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Aphids in Texas Landscapes

Bastiaan M. Drees*

More than 250 species of aphids, often called "plant lice," feed on agricultural and horticultural crops throughout the world, and several can be a problem in Texas landscapes. Many ornamental plants in Texas landscapes are suitable hosts for aphids, including bedding plants (especially chrysanthemums), ash, barberry, boxelder, crape myrtle, jasmine, flowering almond, gardenia, hibiscus, hydrangea, mountain ash, oaks, oleander, peach, pear, pecans, pines, roses, vegetables, and viburnum. Aphid infestations can build to severe levels very rapidly because these insects reproduce very quickly. Infestations can be widespread or localized to just a few plants, and they may be worse in some years than in others.

Identification

Aphids are small insects, ranging from 1/16 to 1/8 inch (1.5 to 3.5 mm) in length. Aphids are soft-bodied and vary in shape and color. Their bodies may be pear-shaped, globular, oval, spindle-shaped, or elongate, and they may look black, grey, red, orange, yellow, green, brown, blue-green, white-marked, or wax-covered. Even a single species may include several colors and shapes. Aphids may or may not have wings. Winged forms tend to develop in response to changes in the environment, such as decreasing daylight or temperature, deterioration of the host plant, or overcrowding.

The body of the aphid is segmented, and the head is distinct from the thorax and abdomen. The head bears a pair of segmented antennae and mouthparts for sucking plant juices. Toward the rear of the abdomen, a pair of tube-like structures, called "cornicles," can be found on most species. These structures secrete a defensive fluid. The back end of the body bears the tail and anal plates. The shape and size of these features and the presence of hairs (also called "setae") help to identify different aphid species.

Life Cycle

The life cycle of aphids is rather unusual and can be complex. Most aphids reproduce sexually and develop through simple metamorphosis (overwintering eggs, then nymphs, and then winged or wingless adults), but they can also reproduce through an asexual process called "parthenogenesis" (the production of offspring without mating). These aphids even bear live young, instead of laying eggs.

Most aphids reach sexual maturity in 4 to 10 days, and the reproductive period is about 3 weeks under good environmental conditions. The average lifespan of an adult is about 1 month. Despite their relatively short lifespans, aphids can be quite prolific. In fact, aphids can reproduce faster than any other insect.

The aphid's variable and complicated life cycle can make these insects difficult to control, because it allows a shortening of time between generations, overlapping of generations, and increased reproduction—all of

*Professor and Extension Entomologist, The Texas A&M University System

which can increase the rate of development of resistance to insecticides.

Occasionally, an aphid species seems to disappear from one type of plant only to reappear some time later. This may be due to a process called "host plant alternation." These aphids use one plant as the "primary host" for reproduction. Another plant, perhaps a distantly related one, is used as a "secondary host" for parthenogenetic reproduction. Migrants returning to the primary host are winged males and winged parthenogenic females which produce egg-laying sexual females. Later on, winged parthenogenic females return to the secondary host. Some species have lost their host-alternating behavior and have a complete life cycle on a herbaceous secondary-host plant. Both parthenogenesis and host alternation have enabled aphids to exploit food plants, particularly short-lived herbaceous ones. However, many cosmopolitan species are now able to live all year round parthenogenetically on secondary crop hosts, and some have spread to areas where their original (primary) hosts do not even occur.

Damage to Plants

Aphids draw sap from plant tissue (phloem) using mouthparts adapted for piercing and sucking. Some aphids feed on foliage, while others feed on the twigs, limbs, branches, fruits, flowers, or roots of plants. Some species inject toxic salivary secretions into plants as they feed. If left unchecked, aphids can stunt plant growth, deform and discolor leaves and fruit, or cause galls to form on leaves, stems, and roots.

As aphid populations develop, infestation sites become littered with empty "skins" (exoskeletons) that the aphids shed during molting. Some species also produce large amounts of white waxy filaments that cover their bodies and litter infested plant parts.

Many aphid species secrete a sticky substance called "honeydew," which is similar to sugar water. This energy-rich anal secretion falls on leaves and other objects below the infestation. A fungus called "sooty mold" (*Capnodium* spp.) colonizes on honeydew-covered surfaces, causing them to be covered with a black coating. As a result, sunlight is unable to reach the leaf surface, which restricts photosynthesis which produces the plant sugars. Honeydew-covered surfaces, including car exteriors, decks, and sidewalks, become sticky and blackened with sooty mold.

Honeydew also attracts ants, flies, and other insects. Some aphid species depend heavily on ants for survival and dispersal. The honeydew-loving ants "tend" the aphids and prey upon natural enemies and unhealthy aphids. Ants also carry aphids to uninfested parts of plants. Some ants (*Lasius* spp.) even harvest and overwinter the eggs of the corn root aphid (*Aphis maidiradicis*).

Certain aphids are important vectors (spreaders) of plant diseases, particularly viruses. The cotton aphid is known to transmit more than 50 plant viruses, and the green peach aphid more than 100.

Monitoring Population Levels

Aphid populations are best monitored by routine (once or twice a week) visual inspections of plants that are potential hosts. Aphids can occur anywhere on the plants, but they are often found on the underside of the leaves or on the new growth. Yellow sticky cards, available from garden stores and nurseries, are effective tools for monitoring winged aphid populations, particularly in greenhouses.

Common Species of Aphids in Texas Landscapes

Many aphid species attack landscape plants in Texas. A few of the more common ones are described below.

Cotton or Melon Aphid, *Aphis gossypii* Glover

Adult aphids (shown in Figure 1) are winged or wingless, soft-bodied, yellow to dark green, and 1/16 inch or less in size. Winged forms have a black head and thorax and hold their wings in a roof-like position over the back of the body.

Life cycle. Wingless adults overwinter in protected areas, such as field debris and soil, and feed on weed hosts. In the greenhouse,

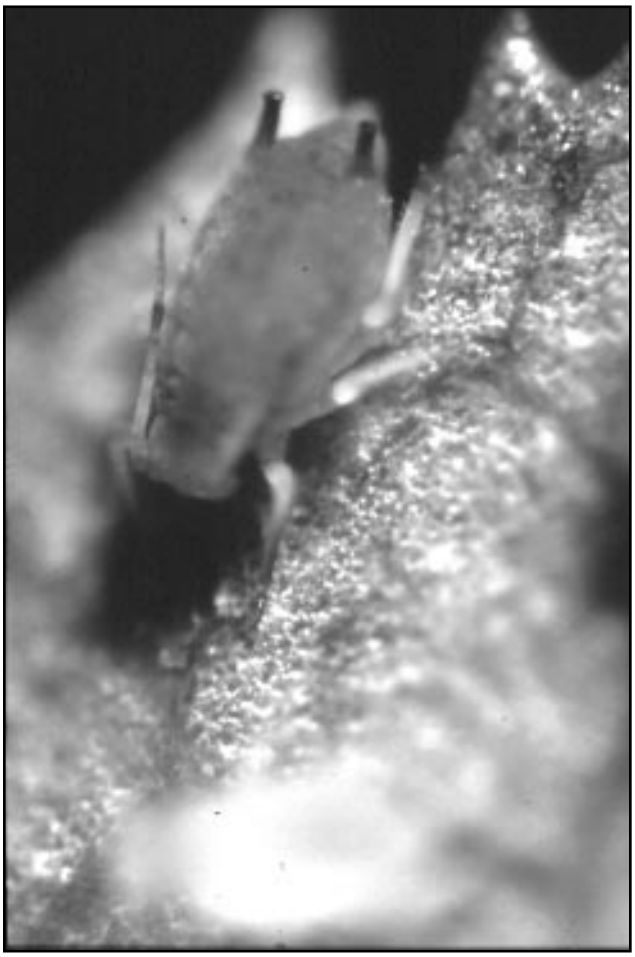

Figure 1. Cotton or melon aphid.

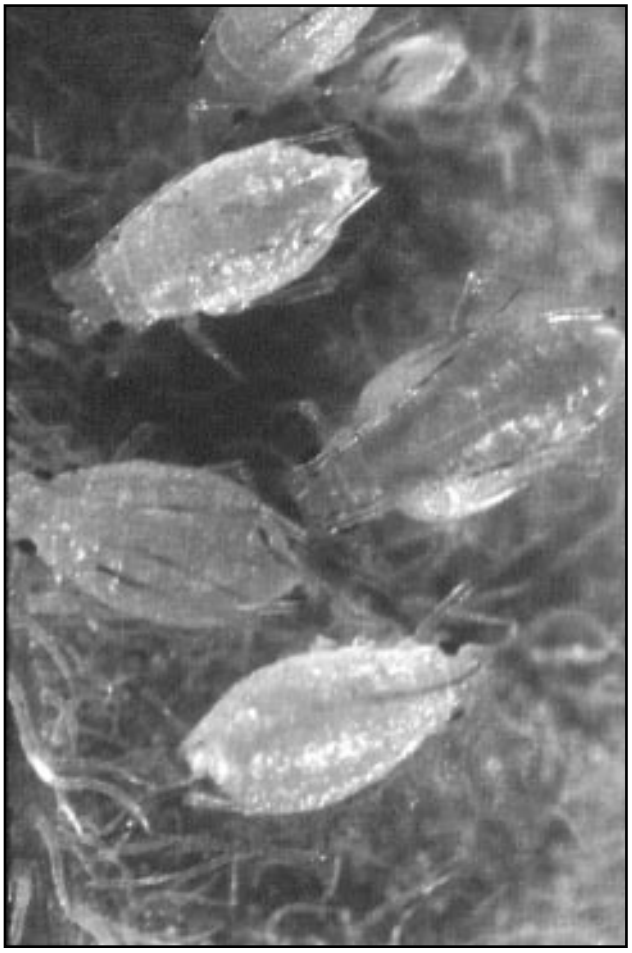

Figure 2. Green peach aphids.

they can be active year-round. In the spring, winged females fly to suitable host plants and produce live nymphs through parthenogenesis. Nymphs develop through several stages (instars) before becoming mostly wingless adults in 4 to 10 days, depending on the temperature. Winged adults are produced when certain environmental conditions occur. Many overlapping generations can occur each year.

Habitat and food sources. This species feeds on a wide variety of plants (members of 25 plant families!) including begonia, catalpa, citrus, ground ivy, gardenia, hydrangea, vegetables, violets, and weeds. Feeding causes distorted growth, as well as reduced growth, quality, and yield. Honeydew excretions are colonized by sooty mold, causing plants to become unsightly and stressed. Numerous skins shed by developing aphids are also unsightly. These aphids are also important vectors of some plant viral diseases.

Green Peach Aphid, *Myzus persicae* (Sulzer)

Also known as tobacco or spinach aphid, adults of this species (shown in Figure 2) are small, usually less than 1/8 inch long. The body varies in color from pink to green, sometimes with three darker stripes down the back, and the head supports long antennae and red eyes. Adult aphids may be winged or wingless. The development of wings is usually triggered by environmental changes.

Life cycle. In Texas, female green peach aphids produce three to six fully formed young a day for several weeks. There may be 30 generations each year. In cooler areas, these aphids overwinter as black, shiny eggs on the bark of peach, plum, apricot, and cherry trees.

Habitat and food sources. The green peach aphid has a wide range of host plants, including peaches, vegetables, and ornamental crops (flowering and bedding plants including chrysanthemums).

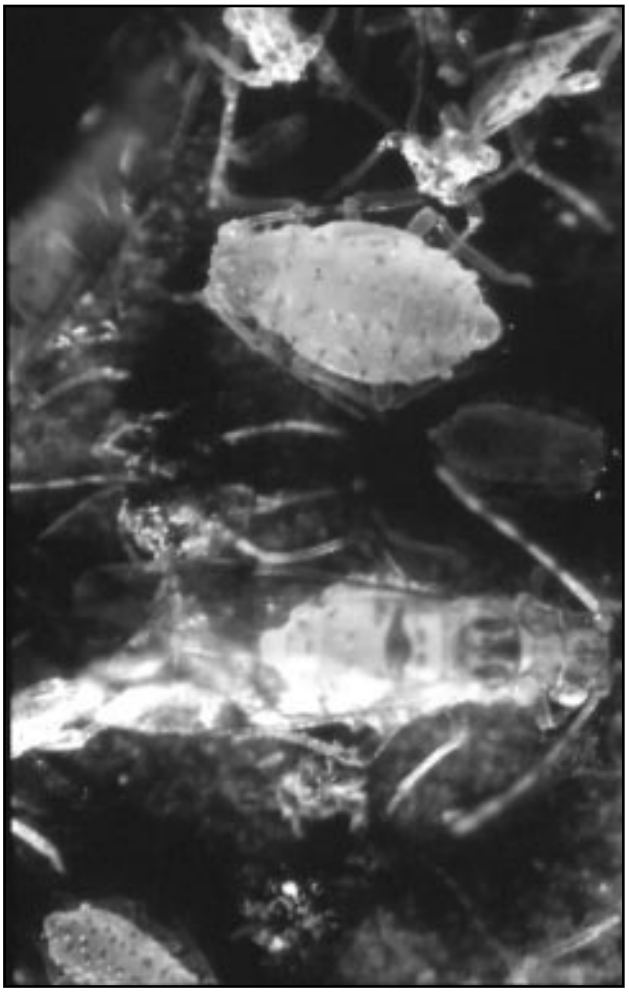

Figure 3. Crape myrtle aphids.

Figure 4. Crape myrtle aphids.

Crape Myrtle Aphid, *Tinocallis kahawaluokalani* (Kirkaldy)

Adults (shown in Figures 3 and 4) are 1/16 inch long, light green to yellow, with black spots and body markings. On winged forms, the second abdominal segment has a double-pronged hump. Wings are clear with dark markings, and they are held in a roof-like position over the back of the body. Some adults are wingless. Nymphal stages are yellow and wingless.

Life cycle. Female aphids produce live young, particularly during the summer months. Nymph and adult stages can be found on host plants throughout the year, but appear to build up in higher numbers during the hot summer months.

Habitat and food sources. This aphid specifically infests crape myrtle. Much of the sap withdrawn from the plant is directly eliminated as honeydew, which becomes infested with sooty mold, producing a dry-looking black coating on the leaf surface. Heavily discolored leaves drop prematurely. The severity of infestations varies from year to year, because populations are affected by environmental conditions and the presence of predaceous insects. Crape myrtles were originally imported from Asia, and this aphid species may have been imported with its host. No parasites are known to attack this aphid in Texas, but many lady beetles and other predators commonly eat them.

Oleander Aphid, *Aphis nerii* Boyer de Fonscolombe

This is a bright yellow aphid with black legs and cornicles (shown in Figure 5).

Life cycle. These aphids first appear on new shoots, buds, and foliage in the spring. Large populations develop over the summer.

Habitat and food sources. Host plants are restricted to oleander, butterfly weed, and milkweed. These aphids do not usually affect

Figure 5. Oleander aphids.

plant health, although their high numbers and the accumulation of sooty mold associated with honeydew can be a nuisance and unsightly. In most cases, many oleander aphids become infested with a parasitic wasp, *Lysiphlebus testaceipes* (Cresson). Infested, or parasitized, aphids swell, turn brown, and die. The wasp cuts a hole in the back of the aphid's abdomen to emerge.

Management Considerations

Most aphid populations are moderated by natural controls that include environmental stresses (such as high winds, heavy rains, and extreme temperatures) and natural enemies (such as lady beetles, green lacewings, syrphid fly larvae, damsel bugs, braconid and chalcid wasps, and parasitic fungi). In some cases, doing nothing is the best course of action, because populations naturally build up and decline quickly, particularly when high numbers of natural enemies are present. However, any aphid may be considered a potential pest when conditions are favorable for reproduction and disease transmission. The reproduction rate of aphids depends upon food quality, host plant species, moisture, and temperature. Good horticultural and agronomic cultural methods can help discourage aphid outbreaks.

A list of biological control agents, non-chemical methods, and insecticides for suppressing aphid infestations on ornamental plants is presented in Table 1. When control is necessary, using biological, non-chemical, and least-toxic methods of aphid suppression is encouraged. Dislodging the aphids by spraying the host plants with water at high pressure may be an ideal way to control them on house plants and in small plantings. Also, some natural enemies can be purchased from commercial insectaries and released to help reduce aphid numbers.

Insect growth regulators, microbial insecticides, and insecticidal soaps can help to control aphids while having the least impact on natural enemies (also known as biological control agents). Insect growth regulator products do not kill fully developed, adult aphids. Instead, they work by preventing the insects' development and are most effective when applied when populations first appear.

Most insecticides are applied to plants as a foliar spray or as a soil treatment. Some foliar sprays (acephate, dimethoate) and soil treatments (disulfoton, imidacloprid, oxamyl) are "systemic insecticides." These products are taken up by the plant and make its tissues and fluids toxic to the feeding aphids. Non-systemic, contact insecticides must be applied to all infested plant surfaces for best results, because they must come into direct contact with the insects. Several applications at 7- to 10-day intervals, or as instructed by the product label, may be needed before an acceptable level of control is achieved.

In agriculture and nursery crop production, chemical control of certain aphid species is difficult because the aphids have become resistant to certain insecticides. Using some insecticides can even cause aphid populations to dramatically increase after the application is made, possibly because they destroy the aphid's natural enemies or because the aphids

are resistant. Carefully monitor the results from any insecticides applied and stay informed as to which compounds perform well.

For more information about aphids and their management, refer to these Texas Agricultural Extension Service publications:

B-1238, "Managing Insect and Mite Pests of Commercial Pecans in Texas"

B-1300, "Managing Insect and Mite Pests in Vegetable Gardens"

B-1305, "Texas Guide for Controlling Insects on Commercial Vegetable Crops"

B- 5041, "Homeowner's Fruit and Nut Spray Schedule"

L-2004, "Insect and Related Pests of African Violets"

L-2088, "Insects and Related Pests of Roses"

Table 1. Methods of Controlling Aphids on Ornamental Plants.*

Class of Control Method Type Examples
Biological Control Agents
Predators
Chrysoperla carnea and *C. rufilabris* (green lacewing larvae and adults)
Hippodamia convergens (convergent lady beetle)
Aphidoletes aphidimyza (predatory midge)
Coccinella septempunctata (lady beetle)
Orius spp. (minute pirate bug)
Parasitic wasps
Aphelinus abdominalis
Aphidius colmani
Aphidius matricariae
Ephedrus cerasicola
Pathogens
See Microbial Insecticides below.
Non-Chemical Methods
High-pressure water sprays
Screen barriers
Non-host or resistant or tolerant plant species, cultivars, or varieties
Insecticides
Insecticidal Soaps and Oils: These materials trap and suffocate small, soft-bodied insects and damage the waxy layer on their exoskeletons, causing their bodies to dessicate (dry out).
insecticidal soap
Safer®
M-Pede®
horticultural oil
SunSpray Ultra-Fine Spray Oil®
neem oil
Triact® 90EC
soybean oil
petroleum oil
dormant and summer oils
Insect Growth Regulators: These materials affect developing insects only and do not kill adults.
azadirachtin
Azatin®
Neemazad®
BioNeem®

Table 1. Methods of Controlling Aphids on Ornamental Plants.* (continued)

Class of Control Method

Type

Examples

Insecticides (continued)

fenoxycarb
Preclude®

kinoprene
Enstar®

Microbial Insecticides (Fungi, Bacteria, Viruses)

***Beauvaria bassiana* JW-1**
Naturalis® (fungus)

Botanical (Plant-Derived) Insecticides

pyrethrins
Pyrenone®
X-clude PT® 1600A
Pyrocide®

nicotine

rotenone

Derivatives of Pyrethrins: These products destabilize nerve cell membranes and quickly kill arthropods contacted, but are quickly deactivated and have little residual activity.

resmethrin

sumethrin

Pyrethroids: These products destabilize nerve cell membranes but are much more stable and can persist in the environment longer than pyrethrins and their derivatives.

bifenthrin

cyfluthrin

es-fenvalerate

fenpropathrin

fluvalinate

lambda-cyhalothrin

permethrin

Chlorinated Hydrocarbons: These materials destabilize nerve cell membranes, preventing them from transmitting nervous impulses.

endosulfan
Thiodan®

lindane

Carbamates: These materials inhibit cholinesterase and prevent the transmission of nerve impulses.

bendiocarb
Dycarb®
Ficam®

carbaryl
Sevin®

methiocarb
Mesurol®

oxamyl

Organophosphates: These products inhibit cholinesterase and prevent the transmission of nerve impulses.

acephate
Orthene®

chlorpyrifos
Dursban®

Table 1. Methods of Controlling Aphids on Ornamental Plants.* (continued)

Class of Control Method Type Examples
Insecticides (continued)
diazinon
dimethoate Cygon®
disulfoton Di-Syston®
fenthion Pestroy®
malathion
naled Dibrom®
Chloronicotinyl: These compounds block nerve impulses by binding with the receptors of nerve transmitting chemicals.
imidacloprid Merit® Marathon®

*NOTE: Some of the products listed are Restricted Use and cannot be purchased without a pesticide applicator's license. For any insecticide, always refer to the product's label for instructions, registered use sites (outdoor, greenhouse, interiorscape), the aphid species controlled, and the plant species or types on which the material can be safely applied.

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