TECHNICAL SHEET

Aphidius-System

The green peach aphid, the cotton aphid and the tobacco peach aphid are mainly feared because of their fast population growth. A preventative or early curative control with the parasite *Aphidius colemani* is therefore a must.

Hosts

Of the more than 40 aphid species that are known to be parasitized by *Aphidius colemani*, the cotton aphid, the green peach aphid and the tobacco peach aphid are the most common. Below a short description of their appearance and life cycle is presented.

1. 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. 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.

2. 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.

3. 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.

Aphidius colemani

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 female *Aphidius* deposits an egg in an aphid. She bends her abdomen under her legs and injects an egg in the aphid with her 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 parasitation (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 colemani 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* is 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*.
From summer on, aphid control with *Aphidius colemani* can be hampered by the presence of hyperparasites.

Aphidius-System

Aphidius colemani is presented in tubes of 500, 1000 and 5000 mummies. Mummies are sprinkled in Bio-boxes that are hung in the crop (± 25 pots/ha). Mummies can also be spread on the rockwool plastic (where it is dry) or on a leaf.
Aphidius 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.**

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