

Aphidius-Mix-System

Because aphid colonies often consist of several aphid species, it can be necessary to introduce both parasitic wasps *Aphidius colemani* and *Aphidius ervi*.

HOSTS

Aphidius colemani and *Aphidius ervi* parasite more than 40 aphid species. Below a short description of the appearance and life cycle of the most common species is presented.

The cotton aphid

The cotton aphid (*Aphis gossypii*) is a 0.9 - 1.8 mm small, round aphid with typical black cornicles. The colour varies from light yellow to dark-green, sometimes almost black. It has a short cauda, no head front knobs, and antennae shorter than the body.

The cotton aphid originates from warmer regions where it is a pest on cotton and Cucurbitaceae. Thanks to the warm climate in greenhouses, it can also survive northern winters. The cotton aphid is mainly a pest on greenhouse vegetables such as cucumber and melon, and on ornamentals such as chrysanthemum and hibiscus. Greenhouse strains do not change their host plant. After hibernation in the greenhouse this aphid can become a pest in early spring (as from the beginning of March). Populations of cotton aphids can increase faster than other aphid species.

Several strains of cotton aphids exist, each with a specific preference for a certain host and resistance against pesticides.

The green peach aphid

The green peach aphid (*Myzus persicae*) is a 1.2 - 2.6 mm small, oval aphid with an emarginated head. The colour varies from pale yellow-green to green, and is sometimes red. Cornicles are medium-sized and the antennae reach as far as the cornicles.

In temperate regions, the green peach aphid usually hibernates as an egg on its winter host (peach, prune or other relatives). After a few generations on its winter host in early spring it moves back to its summer host. The aphid may also hibernate in the greenhouse. In this case acquired resistance to pesticides is preserved.

The green peach aphid can be a pest on greenhouse vegetables (such as sweet pepper, tomato, cucumber, lettuce, eggplant ...), on ornamentals (such as chrysanthemum, pelargonium ...) and on open field crops (such as potato, beet, cabbage, tobacco, spinach ...). The green peach aphid can transmit over 100 virus species.

The tobacco peach aphid

The tobacco peach aphid (*Myzus nicotianae*) looks very similar to the green peach aphid. Only some minute microscopic features distinguish both species. Similar to the green peach aphid, the tobacco peach aphid affects several crops, of which tobacco is preferred.

The 'red aphid' that has recently shown up in sweet pepper and eggplant crops, appears to be a red form of the tobacco peach aphid. This red aphid is mainly alarming because of its resistance to a lot of pesticides, which re-emphasizes the importance of efficient biological control.

The potato aphid

The potato aphid (*Macrosiphum euphorbiae*) is a 2 - 4 mm big, elongated aphid with relative long legs. The antennae are longer than the body. The eyes are noticeable red. The cauda is relatively long and the cornicles are long with a dark end. The potato aphid is mostly green, sometimes yellowish or pink. The larvae have dark longitudinal stripes on their back.

Noticeably is that the potato aphid is very agile. It also lets itself easily fall down.

Although this aphid mostly hibernates in North America on rose, it hibernates in our region usually in the greenhouse. The potato aphid has more than 200 host plants such as tomato, eggplant, sweet pepper, chrysanthemum, rose, gerbera, pelargonium, tobacco and potato. It is also located often on stems or on younger plant parts, causing curled tops, which look like virus infestations.

The glasshouse potato aphid

The glasshouse potato aphid (*Aulacorthum solani*) is a 1.8 - 3 mm medium-sized, round-oval aphid. Distinguishing are the dark rings on the antennae, which are longer than the body. The cauda and the cornicles are of medium length. At the base of the cornicles dark green spots are noticeable. This aphid has mostly a shiny yellowish green colour, but this can vary from white yellowish green to brown green.

The glasshouse potato aphid has no sexual phase and therefore multiplies viviparously on different kinds of crops. In open field it affects a.o. potato crops and all kinds of bulbous plants. In greenhouses it threatens especially sweet pepper, chrysanthemum, gerbera, eggplant, lettuce and bean.

APHIDIUS COLEMANI & APHIDIUS

ERVI

Biology

Aphidius colemani is a slender, black insect with brown legs, long antennae and a suspicious wing venation. Its size depends on the size of the parasitized aphid, but is usually about 2 mm. The female has a pointed abdomen, while the male's abdomen is round.

The parasitic wasp *Aphidius ervi* resembles *Aphidius colemani* very much, but is two times as big. Its bigger size is logically combined with the fact that it parasitizes bigger aphid species. The parasitization occurs for both species equally.

The female *Aphidius* deposits an egg in an aphid. It bends its abdomen under its legs and injects an egg in the aphid with its ovipositor. This takes only a fraction of a second.

In the presence of an *Aphidius* in an aphid colony, aphids often secrete 'alarm pheromones'. The other aphids start to panic, and often let themselves fall down, and usually die on the ground. The wasp parasitizes adult aphids and nymphs. During the egg stage of the wasp (the first 3 days after parasitization) the aphid even eats more than normal and secretes more honeydew. Parasitized aphid adults or 4th instars keep on producing progeny. Then, the *Aphidius* larva starts eating the aphid from inside, starting with the non-vital parts. Seven days after parasitization (at 21°C or 70°F) the parasite fixes the aphid onto the leaf, and forms a silk cocoon which causes the aphid to swell. The outside of the aphid becomes golden-brown and leather-like, and is then called a mummy. Four days after the beginning of the mummification (at 21°C or 70°F) an adult *Aphidius* leaves the mummy through a round hole.

The total development of *Aphidius colemani* takes 14 days at 21°C (70°F), which is longer than aphid development in optimal circumstances (9 days). However this is largely compensated by the hundreds of eggs *Aphidius* lays. Most of these eggs are laid during the first four days. An adult *Aphidius* lives for 2 to 3 weeks.

The parasitic wasp finds aphid colonies from a long distance by 'alarm signals' produced by an infected plant. At shorter distances it smells the honeydew. The adult *Aphidius* feeds on honeydew.

Male *Aphidius* emerge from unfertilized eggs. These are deposited soon after mating or at the end of the female's life. The ratio of females - males is usually about 2:1.

Hyperparasites

Several wasp species parasitize *Aphidius* larvae or pupae. A hyperparasite deposits an egg in the larva or young pupa of *Aphidius*. Following hyperparasitization, the mummy stage requires a few days more than the usual 4 days for a non-parasitized *Aphidius*. Hyperparasites leave the mummy through a hole with a jagged edge, and not through a round hole as *Aphidius* does. *Aphidius* also usually leaves the lid of the exit hole attached to the mummy.

APPLICATION

Aphidius-Mix-System can be released on all crops on which compatible hosts occur.

In view of the fast reproduction of aphids, they have to be controlled early. *Aphidius colemani* and *ervi* are very suited for preventative control. In several greenhouse crops, such as sweet pepper, cucumber, eggplant, rose and chrysanthemum, preventative weekly introductions of minimally 0.15 *Aphidius*/m² are recommended.

As soon as aphids are detected on sticky plates (BUG-SCAN®) or on the plants, quantities are increased to 0.5 - 1 *Aphidius*/ m²/week, depending on the crop and the situation, for at least 3 weeks.

In case of a curative treatment often the gall midge *Aphidoletes aphidimyza* is released simultaneously. More serious infestations of aphids are tackled with the ladybird *Adalia bipunctata* or with the selective pesticide pirimicarb (Pirimor).

From summer on, aphid control with *Aphidius colemani* and *ervi* can be hampered by the presence of hyperparasites!

APHIDIUS-MIX-SYSTEM

Aphidius-Mix-System is delivered in a 100 ml bottle of 500 *Aphidius colemani* and 250 *Aphidius ervi* mummies with buckwheat as carrier. The mummies are sprinkled in Bio-Boxes that are hung in the crop (±25 pots/ha).

Aphidius-Mix-System can be stored briefly at 6-8°C and RH >85%.

ADVANTAGES

- **Applicable in many crops;**
- **Also controls the cotton aphid and 'red aphid';**
- **Preventative introduction possible;**
- **Good searching ability;**
- **High number of eggs per female;**
- **Parasitization is easy to recognize (mummies);**
- **Population is stable even at low infestations.**