

Potato Aphid on Tomatoes

Homoptera: Aphididae, *Macrosiphum euphorbiae*

by Tom Kuhar, Sara Reiter and Hélène Doughty

Distribution. The potato aphid is found throughout the United States and southern Canada but is only considered a serious pest in the northeast and north central regions of the United States.

Description. Potato aphids may be difficult to identify as they have different sexual forms and produce two distinct color forms, green and pink. *Nymphs.* The nymph of the potato aphid (0.03 - 0.08 in long) is yellowish green or pink with long cornicles with dark tips. *Adults.* Adults are found in a number of sexual forms. In the summer, the most common form is the adult wingless form (apterous). Apterous forms are green or pink and free of any dark markings. They are 0.12 - 0.16 inches in length making them one of the largest aphid species. Another common summer form is the alate or winged female (Fig. 1). This form (0.08 - 0.13 in), though slightly smaller, closely resembles the apterous with the addition of transparent wings. Sexual forms also differ in appearance. Oviparous females (0.08 in) are wingless. They have a white head and thorax, pink or greenish abdomen and dark tibiae (legs). Males have wings, a dark head and thorax with a brownish green abdomen and dark appendages. Males are slightly smaller than females at 0.06 in.



Fig. 1. Potato aphid alate (winged) adult.
Image courtesy of David Cappaert.

Plants Attacked. The primary hosts for the potato aphids are potatoes and tomatoes in the summer and wild or cultivated rose in the winter and spring. In Virginia, they are also found on kale, lettuce and spinach in the autumn and may overwinter on these hosts. Aphids move from host to host as plant conditions deteriorate and may be found on many different host plants for brief periods especially during the seedling stage.

Damage. Young tissue is attacked first by the aphids, especially at the growing tip. As the populations grow, aphids spread to the entire plant, removing the sap and causing the leaves to curl downward. Aphid infestation on tomatoes may stunt growth. Aphids especially prefer blossoms and may cause blossom drop and/or fruit deformities. However, studies have shown that greater than 50% of plant leaves need to be infested before a decrease in yield is observed. Like most aphid species, the potato aphid may act as a vector for the cucumber mosaic virus and potato virus Y. However, the potato aphid is not as affective as other aphid species.

Lifecycle. Potato aphids overwinter in the egg stage on roses. In the summer, 2 - 6 generations may be completed before aphids disperse from their winter host to other hosts. Flying viviparous females live approximately 30 days (10 days in the nymph stage) and produce about 2.5 daughter nymphs per day. As higher densities are reached on these plants (Fig. 2), the aphids will again disperse in search of new hosts. In autumn, winged forms are produced and go back to rose plants where oviparous females mate with males and produce overwintering eggs.

In Virginia, sexual forms may not be produced and do not necessarily overwinter in the egg form but instead may overwinter on weeds, winter cole crops or spinach. Winged viviparous females will disperse from winter hosts during March and April to young warm season weeds, and potatoes. In hot weather,



Fig. 2. Potato aphid apterous (wingless) adults and nymphs on a leaf. The white objects at the top are the exuviae or skins shed by the aphid nymph after molting. Image courtesy of University of Georgia Department of Entomology.

aphid numbers decrease but will grow in the fall once temperatures begin to decline.



Fig. 3. Coccinellid (ladybird beetle) larva feeding on the green form of potato aphids on pepper. Image courtesy of University of Georgia Department of Entomology.

Cultural Control. Since the potato aphid is not an efficient virus vector relatively high numbers can be tolerated. Sampling of most recently expanded leaves on tomatoes can give an estimate of population size. Soaps, detergents and oils can be used, with care taken to avoid burning the plant. Tomato varieties can vary significantly on their susceptibility to potato aphid infestation.

Organic/Biological Control. Biological control plays a major role in the natural suppression of aphids. The potato aphid has numerous natural enemies. There are many predatory arthropods that feed on them including ladybird beetles (Fig. 3), lace wing larvae, syrphid fly larvae, and predatory bugs. In addition, potato aphids are often heavily parasitized by native aphidiid wasps. Field parasitism rates exceeding 90% are not uncommon. In addition, aphids are also killed by entomopathogenic fungi, particularly during periods of high humidity and precipitation. This complex of natural enemies can usually keep populations of potato aphids in check.

Chemical Control. The use of insecticides is only recommended after approximately 50% of leaves are

infested. Of the important pest aphid species in Virginia, the potato aphid has shown the least insecticide resistance and is generally the easiest to control. Insecticidal research studies conducted in Virginia have found many classes of insecticides to be efficacious for the control of potato aphids. Effective insecticide active ingredients include: organophosphates such as acephate and dimethoate; carbamates such as oxymyl and methomyl; pyrethroids; neonicotinoids such as imidacloprid, thiamethoxam, dinotefuran, and acetamiprid; and several novel homopteran-specific and IPM-friendly insecticides such as pymetrozine, spirotetramat and flonicamid. The latter chemicals have little to no toxicity to natural enemies and therefore, fit best into an IPM strategy.