ENTOMOLOGY

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Melon Aphid

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The melon (or cotton) aphid, *Aphis gossypii,* is distributed throughout most of the world. It has been reported to feed on 220 different crops, including many important vegetables (tomatoes, potatoes, cucurbits) and ornamentals (chrysanthemum, cineraria, begonia, hollyhock, Easter lily). It also infests many weed hosts such as amaranth, milkweed, lamb's quarters, and grounsel. Melon aphid infestations can reduce crop vigor, yield, and quality. It is known to vector at least 50 plant viruses, some of which are important in vegetable crops.

Appearance

Melon aphids are a relatively small, approximately 1 to 2 mm (<1/16 inch) in length, egg-shaped aphid. Their antennae are approximately one-half the length of the body. Melon aphids are extremely variable in color. Wingless forms may be yellow, green, black, or dark green, and some may have white patches on the abdomen. Colonies are often composed of individuals of several colors (fig. 1). Winged adults have black heads and antennae and dark red or black eyes (fig. 2). The abdomen is green to dark green with dark patches. Warmer temperatures and crowded conditions will result in lighter coloration. The cornicles "tail pipes" are entirely dark and always darker than the body. Melon aphid colonies may be tended by ants.

Melon aphids are often found on the same plants as the green peach aphid, *Myzus persicae,* but can be distinguished from this aphid by their smaller size, generally darker colors, and dark and shorter cornicles. Green peach aphids can be light green to rose, with cornicles the same color as the body and dark only near the tip. Within a colony of green peach aphids, color variation among individuals is minimal compared with the variation among melon aphids.

Life Cycle

Melon aphids overwinter outdoors as eggs on a variety of plant hosts. Probable overwintering hosts in New York include live-forever, catalpa, and rose of Sharon. In the spring, wingless parthenogenic females develop from the eggs and feed on the overwintering hosts. Occasionally winged forms develop and disperse to other hosts, including crops. Several generations of parthenogenic females will be produced during the growing season. In the southern states there may be up to 30 generations per year. Hot and dry conditions appear to foster the rapid development of melon aphid populations. Under favorable conditions, females can begin to produce offspring when they are five days old. Each female produces 20 to 140 offspring during her lifetime. As fall approaches in cold climates, winged forms and males appear and migrate to overwintering hosts where mating occurs and eggs are laid. Melon aphids may be found year-round on certain greenhouse crops. Winged forms are usually rare during most of the year but may invade the greenhouse during spring and fall when they are produced outdoors.


Fig. 1.


Fig. 2.


Fig. 3.


Fig. 4.


Fig. 5.


Fig. 6.


Fig. 7.


Fig. 8.


Fig. 9.


Fig. 10.

Damage

Direct damage to the plant occurs when nymphs and adults pierce the plant tissue and extract sap, resulting in loss of vigor, stunting, curled leaves, reduced yield, and/or plant death (fig. 3, melon aphid damage to potato). Indirect damage is caused by deposits of honeydew (which serves as a substrate for sooty mold), shed skins (fig. 4, honeydew and shed skins on hibiscus), and by transmission of viruses. On ornamentals, the presence of the aphids and/or their shed skins and honeydew can render a plant unsalable (fig. 5, melon aphids on chrysanthemum).

The melon aphid can vector both nonpersistent and persistently transmitted viruses. Viruses are particularly important in vegetable crops. Nonpersistently transmitted viruses are acquired by aphids in just a few seconds of feeding or probing, require no latency period, and can be transmitted to another plant immediately. After only a few minutes the aphid is no longer infective. Foliar insecticide applications may actually increase the spread of nonpersistent viruses by stimulating increased dispersal and probing by aphids. Persistent viruses are acquired by aphids after 10 to 60 minutes of feeding and, following a 12-hour latency period, aphids will remain infective for up to their entire life span. The potato leaf roll virus is the only known persistently transmitted virus vectored by melon aphid in New York.

Nonpersistent viruses transmitted by melon aphids include those affecting beans, peas, celery, lettuce, seed potatoes, cucurbits, onion, peppers, and sweet potato. Of particular importance are cucumber mosaic virus, watermelon mosaic virus, papaya ringspot virus-W strain (formerly watermelon mosaic virus strain 1), and zucchini yellow mosaic virus. The most commonly occurring diseases of cucurbits in New York are caused by aphid-vectored viruses. The virus diseases often have distinctive symptoms and result in reduced growth and yield. They can also cause mottling and distortion of fruit. In most greenhouse ornamentals, virus disease transmission by aphids has not been an important problem. Several Cornell Cooperative Extension fact sheets are available that present information on virus diseases of vegetable crops.

Natural Control

On outdoor crops, a variety of natural factors help suppress populations of the melon aphid, although the importance of many of these is not fully known. These factors are always present but are not necessarily consistent enough to keep populations below economically damaging levels, particularly when viruses are involved. Outbreaks of the fungal pathogen *Entomophthora* spp. occasionally decimate populations. Predators such as aphidlions (lacewing larva, fig. 6), syrphids, and lady beetles (fig. 7) are frequently found in melon aphid infestations, and parasitoids such as *Aphidius* spp. have been reported to be helpful. Parasitized aphids (mummies) appear bloated and straw-colored (fig. 8). The parasitoids emerge through a distinct and large hole they cut through the abdomen of the aphid (fig. 9). Some success has been achieved on certain greenhouse crops using fungal pathogens, parasitoids, aphidlions, and syrphids to control melon aphid. Several species of natural enemies are available commercially for this purpose.

Figures 3 and 10 are by Dale Moyer, Cornell Cooperative Extension, Suffolk County. Figures 4 and 5 are by John Sanderson. All others are by Joseph Ogrodnick, Communication Services, Agricultural Experiment Station, Geneva.

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Management

Vegetable crops. The use of varieties resistant to viruses is highly recommended. If resistant varieties are not available, insecticide treatments may delay symptom expression of viruses. Systemic insecticides are generally better than contact insecticides in controlling insect-vectored viruses. To prevent the spread of viruses, later plantings of susceptible crops such as cucurbits should not be planted near virus-infected early-season plantings. Likewise, other crops susceptible to viruses such as tomato and pepper should not be planted near virus-infected cucurbits. Removal of virus-infected tomato and pepper plants may be helpful if done as soon as symptoms appear. There are no chemical controls for viruses other than those directed at the vectors or perennial weed hosts.

Melon aphid infestations can be difficult to locate and control with insecticides because the aphids occur most frequently on the undersides of leaves and are distributed throughout the plant canopy. Thorough coverage is essential. Some populations may have developed resistance to insecticides. When scouting for infestations examine the undersides of leaves (fig. 10, melon aphids on underside of potato leaf) and, in addition to aphids, look for cast skins, honeydew, sooty mold, and ants. Action thresholds are available for treatment of melon aphid on potatoes, and regular scouting is recommended. Potatoes treated largely or exclusively by insecticides such as cryolite or *Bacillus thuringiensis* products are particularly prone to colonization by melon aphid. Yellow sticky cards or yellow water pan traps can be used to detect flights of winged aphids. Increases in numbers of winged aphids may indicate the necessity to begin closely monitoring the infestation or initiate insecticide treatments.

When soil temperature is not critical to production, reflective mulches can be used to delay colonization by aphids. Removal of weeds that may be alternate hosts of aphids or viruses may be of value, but in the case of melon aphid, which has so many alternate hosts, such a tactic may be impractical on field-grown crops.

Greenhouse ornamentals. Melon aphid management on greenhouse ornamentals starts with weed control inside and out. Screens placed over air intake vents may reduce migration into the greenhouse. Yellow sticky cards should be placed just above the crop canopy as well as near doors, vents, and outside the greenhouse to detect the presence of winged forms. Inspect undersides of the leaves of incoming plant material. Plants should be inspected weekly for aphids (and other pests). Scouting is particularly important early in the crop, before flowering, when chemical coverage can be more thorough and not harmful to flowers. Besides inspecting undersides of leaves, look for small, white aphid cast skins, honeydew, sooty mold, and/or ants. Before flowering occurs, melon aphids tend to infest top, middle, and bottom leaves so the entire plant should be inspected. They also generally do not spread throughout a crop as rapidly as green peach aphid but tend to occur initially in "hot spots." Spot treatments to these areas may provide effective control. Thorough spray coverage and canopy penetration are important. Space plants so as to increase spray coverage. After a pesticide application, reinspect several infested plants, looking for dead aphids, to evaluate the effectiveness of the application.

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