



## CROP PEST:

### Aphids

*Aulacorthum spp., Myzus spp., Aphis spp.*

#### OVERVIEW:

Knowing your crop's history of aphid pressure, as well as which pesticides have been historically used to treat these pests, is paramount. Plan ahead by consulting the previous year's monitoring/spray records to help you know what you might expect and to preventatively release biocontrols before the pests establish themselves. Preventative releases of beneficials can be one of the hardest things for growers to accept, as it might seem wasteful and expensive, but this tactic, combined with judicious and proactive treatments with fungal biocontrols, is especially effective.

Monitoring with yellow sticky cards will only trap the flying adults, and is not an effective means of assessing aphid pressure in the late winter/ early spring.

Regular, methodical scouting of the crop is critical.

Scout carefully in areas near doorways and vents, watch for leaf tip distortion; check the undersides of leaves and deep into crowns of emerging new growth.

Be aware of the nearby crops or trees that can host aphids in your vicinity. Know what your neighbors are growing.



Photo courtesy of Applied Bionomics

Conditions in a greenhouse or hoop house cater to explosions of aphids. This pest can be especially destructive when in their "haploid" stage of giving live birth to offspring, where they can complete a whole lifecycle in a day. Aphids themselves seldom cause permanent damage, but their excrement "honeydew" can lead to sooty mold. Honeydew in turn attracts ants and leads to microbial contamination. If you have aphids, you must eliminate any ants first. Ants "farm" aphids, so they can feed on the honeydew. They will protect the aphids from predation and sometimes actively move aphids around to "greener pastures" within your crop.

#### CHALLENGES:

As we reduce our reliance on neonicotinoids in nursery and greenhouse production, there are some problem crops that will not be easy to manage with biocontrols alone. These include trees and shrubs, hanging basket crops including *Calibrachoa* and *Fuchsia*, and hydroponic lettuce, to name a few. Each growing environment is radically different and consideration must be given to how the biocontrols you choose will fare. For instance, our favorite control *Aphidoletes* must have soil to drop down into to pupate. If you are a hydroponic lettuce grower this affects your decision-making and budget, as it may be necessary to release more frequently to keep your controls humming at an optimum level.

#### BENEFICIAL INSECT CONTROL

*Aphidoletes aphidimyza*—is a small midge with a great ability to seek out and find populations at distances over 100 ft. The predaceous larvae will attack more than 60 species of aphids. The adults are

less than 1/8" long and appear as delicate looking little black flies. With a life span of 10 days, the females can lay between 100-250 eggs in that time. The orange larvae hatch within 2-3 days, chomping their way through the aphid colony, biting the legs of the aphids and injecting a neurotoxin, then sucking the guts out of the aphid through a hole bitten in the thorax. This habit of immobilizing the aphid first goes a long way to halting pest explosions, as they will paralyze many more aphids than they can actually eat in their lifetime. After 3-7 days they will drop to the soil, spin a cocoon, and pupate into the adult. This native insect can and will establish itself in outdoor situations, and in longer-term crop systems where there is soil. When the growing system supports the full life cycle, this is an incredibly efficient biological control.

#### Introduction Rates and Release Information

Generally *Aphidoletes* should be released at a rate of 1 to 3 midges per 10 sq. ft. When they arrive, watch container for a few days and wait until 50% of the adults have emerged before release. Keep medium moist and in a dark area away from direct light.

Aphids can be controlled with rates as low as 0.01 per square foot, weekly, until the aphids are eliminated. If you have a history of aphids, continue at this rate weekly for the duration of the crop. Conditions for optimum performance are between 64°-77°F, and a relative humidity of about 70%.

*Aphidius colemani*, *ervi*, *aphelinus*, and *matricariae*—Parasitic wasps that are easy to establish in longer-term crop systems. While *A. colemani*'s most frequent host and main target is *Aphis gossypii* (Melon or Cotton Aphid), it they will also target *Myzus persicae* (Peach-Potato Aphid.) The Bird Cherry Aphid (*Rhopalosiphum padi*) is also attacked, and is routinely used with banker plants as an alternative host for this parasitoid. (For more information on the pros and cons of using banker plants, and the right species of *Aphidius* for you, please contact Sound Horticulture.)

#### Introduction Rates and Release Information:

Depending on severity of Aphid infestation, *Aphidius spp.* should be released at a rate of 1 – 25 wasps per 100 sq.ft. For best results, apply every week for three weeks.

The female wasp seeks out aphid individuals or colonies, chooses her host aphid and ovi-posit an egg. When the larvae hatch inside the aphid, it feeds on the organs of the aphid, killing it. A cocoon is actually spun inside the parasitized aphid, turning it a golden color. These puffed up carcasses serve to protect the young *Aphidius*, and harden into what we call "Aphid mummies." These take 4-5 days to emerge, cutting a clean, circular hole in the back of the dead aphid. We reduce our reliance on *Aphidius* where possible during the warm summer months, as naturally occurring "hyper-parasites" can attack these wasps and reduce the efficacy. That said, by the warm time of year there are often naturally occurring *Aphidius* that have found their way into your growing system. Early releases entirely prevent development of Aphid colonies in some cases.

Summer months find growers relying more on *Aphidoletes* and the positive effects of the *well-timed early season releases* of those preventative control measures.

*Aphidius* wasp adults are very sensitive to pesticide sprays. In addition, hydroponic, herb and leafy green growers may be concerned about using this great control, because of the mummified aphids that will remain stuck to the plants. In truth, if the aphid populations are kept to a minimum, these parasitoid wasps should still be considered, as most customers will never notice the far and few between "mummy".

*Chrysoperla rufilabris*—Adult green lacewings feed on nectar, honeydew and pollen, powering their systems to fly distances to locate aphid prone plants on which to lay their eggs. These hatch into alligator-like larvae, which will eat anything they can get a good grab on. These are generalist predators that attack aphids and other prey by first injecting paralyzing venom and then drawing out the body

fluids, leaving only a dead, dried up shell of the pest. Each larva can devour up to 200 victims in a weeks time. After about two weeks of feeding, the larva pupates after enclosing itself in a cocoon of silken thread. The pupa is a resting form that develops into the adult, a process requiring from five to eight days. The adult then emerges from the cocoon, mates, and proceeds to lay hundreds of eggs over a 3 to 4 week period. The eggs are laid near insect pests. Each egg is mounted at the top of a hair-like filament or stalk attached to the foliage. The eggs hatch in three or four days. Newly hatched larvae are tiny and difficult to observe.

#### Introduction Rates and Release Information

Knowing how to apply green lacewings can be tricky since we provide so many different life-stage options. If using larvae, for a light infestation release 2 to 5 per 10 square feet, biweekly or as needed. For moderate infestation release 4 to 8 per 10 square feet biweekly or as needed. And for large infestations release 1 per 1 square foot biweekly or as needed. If using adults, divide rate by four. And, if you are applying eggs, multiply rate by five.

An advantage to lacewings is that they can be very inexpensive, as well as grazing on additional pests like thrips, leafhoppers, and mealybugs. A popular way to release lacewing eggs is from cards, which can be easily placed or hung within most crop systems. Sometimes it is best to release eggs (with food and filler in a carrier) so that you can broadcast them and disperse more broadly. Release eggs when several newly hatched larvae are seen moving in the container. Lacewing can also be released as larvae, which will be ready to seek prey immediately. One concern is them eating eggs of other lacewings that may be released in the same area. At times, adult lacewings may be preferred for treating trees and areas which the adults can immediately fly out and locate.

Lacewings are nocturnal and quite evasive, making them difficult to scout. The larvae that will be emerging are very tiny and hard to see. If the larvae are not released immediately upon hatch, they will cannibalize each other. If you are not able to monitor for hatch, it is best to release eggs immediately upon receipt.

Ladybugs or *Hippodamia convergens*—This generalist predator has pros and cons to its use, but is often employed for larger scale row crops, specific “knock downs”, and used with considerations to the crop at hand. We try to avoid the use of *Hippodamia* unless critically necessary due to the wild capture harvesting methods employed.

*As you monitor your greenhouse settings, keep a close eye out for the “freebie” natural predators and encourage them. There are over 1000 species of naturally occurring syrphid, flower or hover flies across North America. These predaceous dipteran flies feed on pollen and nectar, and often are mistaken for bees. Keeping blooming plants around will invite them to seek aphids in your growing area, and lay eggs in those affected plants. Their 1 mm larvae vary in color and pattern, but can be found feeding in your plants. Single syrphid larvae can consume hundreds of aphid larvae in a month!*