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Issued October 1985
4 pages

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Fruit Tips

Common Blueberry Insect Pests and Their Control

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A small planting of blueberries can provide an ample supply of quality fruit for home use. It will probably have insect pest problems, however. Most blueberry pest problems have solutions, and many non-chemical pest management techniques can be used effectively by home gardeners.

Insects that attack blueberries may be classified into three groups: those that feed on the foliage, buds and flowers (foliage feeders), those that suck plant juices (sap feeders) and those that feed on the fruit (fruit feeders). The first two groups are often called indirect pests because they don't attack the fruit. Pests that feed on the fruit are called direct pests.

Foliage Feeders

Leafrollers

Leafrollers (family *Tortricidae*) are the larvae or caterpillars of a few species of small moths. The name "leafroller" is derived from their habit of rolling leaves for shelter. Early in the growing season, these brown or green worms tie together blossoms and feed on them. When full grown ($\frac{1}{2}$ to $\frac{3}{4}$ inch long), the larvae seal up the leaf shelter, form a cocoon (a glossy brown case) and undergo metamorphosis. One to two weeks later, they emerge from the shelter. The adults vary in color from brown to yellow, but they are all about $\frac{1}{2}$ inch long. The adults mate and lay eggs and the cycle repeats. Most leafrollers have at least two cycles, or generations, per year.

Small numbers of leafrollers will not cause significant losses unless they are feeding on the blossoms. The amount of leaf material consumed by one of these insects is small compared with what the plant can produce. Therefore, more than 15 are needed to cause significant damage to a plant. Sometimes they feed on developing berries, but this occurs infrequently.

Chafers and Weevils

These beetles are early season pests of blueberries. They feed on leaves and developing buds. As larvae, they live underground and feed on plant roots. Once again, unless more than 15 occur per bush, they are of little concern.

Sap Feeders

Leafhoppers

These insects (family *Cicadellidae*) are small (under $\frac{1}{4}$ inch), mobile insects often found on the stems or undersides of leaves, where they feed by piercing the surface of the plant and sucking plant juices. Most are green or brown, but some are quite brightly marked with green and red. The young resemble the adults but are smaller and wingless. These insects do little damage by feeding on plants. They do some damage, however, when they make a slit in the stem in which to lay their eggs.

Certain leafhopper species transmit blueberry stunt mycoplasma, a disease that can threaten blueberry production. If diseased plants are close to healthy plants, the chance that the disease will be transmitted is high. It is important, therefore, to remove diseased tissue and, if necessary, entire plants that exhibit symptoms.

Aphids

Plant lice, or aphids (*Illinoia* sp.; family *Aphididae*), are related to leafhoppers but are much smaller—about $\frac{1}{16}$ inch or less. Generally, aphids are green and are less mobile than leafhoppers. They feed on the undersides of the youngest leaves and on tender shoots. Aphids reproduce very rapidly by parthenogenesis (no males are required for reproduction) and can literally

cover stems and leaves. The sap loss is a concern only when the plants are very young—during the first three years. Most aphids are controlled by ladybird beetles and other natural enemies. Insecticides kill these natural enemies along with the pests. Because aphids usually reproduce more rapidly than their natural enemies, they become a greater problem when natural enemies are killed by an insecticide.

Aphids also transmit blueberry shoestring virus, a disease that is a serious problem in commercial plantings and may cause difficulties for homeowners. Remove any plants exhibiting bright red streaks or straplike leaves or plants that have poor vigor. If blueberry shoestring virus is observed in a planting, aphid control with malathion or Sevin should be carried out every year thereafter.

Fruit Feeders

Blueberry Maggot

The blueberry maggot (*Rhagoletis mendax*) is the chief pest of blueberries. The adults are small flies (about $\frac{3}{16}$ inch long) with dark patterns across their wings. These flies lay eggs in the fruit. Each egg hatches into a small white larva, called a maggot, which feeds on the inside of the fruit. After the infested fruit falls to the ground in the fall, the maggot enters the soil, pupates and overwinters. The adult flies leave the soil the next year. Infested fruit is not harmful to eat but has considerably less appeal. (See Fig. 1 to find out when pests are most damaging.)

Control Tactics

Homeowners can control blueberry pests several ways.

Biological

Controlling pests with other living organisms, such as predators and disease, is called biological control. Some forms of biological control are occurring all the time—some people call it the balance of nature.

Predators, such as ladybird beetles, and parasites can be more effective if you provide conditions that favor these creatures. Many pesticides are more toxic to the beneficial insects than to the pests they are used against. Therefore, you must carefully consider the potential benefits that will be lost if you apply insecticides. Natural enemies will survive better if you can supply food (such as a honey and wheat germ spray), water (a bird bath works well) and a diverse habitat (such as a diversified garden design). Biological control can be supplemented by bringing in new predators and/or parasites. Ladybird beetles, praying mantids and lacewings can be bought from some nurseries or other plant dealers. Ordering eggs rather than adults is preferred, because many of these insects will disperse as adults, leaving the area in which they are released.

In blueberries, lacewing larvae (family *Chrysopidae*) feed on aphids. Ladybird beetles (family *Coccinellidae*) are seen early in the growing season, but their populations usually dwindle as the summer progresses. Some flies (*Tachinidae*, *Sarcophagidae*) and wasps (*Braconidae*) are parasites of leafroller larvae. Little is known about management techniques that might enhance the activities of these parasites. The effectiveness of the predators, however, can be increased by using fewer insecticides and by providing vegetative ground cover where some stages may live and overwinter.

Mechanical

Methods such as hand removal of pests are often ignored, because using pesticides is believed to be more

Figure 1. Seasonal occurrence of damaging stages of common blueberry pests in relation to plant development and calendar date. Dates shown are only an approximation—weather conditions can change times of appearance significantly.

	Bud Swell	Bud Break	Leaves Expand	Petal Bloom	Fruit Set	Fruit Development	Fruit Maturity	Foliage Senescence	
Leafrollers (two generations)		*****					*****		
Chafers and Weevils		*****							
Leafhoppers			*****						
Aphids					*****				
Blueberry Maggot							*****		
Month	April			May	June	July	Aug.	Sept	Oct.

convenient. Often, however, hand removal takes less time than preparing, applying and cleaning up after spraying. Larger pests, such as leafrollers or chafers, are easy to detect and remove by hand. Small insects, especially aphids, can be controlled by spraying them with a garden hose. If you use this technique, be sure to spray the water onto the undersides of the leaves, where aphids feed.

Trapping

Some blueberry pests can be trapped using either visual attractants or baits. Leafhoppers and aphids are attracted to goldenrod yellow and can be caught on a yellow surface covered with a sticky substance. Sticky material (e.g., tangletrap) is available from many garden suppliers, hardware stores and nurseries. Paint pieces of plastic or plywood (1 foot square by $\frac{3}{8}$ inch) goldenrod yellow, cover them with tangletrap and suspend them in or near blueberry bushes at a rate of one trap for every two bushes. Use bait traps to trap adult blueberry maggots. Ammonium carbonate is the attractant, and the flies are caught on surfaces coated with tangletrap. There are several ways to design the traps. For one trap, start with a cottage cheese container (see Fig. 2). Place about 1 teaspoon of ammonium carbonate in paper and fasten it to the bottom of the container, then coat the inside walls with tangletrap. Hang the trap upside-down from the foliage by a string fastened to the bottom of the container. If you paint the trap goldenrod yellow, it will be even more effective.

Cultural

Cultivation techniques can affect both pests and beneficial insects. Clean culture—exposed earth under bushes leaves few places for insects to live under the bushes, and both pests and beneficial species may suffer. Sod culture—planting grasses under bushes—increases the available space for insects to inhabit, and both beneficial and pest species will exploit this area.

Mulching around the bases of bushes provides shelter for overwintering insects but gives little to the insects to feed on in the summer. Mulches may provide for increased survival of both blueberry maggot pupae and valuable predators. Any cultivation technique involves such trade-offs between pest and beneficial species.

Insecticide

Bacillus thuringiensis (BT) causes a disease in caterpillars that ingest it. It has low human and other mammalian toxicity and can be purchased under many

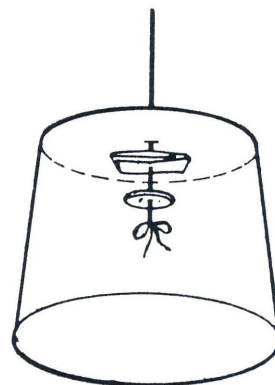


Figure 2. A simple blueberry maggot fly trap can be made from a cottage cheese carton. A paper packet of ammonium carbonate held in place by the button on the end of the string through the packet and the bottom of the container serves as the bait. Flies attracted to it get caught in the Tangletrap smeared on the carton. Painting the carton bright yellow increases its effectiveness.

trade names, including Dipel, Thuricide and Bio-Guard.

Chemical insecticides may be employed against blueberry pests, but they should be assessed against the other options for cost, ease of use and potential contamination and poisonings. Most chemicals have side effects. Exposure of non-target organisms to pesticides occurs both immediately and later during biodegradation of the compounds. Not only pest insects, but also bees, predators, fish, birds, animals and humans can be affected by pesticides in the environment. If used alone, chemical controls may not be nearly as effective as the careful combination of insecticide and non-insecticide controls.

Of the pesticides available to the backyard blueberry grower, malathion and Sevin are probably the most readily available and easiest to use. Malathion provides good control of leafroller larvae and blueberry maggot adults. If it's applied to the undersides of leaves, malathion effectively controls aphids. Malathion is relatively low in toxicity to humans and other animals. Sevin is effective against leafrollers but does not kill aphids and is highly toxic to bees. Therefore, it should never be used during periods of bloom.

Botanical pyrethrins and synthetic pyrethroids are chemicals that may prove quite useful. They exhibit low mammalian toxicity but rapidly knock down pests and degrade quickly. They are derived from chrysanthemum plants and are formulated in many aerosols.

All of the above insecticides are most effective and safest to use when applied strictly according to label directions.

A typical spray schedule for a season is outlined on the next page. Consider using non-chemical controls as well.

Table 1. Typical spray schedule for backyard blueberry insect control (use labeled rates).

Timing	Pest	When to spray	Suggested chemicals	Comments
Petal fall, 7-10 days after bloom	leafrollers, chafers	When 15 or more observed per bush*	malathion Sevin	Sevin is highly toxic to bees
10 days later, or when populations reach damage levels	leafrollers	When 15 or more observed per bush	malathion Sevin Dipel pyrethrins	
Late June through fall	aphids	When 15% terminals are infested	malathion pyrethrins	Coverage of leaf undersides is critical
Blueberry maggot fly emergence period	blueberry maggot	If you noticed infested fruit the previous year, consider control this year	malathion	Check for first flies found on traps

*Mature—full-grown bush.



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