

IPM Update: Summer 2012

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ENTOMOLOGY

Factors Determining Insect Problems

A number of media reports have suggested that insect pests will be unusually problematic this summer because of the mild winter and warm spring. Although the warmer than normal temperatures have given many insects a jump-start this season, it does not necessarily mean that we will have greater insect problems. Several other factors can affect insect numbers, including habitat conditions, availability of food and water, and presence of natural enemies. For example, insect pests that emerge earlier than normal because of warm temperatures may end up having nothing to eat because their food sources are still scarce within the environment. In addition, mild winters may also favor natural enemies that keep certain pests in check, resulting in fewer pest problems. Unfortunately, it will be difficult to predict how this year's winter and spring will ultimately affect insect numbers. Forecasting future insect populations is complex and never easy when so many factors are in play.

News About Insect Control for Fruit Trees

Azinphos-methyl (Guthion) has been the primary insecticide used to control codling moth in commercial apple orchards since the late 1960s. However, a decision by the Environmental Protection Agency (EPA) to phase out this organophosphate insecticide by the end of 2012 signals the end of this product's use by U.S. tree fruit growers. To facilitate its departure, the EPA registered many new insecticides over the past decade. New chemicals include acetamiprid, rynaxypyr, spinetoram, thiacloprid, and several insect growth regulators (IGRs) such as novaluron, methoxyfenozide, and pyriproxyfen. Products containing these chemicals are less toxic to humans and considered safer to the environment than azinphos-methyl because they are more selective in the insect species and life stages they affect.

For controlling codling moth, these new insecticides are most successful if both the eggs and larvae are targeted with products having different modes of action. An insect growth regulator applied during the start of egg laying, followed by two insecticide applications targeting larvae during peak egg hatch, can provide fruit protection equivalent to that given by two applications of azinphos-methyl.

Growers should avoid using insecticides with the same mode of action against more than one successive generation. This avoids or delays the development of resistance by insect populations, which will help preserve the efficacy of these new products for future use.

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Control of Yellow (Tulip) Poplar Tree Pests

Recently, a number of homeowners have called concerning yellow (tulip) poplar trees. They noticed a sticky black substance covering the trees and surrounding ground as well as damage to leaves. Two different insects can cause these problems: Tuliptree Scale and Yellow Poplar Weevil.

Tuliptree Scale. Tuliptree scale is a type of soft scale that attacks primarily yellow poplar and magnolia trees. These insects, which have one generation per year, are generally found on twigs and branches where they feed on the tree's vascular system. The first nymphal instar or immature stage of the scale is called a crawler because it has functional legs, which are used to move over plant surfaces to find a feeding spot. Once settled, they attach themselves to the plant and do not move. Damage symptoms include yellowing of leaves, premature leaf drop, and branch dieback. They also produce copious amounts of a sugary liquid called honeydew, which can promote the growth of sooty mold, a fungus causing the sticky black appearance.

Yellow Poplar Weevil. These weevils also have one generation per year; they will feed on the leaves of yellow poplar, sassafras, sweetbay, and magnolia trees. Larval stages mine through leaves, feeding between the lower and upper leaf surfaces. Adults feed primarily on the lower leaf tissues. Larval activity occurs primarily in late May and June; adults are active in the spring during egg laying and again in late June and July when new adults emerge. Damage symptoms include brown inflated mines or discolored spots that give the leaves a burned appearance.

Although damage from these insects can be unsightly, established trees in the landscape are generally able to withstand some feeding pressure. Many species of predatory and parasitic insects will generally keep these insects under control most years. However, natural enemies usually are not present in high enough numbers to provide sufficient control during certain outbreaks such as this year's. Where populations of these insects are extremely high, chemical control may be warranted.

Note that, tuliptree scale is often difficult to control with chemicals because immobile scales will produce a waxy covering that offers protection from many insecticide sprays. For this reason, chemical control of tuliptree scale is most effective in late August to September when crawlers are active. Foliar-applied broad-spectrum insecticides containing acephate, carbaryl, imidacloprid, malathion, or permethrin can be used to control crawlers during this time. However, these materials can also kill the scale's natural enemies responsible for lasting control in the landscape. Biorational or low-impact materials such as horticultural oil, insecticidal soap, or pyriproxifen can be used in place of these products as a foliar treatment. Where trees are too tall to maintain adequate spray coverage on infested branches, soil-applied systemic insecticides containing imidacloprid can be a good option. Systemic insecticides applied during the fall will generally provide effective control during the following spring.

For the yellow poplar weevil, foliar-applied insecticides containing acephate or carbaryl may be used to target adults.



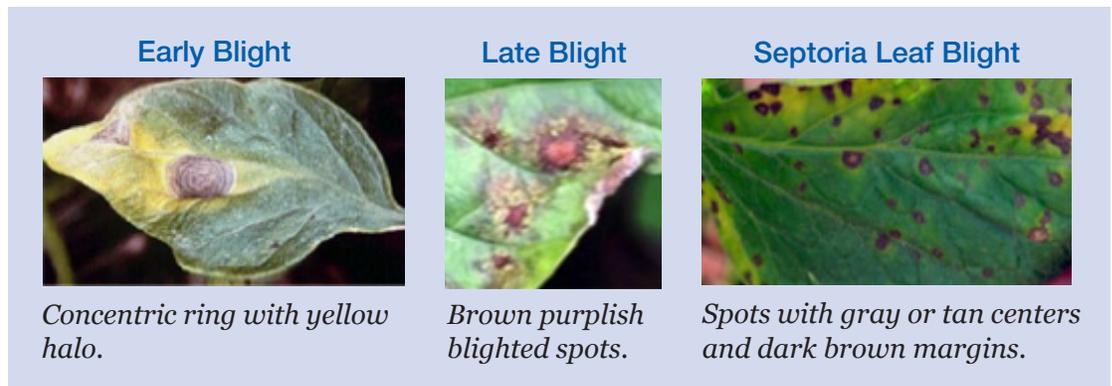
Tomato Early Blight Management

Early blight of tomatoes, caused by the fungal pathogen *Alternaria solani*, is one of the most common diseases of tomato, which can cause significant yield losses almost every year.

The disease is identified by a few (5 to 10 in most cases) brown circular spots up to a half-inch diameter with concentric rings or ridges that form a target-like pattern surrounded by a yellow halo (Fig. 1). As the disease progresses, stem and fruit may also be infected and form dark, sunken spots. Dark, sunken cankers with concentric rings may also appear at or above the soil line.

Do not confuse early blight with two other diseases, late blight and Septoria leaf spot. Spots of late blight, caused by the fungus *Phytophthora infestans*, start out pale green, usually near the edges of tips of foliage, and turn brown to purplish black (Fig. 1). Under humid conditions, a fuzzy mold appears on the undersides of leaves and may quickly blight the stems and fruits, resulting in a leathery-brown appearance.

Septoria blight manifests as numerous brown spots having a diameter of approximately $\frac{1}{16}$ to $\frac{1}{8}$ inch on the leaves, with gray or tan centers (Fig. 1). These spots have a dark brown margin compared with early blight's yellow halo. As the spots mature, many dark brown, pimple-like structures called pycnidia (fruiting bodies of the fungus) may appear inside the spots. These pycnidia can easily be seen with a hand lens. Early and late blight spots do not produce pycnidia. Contrary to the other two diseases, Septoria leaf spots do not affect stems or fruits, but defoliation caused by more severe disease may expose fruits to sunscald.



Facts About Early Blight

Early blight fungus survives the winter on infected plant debris, or it can be brought with infected seeds that initiate the disease in the spring. Any fungal conidia surviving in the soil are splashed on the lower leaves during rain or sprinkler irrigation. Conidia germinate in the presence of a thin film of water on foliage. Germinated conidia infect tissues if foliage remains wet for another 5 to 10 hours, depending on the temperature. Keeping or letting foliage dry during or after a rain or morning fog will minimize the level of infection.



PLANT PATHOLOGY

To manage early blight, follow these tips:

- Use certified seeds from a reputable company or seeds that were kept from disease-free fruits.
- Use resistant varieties such as ‘Mountain Fresh Plus F1’, ‘Juliet F1’, ‘Tommy Toe’, ‘Old Brooks’, or ‘Cabernet F1’.
- Use mulch to prevent soil splash and stake the plant to keep it upright. Because wooden stakes and caging from previous years may have been contaminated, do not use them unless they are treated with 10% bleach for 30 minutes.
- Prune lower leaves and stems that are close to the soil surface.
- Grow tomatoes under a well-ventilated plastic tunnel that keeps relative humidity low.
- Use drip tape instead of sprinkler irrigation.
- Maintain sufficient plant spacing and row orientation to allow air to circulate and sunlight to penetrate.
- At the end of the season, remove all plant debris from the garden and burn or bury it by deep plowing.

In an area with previous records of early blight incidence and if rotation is not an option, apply either of the following products in a preventative schedule. For organically grown tomatoes, use copper hydroxide (Kocide 101) or Serenade on a 10-day schedule starting pre-bloom or at first sight of blight spots. For conventional tomatoes, use chlorothalonil (Daconil 2787) or azoxystrobin (Quadris, Amistar, etc.) if disease is detected and weather remains damp and rainy.



Herbicide-Resistant Weed Update

Herbicide-resistant weed biotypes, especially those in row crops, continue to make headlines in weed management. Lately, biotypes of certain weeds – including palmer amaranth (*Amaranthus palmeri*), water hemp (*Amaranthus rudis*), common and giant ragweed (*Ambrosia spp.*), horseweed/marestail (*Conyza canadensis*), and johnsongrass (*Sorghum halepense*) – have been reported to be resistant to the herbicide glyphosate (Roundup) in various areas of the nation. In West Virginia, glyphosate-resistant biotypes of horseweed and palmer amaranth have been seen. The single-most important practice contributing to herbicide resistance is the repeated use of the same herbicide, or using herbicides with similar modes of action year after year. Management practices to avoid this will help ensure that cost-effective herbicides remain available.

A recent study reported that herbicide-resistant weeds are becoming increasingly troublesome in agronomic crops when compared with typical weeds that prevailed in row crops before the advent of transgenic crops. Genetically modified organisms (GMOs) or transgenic crops that tolerate herbicides have been on the market for the past 15 years. While crops that tolerate glyphosate (Roundup-Ready), glufosinate (LibertyLink), and imidazolinone (IMI or Lightning) are commonly available, crops that can tolerate other common herbicides such as 2,4-D and dicamba are being developed. This technology continues to generate public interest as well as controversy. Harmful effects on human health have yet to be documented. Overdependence on this technology and related indirect effects on cropping systems and the ecosystem appear to be primary concerns among scientists. Conscientious use of this otherwise effective tool in the IPM toolbox will ensure its continued availability.

Pasture Weed Management

Integrated management strategies can be used to control weeds in pastures. Weeds tend to establish when soil is left exposed as a result of overgrazing or other poor management practices. Mixed-grazing practices have been proven to be effective to manage forbs and brushes. Sheep can control forbs that tend to be weedy in pastures grazed by larger animals. Goats and other small ruminants prefer brushes such as multiflora rose, making such pastures more manageable and productive. Conventional livestock can be trained to consume plants typically considered to be weeds.

Demonstrations in West Virginia are currently looking closer at this practice (<http://thetaoofcow.livestockforlandscapes.com/2011/12/15/west-virginia-extension-talks-about-cows-eating-weeds/>). However, toxic attributes of certain weeds should be understood before introducing livestock to new forage. Herbicides can supplement other management practices effectively, especially if there is an overabundance of obnoxious weeds. However, timing of the application is critical in obtaining satisfactory control. Our research indicated that mid- to late-July application of certain selective herbicides can provide better long-term control of the perennials bedstraw and Canada thistle. Adequate soil moisture is required at the time of herbicide application. Weeds under moisture stress do not respond well to systemic herbicides. Adding a surfactant (a substance that improves the absorption of the herbicide into the leaves) to the spray tank also enhances the effectiveness of such herbicides. Spot treatment is recommended to reduce herbicide use and to provide optimal spray coverage.

A couple of new herbicides for control of multiflora rose and brambles are expected to become available in 2013.

Garden and Lawn Weed Management

In small-scale vegetable production, mulches serve as an effective barrier for most annual weeds. Black plastic by itself or 4 inches of straw mulch applied over newspaper were found to be effective in most vegetable crops. In addition to controlling weeds, these mulches help to conserve soil moisture. If lawn clippings or hay are used as mulch, make sure the source was not treated with herbicides or fertilizers containing herbicides.

Removing weeds manually or using cultivators is effective, especially when weeds are young. Both weeds and crops have their peak demand for water and nutrients at the same time. Typically, weeds out-compete the crop. Weed competition is critical during early stages of crop growth, and efforts to manage weeds during this stage can be more effective.

In lawns, proper mowing height plays an indirect role in weed management. For the cool-season grasses prevalent in West Virginia, 2.5- to 3-inch mowing height is recommended. Lawns may be clipped at intervals, using sharp mower blades, so that no more than one-third of the top growth is removed by each mowing. Recycling grass clippings reduces the need for fertilizers. Aeration is not recommended during summer months for cool-season grasses. Maintaining a healthy lawn is the single-most effective strategy for keeping weeds at bay!

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