APHIDS

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Aphids are an extremely successful group of insects, attacking nearly every species of green plant. In this article, aspects of aphid identification, types of damage, life histories and control will be reviewed.

Aphids are small (generally less than 1/8 inch long), soft-bodied, pear-shaped insects that are usually found in large colonies on new growth, on the undersurface of leaves, and/or on buds. Aphids come in many colors, and may be winged or wingless as adults. Winged aphids at rest generally hold their wings vertically over their body (Figure 1). True aphids may be easily recognized by the presence of a pair of "exhaust-pipe"-like structures known as cornicles on the posterior end of their body.

When an aphid is physically disturbed or irritated, a drop of a highly volatile liquid (alarm pheromone) is secreted and appears at the tip of each cornicle. The odor of the pheromone warns other aphids in the colony of impending danger. The aroused aphids become more restless and may walk or fly away from the site or drop from the plant. Alarm pheromones are currently being investigated as possible aphid management chemicals.

Aphids feed on plant sap by inserting their needle-like, piercing-sucking mouthparts into plant phloem tissue. Feeding may result in reduced plant vitality, stunting and/or deformation of growth. In addition, aphids transmit more plant viruses than any other group of animals.

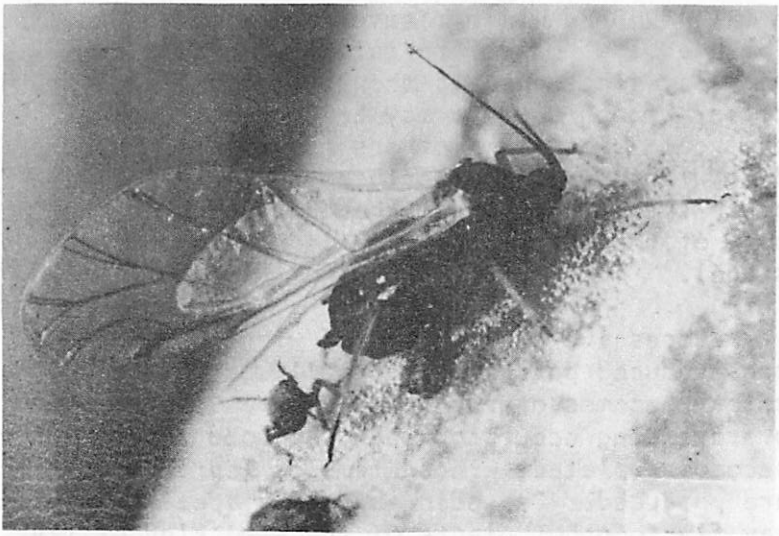

Figure 1. Winged bean aphid and nymphs.

Ahpids excrete large quantities of honeydew, a sticky, sugary, liquid waste product which is visable as small, clear spots or droplets on leaf surfaces.

Phloem sap is high in sugars, but low in amino acids, which are the building blocks of protein. Therefore, aphids must ingest a large quantity of sap in order to acquire sufficient protein. The excess sap, mainly sugars, is excreted as honeydew droplets. Honeydew offers a medium for the growth of a blackish sooty mold fungus which imparts an unsightly appearance to contaminated plants. Honeydew also tends to attract ants and bees while soiling cars, tables, chairs, and other objects beneath infested plants.

The typical aphid life history is quite complex. Outdoors, aphids generally overwinter as small, oval, blackish eggs on some perennial plant or with some species on dead remnants of vegetables. During spring the eggs hatch into

female nymphs, which mature into wingless adults. These adult females are referred to as stem-mothers, since each is the start of a large colony of aphids that may be produced during the year. The stem mothers are able to reproduce without mating (parthenogenesis) and give birth to living nymphs (the eggs hatch in the body of the mother so there is no exposed egg stage).

Successive generations of wingless females are produced parthenogenetically until the aphid colony becomes overcrowded (Figure 2). When overcrowding occurs or when the food supply becomes depleted, winged females (spring migrants) are produced. Depending on their species, aphids may fly to other plants of the same kind or fly to plants of a different type which serve as the summer hosts.

The summer host plants are often herbaceous annuals and may include many flowers, vegetables, grains, weeds, etc. Several generations of winged

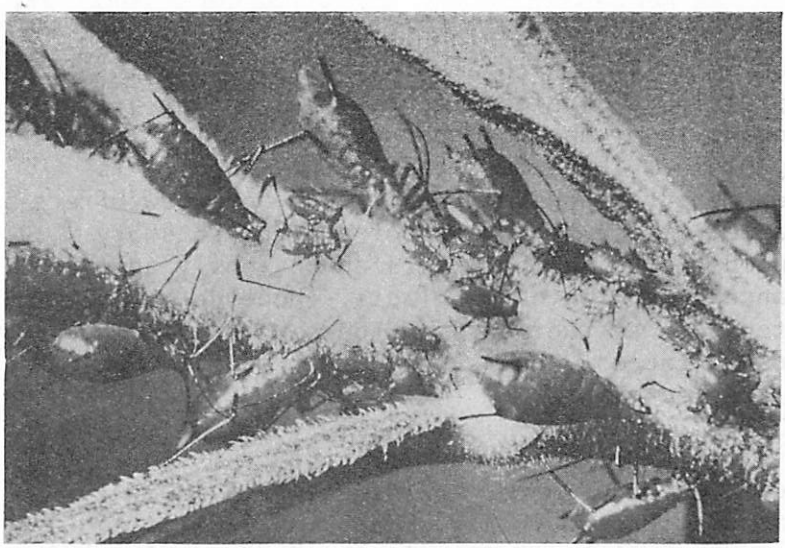

Figure 2. Wingless adults and nymphs of rudbeckia aphid. Note cornicles on posterior end.

and wingless females are produced throughout the summer. Depending on the aphid species and the environmental conditions, aphids may typically give birth to 30-100 nymphs during their reproductive life (about three weeks). Newly born nymphs mature rapidly and begin to reproduce in about 7-10 days.

In late summer, as day length shortens, a generation of winged fall migrant females and winged males is produced. This is the only period in the life history of aphids when males are present. Both sexes then fly back to the winter-spring host plant species where the fall migrants give birth to true sexually reproducing females. These females mate with the males to produce the overwintering eggs.

Due to favorable year-round light and temperature conditions in the greenhouse, generally only female aphids are present; males and eggs are rarely, if ever, produced. Aphid outbreaks in the greenhouse may start by introducing infested plant material and/or winged females may easily enter from the outside through open vents and doors. Once in the greenhouse, aphid populations may build rapidly on ornamental plants or weeds that may be present.

A good aphid control program requires continuous inspection to eliminate initial infestations before the plants reach blossom and/or marketing stages. Insecticide applications at these times may be injurious to open blossoms and hazardous to the consumer. If treatments have to be made in the blossom stage, fumigation may be more effective and less phytotoxic to plants. Systemic aphicides applied to the soil as granules or drenches, or to the foliage as sprays, can also be very effective. For detailed information on aphid control, see the Connecticut Greenhouse Newsletter No. 86, June 1978.