discovered. These insects feed on elm and willow, and we are finding most of them either on willow or walking across the ground towards willow trees. They can cause considerable defoliation on their hosts.

Although these insects look somewhat like caterpillars, the adults are wasplike. Not true caterpillars, they have more than five pairs of prolegs, false legs, on the abdomen. *B.t.k.* will not control them. Instead, use carbaryl (Sevin), a synthetic pyrethroid, or another labeled insecticide. Control may not be necessary because leaf loss this late in the growing season is unlikely to harm the health of the tree. (*Phil Nixon*)

## PLANT DISEASES

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### Rose Cane Cankers

Even in the drought-stressed northern parts of the state, it is difficult to find new diseases to write about. Rose cankers appear at any time of year but especially when plants are under stress. Three canker diseases—brown canker, stem or common canker, and brand canker—are common in Illinois and are generally confused with weather injury or other problems. Where control measures are not practiced, cane infections may approach 100 percent with all canes infected. Identifying the particular canker species is not important, but identifying a problem as a canker is important. The first symptoms are small, roundish lesions in the canes; the spots are pale yellow, reddish, or bluish purple. They gradually enlarge, turn brown or grayish white (often with a darker margin), and may partially or completely girdle the cane. Complete girdling results in dieback or poor growth of the plant parts above the affected areas. Cankered areas are sprinkled with black, speck-sized, fungus-fruiting bodies. When left unchecked, infections may spread downward into the crown, causing entire rose plants to wilt, wither, and die. Infection occurs chiefly through a wide variety of

wounds, including thorn abrasions. Infections may also occur on the leaves and flowers.

Management of rose cankers starts with good sanitation. Prune the canes in fall and in early spring, according to the type and cultivar grown. Remove and burn or haul away all infected, dead, and weak parts of canes, as well as infected leaves, flowers, buds, and hips. When pruning cankerous stems, cut back to a strongly growing shoot or branch at least 2 to 3 inches below any sign of infection. Before each cut, dip the shears in a disinfectant such as 10 percent Clorox or 70 percent rubbing alcohol. Use sharp tools to make clean, slanting pruning cuts no more than 1/4 inch above a node.

Plant only top-quality, disease-free plants from a reputable nursery. The plants should be free of cane bruises or colored spots. Bargain roses are often infected. Maintain plants in high vigor by proper planting, spacing, fertilizing, watering, winter protection, and thorough spraying with fungicides. Start as the buds break open in the spring and continue at seven- to ten-day intervals into September or early October. The fungicides that control black spot usually control cankers as well, so no additional spraying is required. Don't stop now though. Adding a spreader-sticker material to the spray helps wet the canes for better protection. Consult *Report on Plant Disease* No. 626 for details concerning rose cankers. (Nancy Pataky)

### Vinca Stem Blight

We usually see this disease in cooler, wet conditions, but we have seen it again lately in some parts of the state. Chicagoans may not believe it possible as they struggle through drought (seven weeks now), but some parts of the state do have enough moisture at present. Infection can occur any time from June to August following periods of cool, wet weather, and recent cool spells have triggered a new flush of disease.

Vinca (periwinkle) stem blight is a fungal disease that causes dark brown to black girdling lesions on the stems. When lesions occur at the ground line, the entire runner dies. Where healthy stems touch the soil or infected plant parts, new lesions may develop. Within a few weeks, the disease can spread to stems and leaves, causing large sections of the bed to die. The pathogen, a fungus called *Phoma exigua* var. *exigua*, can persist for long periods of time in moist soil and plant debris.

Avoid overhead watering or excessive watering of vinca beds. It may help to improve air circulation in the area by pruning surrounding plant material and overhanging branches. Because the fungus can survive in the soil on dead plant material, remove fallen leaves and dead tissue.

Fungicides may help contain this disease, and registered chemicals are listed in the usual pest control handbooks. Copper compounds are listed without trade names because there are literally dozens of these products. Consult with garden center staff for information about the copper compounds; then read the labels carefully to select a product that is cleared for use on vinca. Mancozeb also works well, but you may have trouble locating it. Stem blight of vinca is discussed in *Report on Plant Disease* No. 640. (Nancy Pataky)

### More Chlorosis

Recently, the Plant Clinic has received several samples of red maples. Based on the maple samples that we receive, this species seems to have more problems than the other maples. It is not unusual to see dieback and decline in red maple for no apparent reason. On the recent samples, however, there was a yellowing to browning of the interveinal tissues with poor stem growth and overall stunting in the landscape. These samples were found to be free of infectious disease but were diagnosed with chlorosis due to likely manganese deficiency. The same soil conditions of high pH that inhibit iron uptake can also inhibit manganese uptake. Red maples are particularly sensitive to manganese deficiency. For more on chlorosis, refer to the article on pin oak problems in issue No. 9 of this newsletter. Also refer to *Report on Plant Disease* No. 603. (Nancy Pataky)

### Frogeye Leaf Spot of Crab Apple

If you have had a leaf disease on your crab apple this year and it does not quite fit the description of apple scab, it may be frogeye leaf spot. This disease is not new, but it does not get as much press as scab on crab apples. Frogeye is the leaf spot phase of a more notorious disease of apple and crab apple called black rot. Limb cankers and fruit rot phases can be quite damaging to apples, but the leaf spot disease causes early defoliation as we see with scab.

Frogeye leaf spot is a fungal disease that has been prevalent in the Midwest the last several years on apple and crab apple. The cause is *Botryosphaeria*

*obtusa*. Classic symptoms include numerous small spots on older cluster leaves with marked zones of lighter and darker tissues within the spots. Affected leaves are always near dead or dying limbs that have a black rot canker on them. This same canker and, in some cases, infected leaves will produce inoculum, which then infects developing fruit from August through September. Removing and destroying all dead wood during annual pruning is a highly recommended control measure. Also remove any mummified fruit on the ground or in the tree. Because *Botryosphaeria* is a canker-producing fungus, you should follow good horticultural practices to improve tree health as you would with any canker disease. This means removing dead wood, watering the tree in periods of drought that last two weeks, and fertilizing in the fall or early spring. Producers of edible apples should use a fungicide program to control the leaf spot phase of this disease. The same fungicides used to control scab should also control the leaf spot on crab apple trees. *Report on Plant Disease* No. 814 discusses black rot and frogeye leaf spot of edible apple. (Nancy Pataky)

### Leaf Drop of Tulip Tree

Have you noticed tulip trees with scattered yellow leaves and black spots between veins? The leaves may even have green veins like chlorosis, but they are scattered in the trees. You certainly will notice them when they fall from the tree in August.

The affected trees have been tested in a few cases, and I have tried to find a pathogen associated with the leaf spots. I cannot find a pathogen to blame. The condition, which shows up after hot, dry weather in

midsummer, is attributed to “unknown causes.” I have had a few calls about this condition but would expect more from the drought-stricken areas. It appears to occur only in hot, dry weather. A row of tulip trees on campus shows scattered yellow leaves whenever we have a drought period and, true to form, this condition appeared two weeks ago at the height of our heat wave. Affected leaves will drop early. What can you do to help the trees? Water them! A picture of affected leaves appears on page 477 of *Diseases of Trees and Shrubs* by Sinclair, Lyon, and Johnson. (Nancy Pataky)

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