

Management of Aphids in Organic Tomato Production in Alabama

Authors:

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Green peach aphid:

Myzus persicae (Sulzer)
(Insecta: Hemiptera: Aphididae)

Introduction:

Aphids are tiny insects that infest a wide range of cultivated host plants and weeds. There are several species of aphids that infest vegetable crops including tomato, eggplant, pepper, peas, beans, corn, and sweet potato. In Alabama, the green peach aphid (*Myzus persicae*) is the most common aphid found on tomatoes early in the growing season. Adult females give birth to living offspring. Their young ones are slightly smaller but similar to adults in color and shape. Females begin to reproduce quickly within a few days from the onset of summer temperatures. The exponential growth in aphid populations observed throughout the growing season is due to a number of factors. These include female aphids can reproduce without having to mate with males; aphids have very short intervals between generations and have multiple generations per year; aphids have a very wide host range that enables them to survive the absence of specific host plants better than most other insect pests.

Identification and signs/symptoms of aphid incidence: Adult green peach aphids appear in summer and are about 1.8 to 2.1 mm long, soft-bodied, pear shaped insects with long legs, antennae, and a pair of long, slender tail or pipe-like appendages called “cornicles” that stick out from the rear end of the abdomen. This insect has piercing-sucking mouthparts used to suck sap from host plants. Aphids are usually found on the underside of leaves and on young tender growth parts of leaves. Adults appear in a range of colors: solid pink, green pink mottled or light green with a dark stripe. They sometimes have wings but are usually wingless. The presence of honeydew, a sugary sticky substance secreted on leaf surfaces is a telltale sign of the occurrence of this pest.

Injury: The insect inserts its needle-like piercing-sucking mouthpart into leaf veins, stems, growing tips and blossoms of tomato plants to suck sap. This type of feeding results in characteristic plant injury that is a symptom of aphid activity. High population of aphids feeding on fluid of young tomato plants result in water stress, wilting and reduced growth rate of the plants. Early season infestations result in delayed maturity. New growth on infested plants become stunted and curled inside. Leaves of severely infested plants turn brown and experience dieback (i.e., plants begin to die from the top to the bottom.) Prolonged infestations can cause considerable loss in yield of the tomato. The feeding activity of aphids poses health problems for tomato host plants in multiple ways. First, the removal of sap and the associated water stress is unhealthy for the plant. The honeydew released through the anus of aphids makes leaf surfaces sticky and thus trap a number of fungal spores that result in black sooty molds on the leaves. These sooty molds reduce the ability of the tomato leaves to produce food through photosynthesis. The trapping of fungal spores on the leaves also results in a number of fungal diseases. Disease transmission is another major issue associated with the feeding activity of aphids. Aphid infestation tends to spread rapidly from one field to another and transmit a large number of plant viruses that cause mosaics, leaf roll, spindle tuber and unmottled curly dwarf. Mosaics refer to patches of different shades of color ranging from yellow through light green to deep green observed on infested leaves. Even though a number of aphids are only able to transmit one type of virus, the green peach aphid and some others are able to transmit several different viruses.

Management: Monitoring is a key step in the successful management of aphids. The cryptic nature of this tiny insect, which typically prefers the underside of host leaves, makes it easy to miss. Scouting



Adult aphids on tomato

Feeding damage by aphids on tomato leaves

Photos: Anitha Chitturi

tomato fields several times a week, paying particular attention to prime infestation/damage sites such as the underside of leaves and tender new growth will allow early detection and management of aphids that is more effective. A good indicator of the incidence of aphids is the presence of ants on the plant. The honeydew produced by aphids attracts ants; therefore, ants care for and protect aphids from ladybugs, which feed on aphids. It must be noted that aphid infestations are spotty in appearance during the early parts of the growing season; thus treating such plants promptly may prevent and limit the spread of aphid-borne diseases later in the season.

There are no pesticide options for the management of viral diseases in plants. The most effective management method for insect-borne viruses is the management of insects that transmit them, thus preventing or reducing transmission of the virus. There are recommended management methods suitable for farms of all sizes. However, some are most suitable for small-sized tomato farms. In small farms, leaves bearing aphid groups can be cut, crushed, or dropped in soapy solution to prevent further spread of aphids to other leaves. Reflective mulches (permitted for use in certified organic production) can be used in the management of aphids and the viral diseases they transmit to tomatoes. Aphids have several natural enemies such as ladybird beetles, lacewings, syrphid flies and parasitic wasps, which feed on them, thus helping to keep their populations in check. Tiny parasitic wasps lay eggs inside aphid bodies and the emerging larvae feed on the aphids from inside out, leaving brown or black mummified aphids. Irrespective of whether crops are produced conventionally or under organic production systems, pesticides should be used as a last resort in an Integrated Pest Management (IPM) program. The non-pesticidal IPM tactics are even more crucial in organic than conventional vegetable production. This is because organic

insecticides are generally not as quick acting and effective as their conventional (i.e., synthetic) counterparts. More frequent and effective monitoring of aphids is needed on organic farms to ensure early detection of aphids; this affords the organic pesticides more time to achieve aphid reductions necessary to keep their populations below the economic threshold level. Spray applications must target the underside of leaves in order to ensure direct contact with the aphids. This is particularly important because organic insecticides are neither systemic nor able to penetrate leaves from one side of a leaf and kill insects on the other side of the leaf. Recommended organic

insecticides include insecticidal soaps, neem, and pyrethrins. Their effectiveness has been reported, as they are known to knock down aphids. Insecticidal soaps show appreciable effectiveness against soft-bodied insects such as aphids but spraying should be directed to only areas with aphids rather than the entire plant. Care should be taken to ensure that spraying is carried out only during the cooler time of the day. Pyrethrins are an effective choice to help reduce large populations of aphids but spraying should be done only in the early morning or late in the evening to avoid targeting natural predators and pollinator populations. Pyrethrins are broken down into less effective products in the presence of sunlight. Spraying in the evening or late afternoon reduces exposure to sunlight and allows the product to remain effective overnight. Spinosad has been

reported to have some ability to penetrate leaves and kill insects on the other side of the leaf, but using a sprayer that is capable of ensuring complete coverage of plants is still very critical. Certified organic tomato producers must use OMRI-listed insecticides or check with their certifying organizations prior to using organic insecticides that are not OMRI-listed. Also, contact your local extension agent for more information on recommended/approved insecticides for your area.

The feeding activity of aphids poses health problems for tomato host plants in multiple ways.

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For more information, contact your county Extension office.

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