Aphids are small, soft-bodied insects with long, slender mouthparts with which they pierce stems, leaves, and other tender plant parts to suck out plant fluids. Almost every plant has one or more aphid species which occasionally feed on it. Many aphid species are difficult to distinguish from one another; however, identification to species is not necessary to control aphids in most situations.

Description

Aphids may be green, yellow, brown, red or black depending on the species and the plants they feed on. A few species appear waxy or woolly due to the secretion of a waxy white or gray substance over their body surface. All are small, pear-shaped insects with long legs and antennae. Most species have a pair of tubelike structures called cornicles projecting backwards out of the hind end of their body. The presence of cornicles distinguishes aphids from all other insects.

Adult aphids are generally wingless, but most species also occur in winged forms, especially when populations are high or during spring and fall. The ability to produce winged individuals provides the pest with a way to disperse to other plants when the food source gets scarce. Although they may be found singly, aphids often feed in dense groups on leaves or stems. Unlike leafhoppers, plant bugs, and certain other insects that might be confused with them, most aphids do not disperse rapidly when disturbed.

Life Cycle

Aphids have many generations each year. Most pest aphids reproduce asexually throughout much of the year with adult females giving birth to live offspring (often as many as 12 a day) without mating or laying eggs. Young aphids, or nymphs, molt about four times before becoming an adult. There is no pupal stage. Some species mate and produce eggs in fall or winter, which provides them a more hardy stage to survive harsh weather. In some cases, these eggs are laid on an alternative host, usually a perennial plant, for winter survival. When the weather is warm, many species of aphids can develop from newborn nymph to reproducing adult in less than two weeks. Because each adult aphid can produce up to 80 offspring in a matter of a week, aphid populations can increase with great speed.

Damage

Low to moderate numbers of leaf-feeding aphids are usually not damaging in gardens or on trees. However, large populations cause curling, yellowing, and distortion of leaves and stunting of shoots; they can also produce large quantities of a sticky substance known as honeydew, which often turns black with the growth of a sooty mold fungus. Some aphid species inject a toxin into plants, which further distorts growth. A few species cause gall formations.

Aphids transmit viruses from plant to plant on certain vegetable and ornamental plants. Squash, cucumber, pumpkins, melons, beans, potatoes, lettuce, beets, chard and bok choy are all common hosts of aphid-transmitted viruses. The viruses cause mottling, yellowing or curling of leaves and stunting of plant growth. Although losses can be great, they are difficult to prevent through the control of aphids because infection occurs even when aphid numbers are very low; it only takes a few minutes for the aphid to transmit the virus while it takes a much longer time to kill the aphid with an insecticide.

A few aphid species attack parts of plants other than leaves and shoots. The woolly apple aphid, for example, infests woody parts of apple roots and limbs, often near pruning wounds, and can cause overall tree decline if roots are infested for several years.

Control

Although aphids seldom kill a plant, the damage and unsightly honeydew they generate sometimes warrant control. Consider the non-chemical controls discussed below; most insecticides, if used, will destroy beneficial insects along with the pest. On mature trees, such as in citrus orchards, aphids and the honeydew they produce can provide a valuable food source for beneficial insects.

Biological Control

Natural enemies can be very important in the control of aphids, especially in gardens not sprayed with broad-spectrum pesticides (organophosphates, carbamates, and pyrethroids) that kill natural enemy species as well as pests. Usually natural enemy populations do not appear in significant numbers until aphids begin to be numerous. Among the most important natural enemies are various species of parasitic wasps that lay their eggs inside aphids. The skin of the parasitized aphid turns crusty and light brown, a form called a mummy. The generation time of most parasites is quite short when the weather is warm; when you begin to see mummies on your plants, the aphid population is likely to be reduced substantially within a week or two.

Many predators also feed on aphids. The most well known are lady beetle adults and larvae, lacewing larvae, and syrphid fly larvae. Naturally occurring predators work best, especially in a small backyard situation. Commercially available lady beetles may give some temporary control when properly handled, although most of them will disperse away from your yard within a few days.

Aphids are very susceptible to fungal diseases in humid weather. Whole colonies of aphids can be killed by these pathogens when conditions are right. Look for dead aphids that have turned reddish or brown; they have a fuzzy, shriveled texture unlike the shiny, bloated, tan-colored mummies that form when aphids are parasitized.

Cultural Control

Before planting vegetables, check surrounding areas for sources of aphids and remove them. Aphids often build up on weeds such as sowthistle and mustards, moving onto crop seedlings after they are planted. Check transplants for aphids and remove them before planting.

Where aphid populations are localized on a few curled leaves or new shoots, the best control may be to prune these areas out, drop the infested plant parts in a bucket of soapy water, and dispose of them. In large trees, some aphids thrive in the dense inner canopy; pruning these areas out can make the habitat less suitable.

In some situations ants tend aphids and feed on the honeydew aphids excrete. At the same time, they protect the aphids from natural enemies. If you see ants crawling up aphid-infested trees or woody plants, put a band of sticky material (Tanglefoot, etc.) around the trunk to prevent ants from getting up. Do not apply sticky material directly to the bark of young or thin-barked trees or to trees that have been severely pruned; the material may have phytotoxic effects. Wrap the trunk with fabric tree wrap or duct tape and apply sticky material to the wrap. Alternatively, ant stakes, dusts, granules, or baits may be used on the ground to control the ants without affecting

the aphids or their natural enemies. Prune out other ant routes such as branches touching buildings, the ground, or other trees.

High levels of nitrogen fertilizer favor aphid reproduction. Never use more nitrogen than necessary. Use less soluble forms of nitrogen and apply it in small portions throughout the season rather than all at once. A urea-based, time-released formulation (most organic fertilizers can be classified as time-release products as compared to synthetically manufactured fertilizers) is ideal.

Because many vegetables are primarily susceptible to serious aphid damage during the seedling stage, losses can be reduced by growing seedlings under protective covers in the garden or in a greenhouse, or inside and then transplanting them when they are older and more tolerant of aphid feeding. Protective covers will also prevent transmission of aphid-borne viruses.

Aluminum foil mulches have been successfully used to reduce transmission of aphid-borne viruses in summer squashes, melons, and other susceptible vegetables. They repel invading aphid populations, reducing numbers on seedlings and small plants. However, as plants grow, aluminum foil mulches give mixed results for aphid control; they seem to repel natural enemies of aphids as well as aphids. The few aphids that do drift onto plants grow and reproduce with greater speed than those landing on plants growing in bare soil because temperatures are higher on the aluminum foil-mulched plants. Yields of vegetables grown on aluminum foil mulches are usually increased, despite higher aphids numbers, by the greater amount of solar energy reflecting on leaves.

Another way to reduce aphid populations on sturdy plants is to knock them off with a strong spray of water. Most dislodged aphids will not be able to return to the plant and honeydew will be washed off as well. Using water sprays early in the day allows plants to dry off rapidly in the sun and be less susceptible to fungal diseases.

Chemical Control

Many pesticides are available to control aphids around the home. Check labels before using, as not all of these materials are registered for all plant types. Selective insecticides such as oils and soaps are safer to use where children and pets may be present, and may provide more effective long term control because they do not kill the natural enemies of the aphids.