

Aphidoletes (*Aphidoletes aphidimyza*) Aphid Predatory Midge

Target pest
Aphids

Description

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

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

resembling mosquitoes.

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 usually takes place.

Use in Biological Control

- Aphidoletes are used to control aphids indoors in commercial greenhouses and interior plantscapes as well as outdoors in orchards, shade trees, roses and home gardens (For 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 out.
- 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

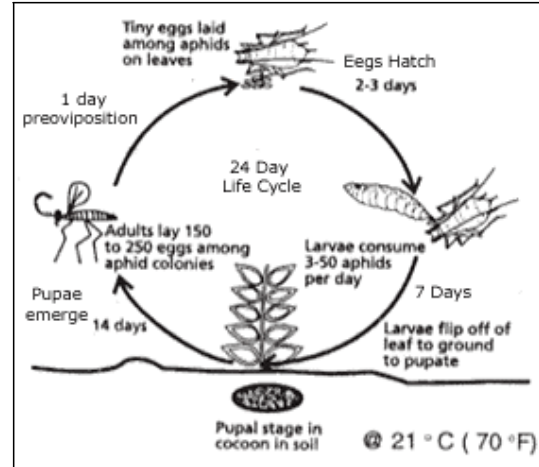
Using 10-15 X hand lens, full grown larvae are relatively easy to see among the aphids because of their characteristic orange colour.

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 somewhat more females (60% females).
- Female midges lay their eggs on leaves beside aphids. Each females lays 150-200 eggs during her lifespan of 1-2 weeks. The eggs are shiny orange ovals, less than 0.3 mm (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) of soil or organic material to spin a cocoon. Adults emerge in 2-3 weeks.



- Outdoors, the last generation of Aphidoletes in the fall over-winters 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 responds to cool temperatures and shortening day lengths (less than 16 hrs) by entering diapause (like a hibernation state), therefore in most greenhouse they are only active from March to September unless supplemental lighting is used (see below).

Product Information

Note! It is critical to keep the vermiculite or sand moist or the Aphidoletes will not emerge. Add a small amount of water if the media has dried out. Aphidoletes is sent as pupae (cocoons) in moist vermiculite or sand. Adults should begin to emerge within 1 week and all should emerge within 14 days of receipt. If adults do not emerge add a small amount of water to the media and keep the container closed to raise humidity. The predators may be released in either of two ways:

- Hold closed containers in a warm place at 22-25°C (72-77°F) (warmer speeds up emergence) until many adults are seen flying in the container then place the opened container near the aphid infestation in the shade in the release area.
- For use in a heated greenhouse or plantscape area, cut one corner off of the plastic container so that there is a **small** opening of approximately 1cm (3/8 inch). Place the container in the release area out of direct sunlight.

Introduction Rates

Note! Recent research has indicated that in greenhouses, low level (0.25-0.5/sq.m.), weekly preventive 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 or 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/m² will help maintain control. For preventive releases. use 2 release points/ha and release in areas where aphids have **not** established. Do not release directly under circulation fans. 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 & Ornamentals - Use preventively at low rates (0.25-0.5) weekly or bi-weekly before aphids appear. Once aphids are detected continue preventive releases an 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 5,000-10,000 Aphidoletes/ha (1,000-4,000/acre), repeated 1-3 times, 1-2 weeks apart, or until established.

For outdoor use, keep the Aphidoletes in a warm spot (22-25°C (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.
- Unless they are used preventively. The 2nd generation will diapause in short-day conditions. During fall and winter if there is supplemental lighting. It has been found that leaving on one 60-watt light bulb all night will prevent diapause in more than half of the larvae within a 20 m (20 yd) diameter circle as long as night temperatures are above 15°C (60°F).
- 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 (see Sheet 242) and ladybeetles.
- 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.
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Using Pesticides

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.