

# Aphids infesting potatoes in Canada: life cycle and field key

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# **Aphids infesting potatoes in Canada: life cycle and field key**

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LES PUCERONS NUISIBLES DE LA POMME DE TERRE AU CANADA: CYCLE VITAL  
ET CLÉ D'IDENTIFICATION

In Canada, four species of aphids may occur on potatoes. Some species are encountered more often than others, depending on the locality, climate, host distribution, and other ecological factors. The abundance of each species varies also from year to year, season to season, locality to locality, field to field, and plant to plant.

## LIFE CYCLE

Figure 1 represents a typical life cycle (*Aphis nasturtii* Kalténbach, the buckthorn aphid).

In most potato-growing areas of Canada, aphids have a complicated life cycle. They may be winged or wingless, male or female. The females may be parthenogenetic viviparous (without fertilization produce living young); or oviparous (mate with males and produce fertilized eggs).

Usually under Canadian conditions, aphids survive the severe winter climate in the egg stage. In the spring, a female nymph hatches from each egg and feeds on the expanding leaves of the overwintering host. As she grows she molts four times and when mature, this wingless viviparous female (stem mother) produces female nymphs. These also feed on the succulent leaves of the overwintering host and when mature may be winged or wingless. The winged forms fly to herbaceous plants such as weeds, vegetables, and cultivated flowers, where they produce only female nymphs. This parthenogenetic viviparous reproductive process of females producing females without mating with males continues for many generations during the long days and short nights of summer. Colonies of females remain on the overwintering and summer hosts until the plants are no longer suitable as a source of food.

Generally in late August, when the day length decreases to 14 h or less, some offspring of wingless viviparous females develop into males, usually winged. These males move to an overwintering host suitable for the species. Some winged viviparous females will fly from a summer host to an acceptable overwintering host and there give birth to nymphs that will develop into wingless oviparous females. These females mate with the males and lay the overwintering eggs.

## HOST PLANTS AND INJURY

The potato-infesting aphids lay their eggs on different plants: the buckthorn aphid, *Aphis nasturtii* Kalténbach, on buckthorn (*Rhamnus alnifolia*, *R. cathartica*, *R. frangula*); the potato aphid, *Macrosiphum euphorbiae* (Thomas), on rose (*Rosa nitida*, *R. rugosa*), raspberry (*Rubus idaeus*), and strawberry (*Fragaria chiloensis*); the green peach aphid, *Myzus persicae* (Sulzer), on peach (*Prunus persica*), Canada plum (*Prunus nigra*), and black cherry (*Prunus serotina*); the foxglove aphid, *Aulacorthum solani* (Kaltén-

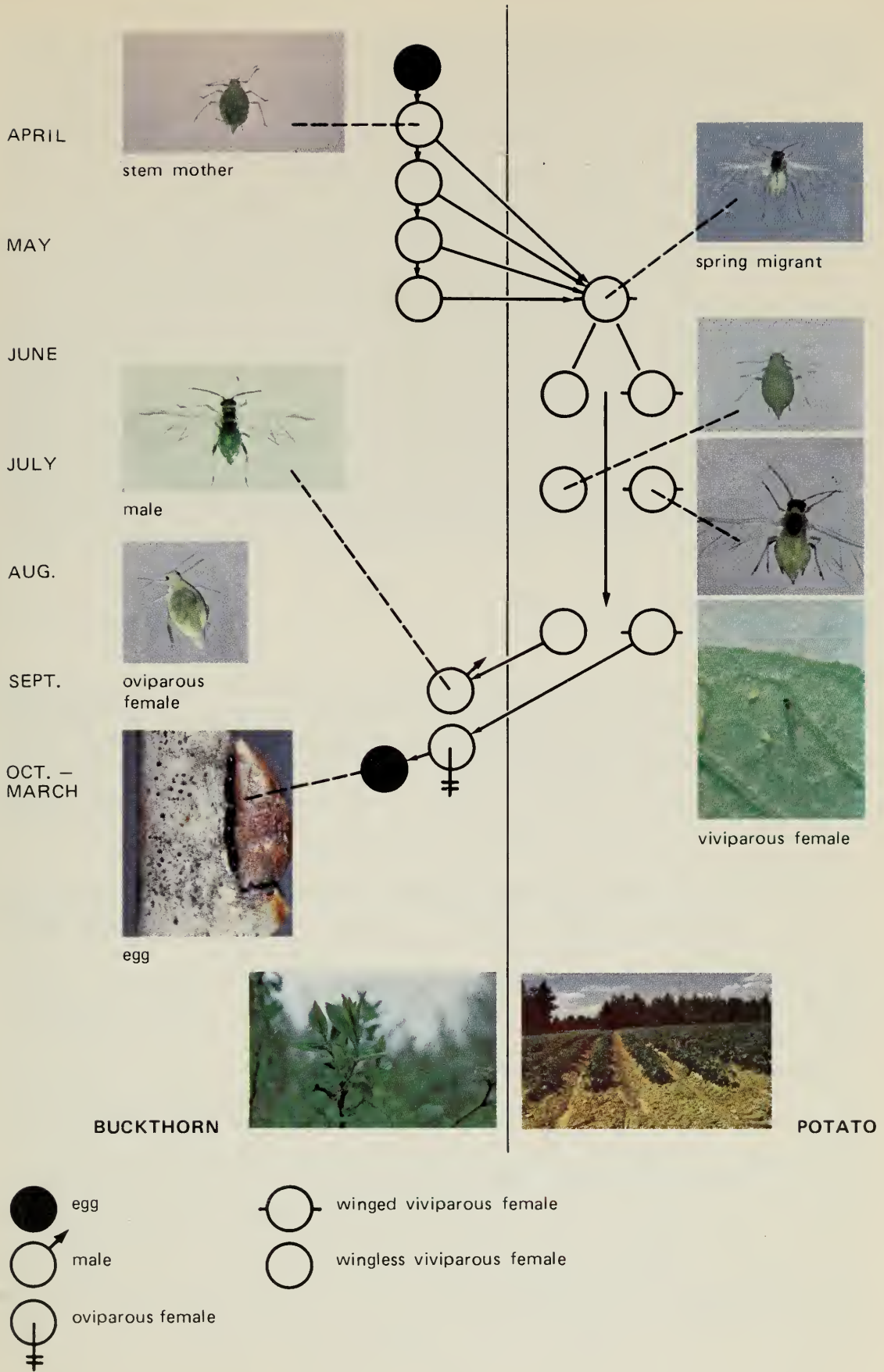


Fig. 1. Life cycle of *Aphis nasturtii* Kaltenbach, the buckthorn aphid.

bach), on foxglove (*Digitalis purpurea*), clover (*Trifolium pratense*), plantain (*Plantago maritima*), and other plants that remain green all winter.

In summer, these aphids colonize and feed on many kinds of plants in addition to potato. They are commonly found in greenhouses on bulbs, bedding plants, and vegetable transplants. Because artificial, summerlike conditions exist in greenhouses throughout the year, parthenogenetic viviparous females are produced continuously, often in numbers great enough to injure the plants. Aphids can produce many offspring in a short time (at 20°C *M. persicae* can produce an average of 75 offspring in 20 days). Aphid-infested plants placed outdoors or in unscreened buildings are a source for contamination of crop and weed plants. If contamination of these occurs at the beginning of a season there is a greater possibility that they will be good sources for early infestations on potatoes and that aphid numbers will become large enough to reduce yields or injure the plants. In dry seasons injury may be fatal. Aphids also cause indirect damage by injecting viruses into the leaves of potatoes. The viruses cause diseases that may decrease yields and lower the value of the tubers.

## APHID IDENTIFICATION

The four species of potato-infesting aphids not only differ in their selection of hosts, but also in their appearance, behavior, and abundance. Because each species differs in habit, rate of development, and efficiency of transmitting viruses, and because control measures for one species may not be effective against another, growers, extension specialists, inspectors, researchers, and pesticide dealers must be able to identify the aphids that are present.

Most keys published by taxonomists for aphid identification require the use of a microscope. However, the four species of aphids commonly found in potato fields in Canada may be accurately identified on the basis of characters visible to the naked eye. To check the identification, a good quality hand lens (6–10X) should be used, at least until the worker is confident of accuracy.

The body (Fig. 2) of an aphid is made up of three parts: the head, the thorax, and the abdomen. On the head are the eyes, antennae, and rostrum (mouth). The front of the head between the antennae may be flat, convex, or concave. The antennae are borne on antennal tubercles, which are extensions of the head (Fig. 3). They may be parallel to each other, or be inward- or outward-pointing. The wings when present and the legs are attached to the thorax. The undeveloped wings appear as wing pads, or "shoulder pads," on the thorax (Fig. 4aa, bb, cc, dd). The fifth or sixth abdominal segment bears a pair of pipelike structures called cornicles. The last segment of the abdomen is modified to form a tail, or cauda. Immature forms are distinguished by their undeveloped cauda.

The following key revises the one by L. A. Dionne, 1948, *Field identification of potato aphids* (Div. Entomol. Proc. Publ. 77, Dep. Agric., Ottawa,

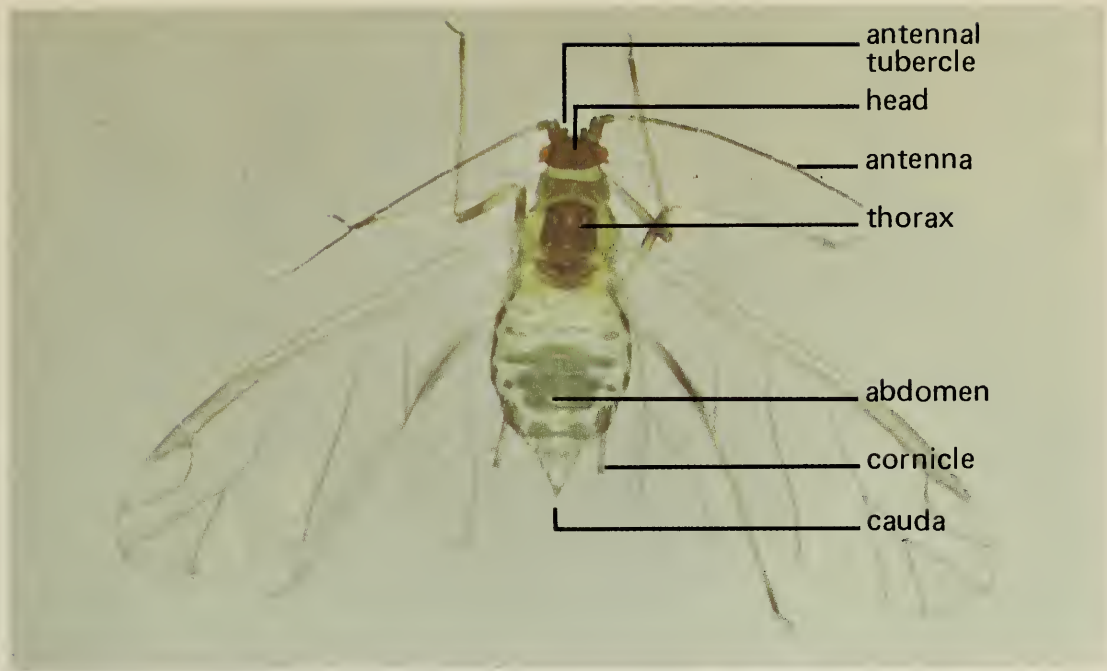


Fig. 2. *Myzus persicae* (Sulzer), the green peach aphid, showing features used to identify potato-infesting aphids.

Canada). It has been prepared as an aid in learning how to identify winged and wingless aphids on potatoes, but cannot be used when they occur on other plants. This learning aid is a prerequisite for using the Guide (Agric. Can. Publ. 1676).

## KEY TO WINGLESS AND WINGED POTATO-INFESTING APHIDS

1. Wings absent ..... 2  
 Wings present ..... 5
2. Body (Fig. 4c, 5c) elongate, wedge-shaped. Head (Fig. 3c) with prominent outward-sloping antennal tubercles. Legs and antennae long. Cornicles cylindrical, flared outward, about one-third the length of the body; cauda about one-third the length of the cornicles, both extending about the same distance past end of body. Largest of potato-infesting aphids. Color a shade of green (Fig. 5c), pink, or yellow, with a darker dorsal ridge.

*Macrosiphum euphorbiae* (Thomas)  
 POTATO APHID

Body egg-shaped, or pear- or almond-shaped ..... 3

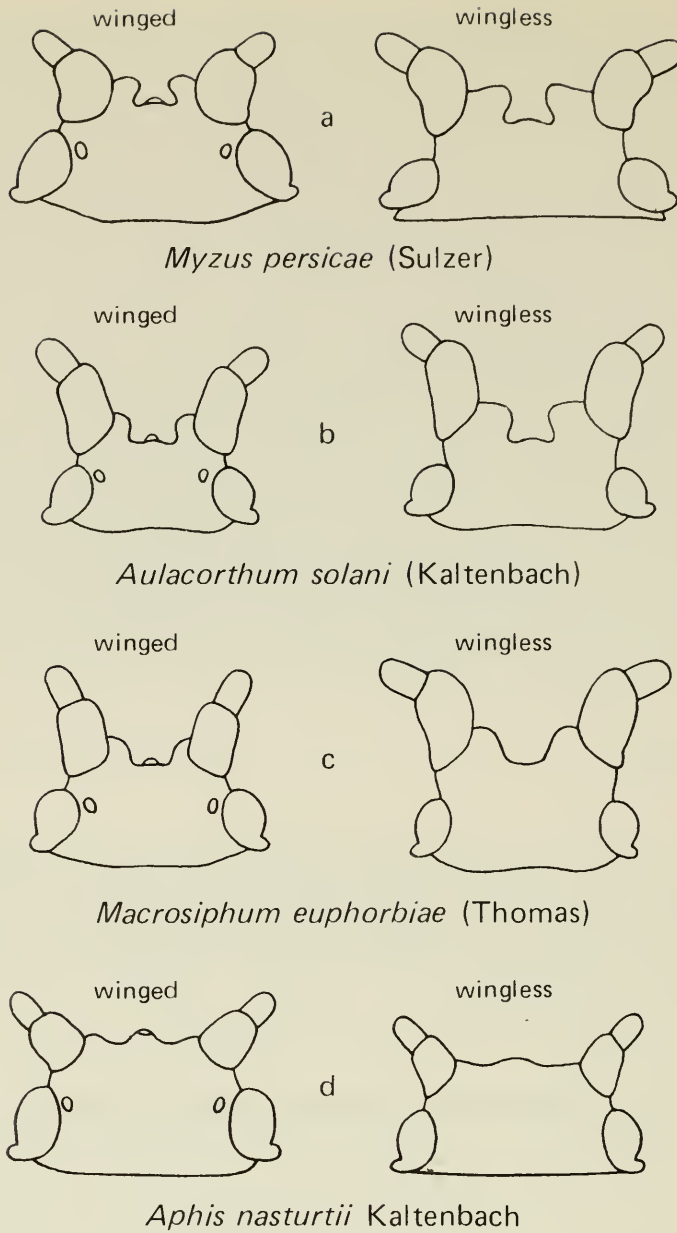


Fig. 3. Outline of head region of potato-infesting aphids to show shape of antennal tubercles.

3. Body (Fig. 4a, 5a) flat, egg-shaped. Front of head (Fig. 3d) slightly curved, almost flat; antennal tubercles small, hardly noticeable. Antennae, legs, and cauda short. Smallest of potato-infesting aphids; found mostly on middle and bottom leaves. Color in spring deep green, in summer lemon yellow to green (Fig. 5a); cornicles pale with dusky tips; immature male black, found after mid-August.

*Aphis nasturtii* Kaltenbach  
BUCKTHORN APHID



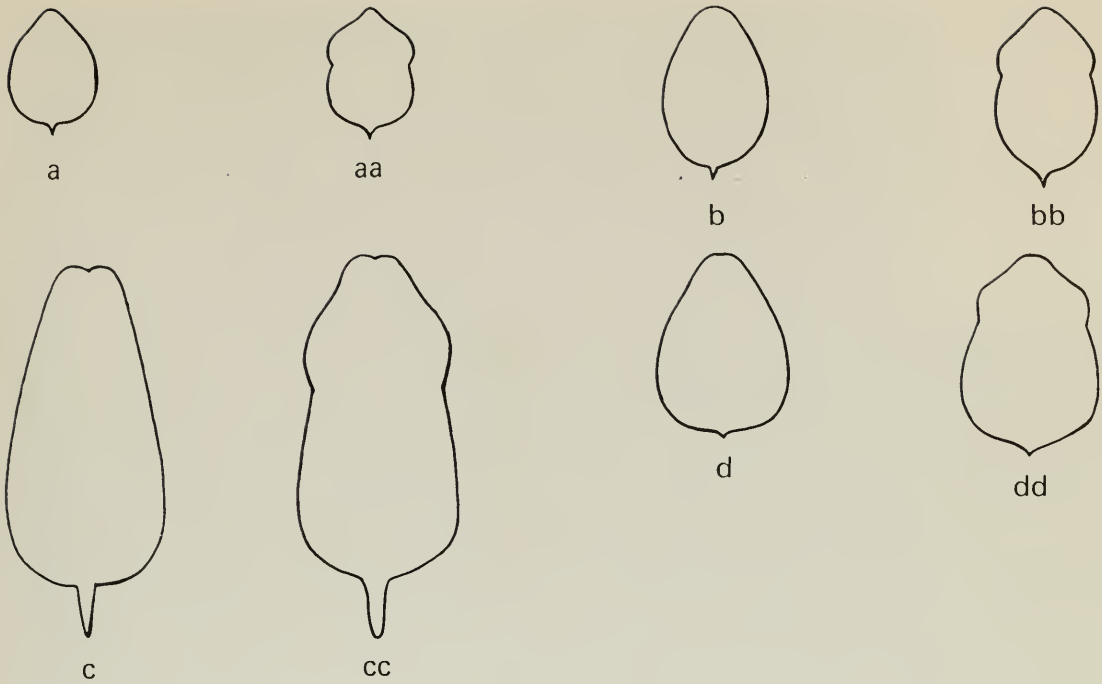


Fig. 4. Impressions of body outlines of potato-infesting aphids. Wingless and wing pad forms; *a, aa*, *Aphis nasturtii* Kaltenbach; *b, bb*, *Myzus persicae* (Sulzer); *c, cc*, *Macrosiphum euphorbiae* (Thomas); *d, dd*, *Aulacorthum solani* (Kaltenbach).

Body thick, pear- or almond-shaped ..... 4

4. Abdomen (Fig. 4*b*, 5*b*) almost same width from thorax to bases of cornicles, then sides gently rounded to meet the cauda abruptly. Head (Fig. 3*a*) with prominent inward-pointing antennal tubercles. Cornicles slightly swollen on apical half; cauda short. Color light green to almost translucent (Fig. 5*b*), sometimes deep pink or peach.

*Myzus persicae* (Sulzer)  
GREEN PEACH APHID

Abdomen (Fig. 4*d*, 5*d*) globular, widest just ahead of cornicles, tapering to insignificant upturned cauda. Head (Fig. 3*b*) with prominent almost parallel straight-sided antennal tubercles. Cornicles not swollen, slightly tapered with prominent flanges on the dark tips. Color light to dark green (Fig. 5*d*), sometimes brownish, usually with darker areas around bases of cornicles, legs and antennae with dark joints. Seldom abundant; found mostly on lower leaves of plants.

*Aulacorthum solani* (Kaltenbach)  
FOXGLOVE APHID



Fig. 5. Wingless viviparous females of potato-infesting aphids (X17); a, *Aphis nasturtii* Kaltenbach; b, *Myzus persicae* (Sulzer); c, *Macrosiphum euphorbiae* (Thomas); d, *Aulacorthum solani* (Kaltenbach).



Fig. 6. Winged viviparous females (X17); a, *Aphis nasturtii* Kaltenbach; b, *Myzus persicae* (Sulzer).



5. Head and thorax dark brown to black (Fig. 6), abdomen a shade of green, yellow, or pink. .... 6  
 Head and thorax light yellow-brown or green-brown to dark brown; abdomen green, pink, or yellow-green (Fig. 7). .... 7

6. Abdomen green or pink with a more or less solid dark patch (Fig. 6b). Cornicles usually slightly swollen. Head (Fig. 3a) with prominent inward-pointing antennal tubercles.

*Myzus persicae* (Sulzer)  
 GREEN PEACH APHID

Abdomen pale green or lemon yellow, never with solid dark patch (Fig. 6a). Cornicles short and dark. Front of head almost flat (Fig. 3d); antennal tubercles inconspicuous.

*Aphis nasturtii* Kalténbach  
 BUCKTHORN APHID

7. Abdomen usually a shade of yellow green with interrupted olive brown bars or continuous brownish black bars (Fig. 7a). Basal veins of front wings slightly darker and thicker than other veins. Cornicles straight, with prominent flanges resembling the head of a carpet tack. Head (Fig. 3b) with prominent almost parallel straight-sided antennal tubercles.

*Aulacorthum solani* (Kalténbach)  
 FOXGLOVE APHID

Abdomen green to yellow, without black bars (Fig. 7b). All veins of front wings of same thickness. Cornicles extremely long, the tips without tacklike flanges. Head (Fig. 3c) with prominent outward-sloping antennal tubercles.

*Macrosiphum euphorbiae* (Thomas)  
 POTATO APHID

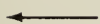


Fig. 7. Winged viviparous female (X17); a, *Aulacorthum solani* (Kalténbach); b, *Macrosiphum euphorbiae* (Thomas).

## ACKNOWLEDGMENT

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