

## Aphidoletes (*Aphidoletes aphidimyza*) Aphid Predatory (aphidophagus) Midge

### Target pest

Aphids

### Description

“Aphidoletes” larvae are voracious native predators of over 60 species of aphids.

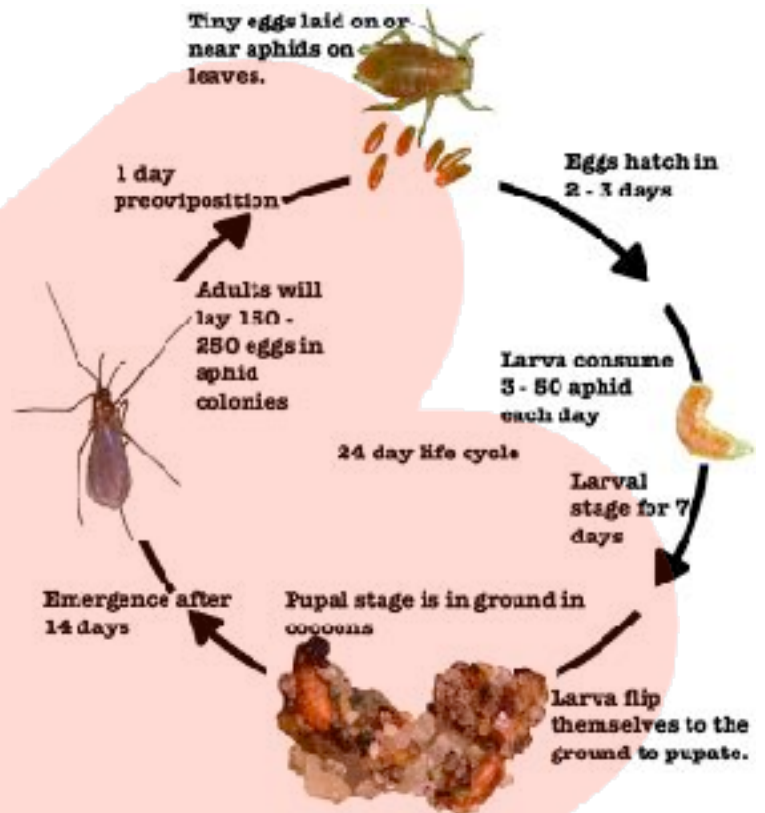
- Larvae are orange, legless maggots up to 3mm (1/16 inch) long.

Adults are difficult to see as they are most active in the evening but they may frequently be found hanging (unstuck) from spider webs where mating can take place.

- Adults are small, delicate midges resembling mosquitos.

### Use in Biological Control

- Aphidoletes are used to control aphids indoors in commercial greenhouses and interior plants scapes as well as outdoors in orchards, shade trees, roses and home gardens (For more information on aphids, see Sheet 340)
- Optimum conditions are 21-25°C (70-77°F) and high relative humidity (over 70%) particularly for the pupal stage which must not dry completely.
- If aphids are present in outdoor plants in late summer, a release of Aphidoletes at this time helps reduce the overwintering aphid population while establishing overwintering predator populations that will be active early the following Spring.



### Monitoring Tips

Using a 10-15 X hand lens, full grown larvae are relatively easy to see among the aphids because of their characteristic orange colour.

Younger larvae are much smaller and pale in colour, making them very difficult to see.

### Life Cycle

A complete life cycle takes 24 days at 21°C (70°F). Development rate depends on temperature and availability of prey.

- Sex ratio in populations vary, but there are usually more females. (60% females)

- Female midges lay their eggs on leaves beside aphids. Each female lays 150-200 eggs during her lifespan of 1-2 weeks. The eggs are shiny orange ovals, less than 0.3mm (1/50 inch) long.
- At 21°C, eggs hatch in 2-3 days and the tiny, legless larvae crawl along the leaf in search of aphids.
- Larvae feed by biting aphids and paralyzing them with a toxin before sucking out the aphid body fluids. They feed for 7-10 days and can kill 3-50 aphids per day. Where aphid populations are high, larvae kill many more aphids than they can consume.
- To pupate, larvae drop to the ground and burrow into the top 1-2 cm (1/2 inch) or soil or organic material to spin a cocoon. Adults emerge in 2-3 weeks.
- Outdoors, the last generation of Aphidoletes in the fall overwinters in the cocoons in the soil. They are very hardy and survive outside throughout the growing regions of Canada, re-emerging in the Spring as adults; so, aphid control may occur for more than one season.

**Note:** Aphidoletes respond to cool temperatures and shortening day lengths (less than 16 hours) by entering diapause (similar to hibernation), therefore, in most greenhouses they are only actively cycling from March to September unless supplemental lighting is used (see below).

## Product Information

**Note:** Do not open a tray of Aphidoletes until release. Each package is carefully produced with adequate moisture for optimal emergence. Opening can reduce emergence rates.

The predators are released in one of two ways:

- Hold closed containers in a warm place at 22-25°C (72-77°F) until many adults are seen flying in the container. Then place opened container centrally in the release area, in the shade and protected from water.
- Upon receipt, hang the Aphidoletes MAX vial centrally in the release area, protected from direct sunlight and water.

## Introduction Rates

**Note:** Recent research has indicated that in greenhouses, low level (0.25-0.5/sq.m.) weekly preventative releases will prevent the build-up of most species of aphids.

Generally, Aphidoletes should be released in the spring before the first sign of aphid infestations and then once aphids are detected, additional releases should be made, 2-3 times at 7-10 day intervals in the aphid areas to establish the predator.

### Greenhouse Vegetables

In crops where aphids have been a problem in the past, weekly or bi-weekly, preventive releases of 0.25-0.5 Aphidoletes/m<sup>2</sup> will help maintain control. For preventive releases use 2 release points per hectare and release in areas where aphids have not established. Do not operate circulation fans during the release period and keep them off for at least two hours. Once aphids are detected use the following rates in the infested areas:

- Tomato - 100 aphidoletes/infested plant weekly for 3 weeks.
- Pepper - 100 aphidoletes/infested plant weekly or until established
- Cucumber - 10 aphidoletes/plant weekly in infested areas only until established
- Flower and Ornamentals - Use preventively at low rates (0.25-0.5) weekly or bio-weekly before aphids appear. Once aphids are detected continue preventive releases and add additional releases of 100-1000 in hot spot areas.

### Outdoor Use

- Gardens - 250 aphidoletes/aphid hot spot weekly for 2 weeks.
- Orchards - 5-10 aphidoletes/tree weekly for 3 weeks
- Shade trees - 5-10 aphidoletes/tree weekly for 3 weeks
- Roses - 3-5 aphidoletes/plant weekly for 3 weeks

For large areas, such as apple orchards, use 5,000 to 10,000 aphidoletes per hectare (1,000 to 4,000/acre) repeated 1-3 times 1-2 weeks apart or until established.

When applying outdoors, keep the Aphidoletes in a warm spot (22-25°C or 72-77°F) until they all emerge and then release during the evening on the upwind side of the planting so that the prevailing winds will help to disperse the midges throughout the plot.

## For Best Results

- Use preventively at low rates (0.25-0.5) weekly or bi-weekly before aphids appear. This will reduce aphid hot spots from developing into problem areas. When aphids are found, continue to make these preventive releases away from aphid infested areas so the Aphidoletes can find any new infested areas. Make additional weekly Aphidoletes releases at rates of 100/plant or 1000 per hot spot until control is achieved.
- The second generation will diapause in short-day conditions during fall and winter if there is no supplemental lighting. Preventively this is acceptable. But if a second generation is preferred, leaving one 60 watt light bulb on all night will prevent diapause in more than half the larvae within a 20m radius of the light (if above 15°C).
- The larvae need to burrow into damp soil, peat moss, sawdust or other growth media to pupate. In greenhouses with bare plastic or concrete floors, survival will be low unless such organic materials are provided. Adding a very thin layer (1/8 inch) of sand, sawdust or other organic materials under the leaf zones of plants will improve cycling of Aphidoletes.
- For control of cotton/melon aphid, which reproduces very quickly, Aphidoletes should be used along with Aphidius parasitic wasps (Sheet 242) or other aphid predators.
- It may be necessary to control ants in conservatories and around outdoor trees (use ant bait) because they can protect aphid colonies by removing predator larvae.
- Fan speeds must be stopped or set to their slowest setting at the time of releasing aphidoletes. The windspeed and fan blades will kill adult aphidoletes before laying eggs. After at least two hours, fan speed can be increased until the next release.

## Using Pesticides

Generally, pesticides are not compatible with bio-control programs.

For effects of specific pesticides on Aphidoletes see sheet 180.

Insecticidal soaps are harmful to all stages of Aphidoletes, but have no residual effect so can be used to reduce the number of aphids in hot spots. Strong sprays of water alone will dislodge aphids from plants and reduce numbers surviving in hot spots.