



Aphidoletes aphidimyza

Aphid Predatory Midge

DESCRIPTION:

Aphidoletes larvae are voracious native predators of over 60 species of aphids. Larvae are orange, legless maggots up to 1/16 inch (3 mm) 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.

TARGET PEST:

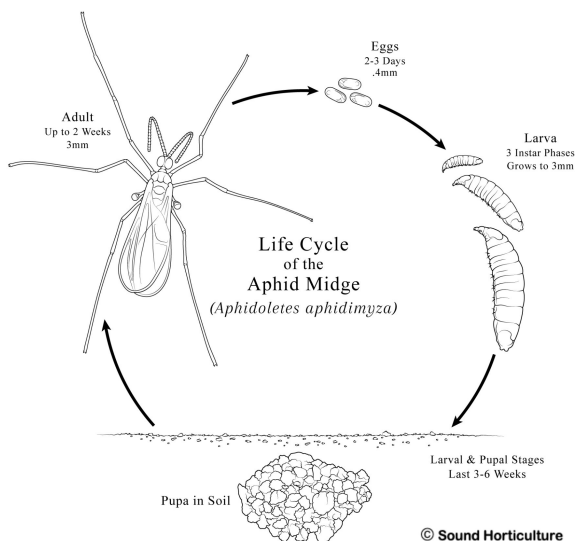
Aphids



Aphidoletes aphidimyza

LIFE CYCLE:

A complete life cycle takes 24 days at 70 °F (21°C). 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 female lays 150-200 eggs during her lifespan of 1-2 weeks. The eggs are shiny orange ovals, less than 1/50-inch (0.3 mm) long. At 70°F (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's 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 -inch (1-2 cm) of soil or organic material to spin a cocoon. Adults emerge in 2-3 weeks. When used outdoors, the last generation of *Aphidoletes* in the fall over-winters in cocoons in the soil. They are very hardy and survive outside, re-emerging in the spring as adults. This allows for aphid control across seasons. *Aphidoletes* responds to cool temperatures and shortening day lengths (less than 16 hrs) by entering diapause (like a hibernation state). Therefore, in most greenhouses they are only active from March to September unless supplemental lighting is used.

For more information, Please contact **Sound Horticulture**

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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. Optimum conditions are 70-77°F (21-25°C) 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 color. Younger larvae are much smaller and pale in color, making them very difficult to see.

PRODUCT INFORMATION:

Aphidoletes is sent as pupae (cocoons) in moist vermiculite or sand. It is critical to keep the vermiculite or sand moist so the *Aphidoletes* will emerge. Add a small amount of water if the media has dried out. 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. Hold closed containers in a warm place at 72-77°F (22-25°C)—warmth 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 1/2-inch. Place the container in the release area out of direct sunlight.

INTRODUCTION RATES:

Recent research has indicated that in greenhouse's low-level (2.25-4.5 per square foot), 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 again 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 Crops:

In crops where aphids have been a problem in the past, weekly or bi-weekly, preventive releases of 0.25- 0.5 *Aphidoletes*/yd² will help maintain control. For preventive releases, use 2 release points/acre 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 (2.25-4.5 per square foot) weekly or biweekly before aphids appear. Once aphids are detected, continue preventive releases and add additional releases of 100-1000 in hot spot areas.

Outdoor Use:

For outdoor use, keep the *Aphidoletes* in a warm spot 72-77°F (22-25°C) until all have emerged, 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 large areas such as apple orchards, use 1,000-4,000 *Aphidoletes*/acre (5,000-10,000/ha), repeated 1-3 times, 1-2 weeks apart, or until established.

Use the following rates in the infested areas:

- 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 BEST RESULTS:

Use preventively at low rates (2.25-4.5 per square foot) weekly or bi-weekly before aphids

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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 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 60 ft (20m) diameter circle as long as night temperatures are above 60°F (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 (see *Aphidius*) and Lady Beetle.

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.

USING CHEMICALS:

For effects of specific pesticides on *Aphidoletes*, contact Sound Horticulture for information. 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.

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