
GENERAL

Before introducing beneficials, the greenhouse and plants should be free of harmful pesticide residues.

Before the beginning of your cultivation discuss with your advisor a plan of approach for the whole season.

SCOUTING AND MONITORING

Use yellow Bug-Scan[®] sticky traps for (timely) detection of flying insects. During the heating of the greenhouse hang min. 20 yellow sticky traps per ha to detect the first flying insects.

Also use yellow Bug-Scan[®] sticky traps during the cultivation. Count and register during **minimum the first 10 weeks** of your cultivation the different species of flying insects which are captured on the sticky traps.

CONTACT WITH BENEFICIALS

Follow up carefully the user's instructions; always pay attention to the icons on the packing. If necessary consult the Icon Guide.

Introduce beneficials preferably early in the morning.

If you want to store the beneficials for a short time, you have to reckon with the storage temperature and the use by date which are mentioned on the packing.

CHEMICAL CORRECTIONS

If a chemical correction has been inevitable, use as much as possible selective chemical crop protection products. Try to apply chemical corrections on local spots.

In case of doubt about the side effects of pesticides, contact your advisor or consult the Side Effects Manual which is available on www.biobest.be.

BIOLOGICAL CONTROL OF THRIPS

Amblyseius-Breeding-System (A.B.S.)

(predatory mite - *Amblyseius cucumeris* in sachets)



- Introduce minimum 4.000 Amblyseius-Breeding-System/ha.
- Starting: from the first bloom.
- Warning:

The products Amblyseius-Breeding-System (ABS) and Amblyseius-Slow-Release-System (ASR), which contain the predatory mite *Amblyseius cucumeris* delivered in breeding sachets, also contain Mold mites (*Tyrophagus putrescentiae*) and bran. Under certain circumstances such as a moist greenhouse climate or when using large quantities of breeding sachets, Mold mite population can increase to the point of causing damages in some crops (e.g. cucumbers). When planning to use these products in crops where they have never been used before, we recommend to first perform a small-scale trial or to discuss this with your Biobest advisor or supplier.

Amblyseius-Breeding-System (A.B.S.)

(predatory mite - *Amblyseius cucumeris* in 5 L - buckets)



- *Amblyseius cucumeris* can be introduced before the bloom as breeding material on the pot.
- Disperse on each pot minimum 2,5 cc. Introduce minimum 750.000 *Amblyseius*/ha.
- If necessary, repeat after 4 weeks if there is still no bloom.
- Warning:

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Amblyseius-System

(predatory mite - *Amblyseius cucumeris* in 1 L - sprinkler tube)



- If no breeding material is used, *Amblyseius cucumeris* can be introduced as sprinkling material. (50.000 *Amblyseius cucumeris* per liter)
- Introduce minimum 2 x 500.000 *Amblyseius*/ha on the crop, with an interval of 1 to 2 weeks.
- Apply only when there is sufficient bloom and a sufficient high relative humidity.
- Warning:

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Orius-System

(predatory bug - *Orius* spp.)

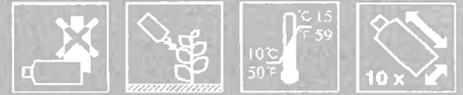


- Preventive: Introduce *Orius* from week 6 to 8. For late planting: from the first bloom.
- Curative: **Before week 6!** Introduce *Orius* from the moment that thrips (larvae or adult) is observed in the crop.
- Release in 4 introductions minimum 1 *Orius*/m².

- When the thrips infestation increases: introduce *Orius* in and around the thrips hot spots (minimum 5 - 10 *Orius*/m²).
- Remark: Per packing maximum 5 – 10 introduction points.

Degenerans-System

(predatory mite - *Amblyseius degenerans*)



- Preferably in combination with *Amblyseius cucumeris* and *Orius*.
- Introduce minimum 2.500 Degenerans-System/ha. You can only introduce when there is sufficient bloom present.
- Remark: Per packing maximum 100 introductions points.

BIOLOGICAL CONTROL OF SPIDER MITE

Phytoseiulus-System

(predatory mite - *Phytoseiulus persimilis*)



- Introduce minimum 6 *Phytoseiulus*/m² as soon as the first spider mites are detected.
- The exact amount of *Phytoseiulus* depends on the severeness of the spider mite damage. Introduce in and around the spider mite hot spots minimum 20 *Phytoseiulus*/m².
- Remark:
 - Introduce *Phytoseiulus* on a leaf, ± 15-20 cm under the top of the plant.
 - Reckon with the use of sulphur steamers till min. 5 days after introduction.

Californicus-System

(predatory mite - *Amblyseius californicus*)



- Introduce *Amblyseius californicus* preventive on places where spider mites are early expected, minimum 4 *Amblyseius californicus*/m².
- Introduce *Amblyseius californicus* preventive in the whole greenhouse minimum 2 mites/m².
- Remark: Introduce *Amblyseius californicus* when there is sufficient bloom.

Feltiella-System

(gall midge - *Feltiella acarisuga*)



- In combination with *Phytoseiulus* at spider mite hot spots.
- Introduce locally 1 pot (250 pupae) during 4 - 6 weeks.
- Remark: The gall midges have an excellent ability to search, but they can become disorientated by frequent use of a sulphur steamer.

BIOLOGICAL CONTROL OF APHID

Aphidius-System

(parasitic wasp - *Aphidius colemani*)



- Preventive: Introduce minimum 0,15 *Aphidius colemani*/m² per week.
- Curative: As soon as aphids are detected: introduce minimum 0,5 *Aphidius colemani*/m² per week, until an equilibrium is reached.
- When there is enough parasitization: introduce minimum 0,15 *Aphidius colemani*/m² per week to maintain the balance.
- Remark:
 - Start with the first introduction at the first bloom.
 - When hyperparasitizing occurs, *Aphidius colemani* can be replaced by *Aphidoletes aphidimyza*.

Aphidoletes-System

(gall midge - *Aphidoletes aphidimyza*)



- Preventive: Introduce 0,1 - 0,2 *Aphidoletes*/m²/week
- Curative: When aphids are detected in the crop, introduce 0,5 – 1 *Aphidoletes*/m²/week
- Open the bottle and put it under the aphid hot spot, or disperse *Aphidoletes*, in heaps, on a moist substrate.
- Remark: The gall midges have an excellent ability to search, but they can become disorientated by frequent use of a sulphur steamer.

Ervi-M-System

(parasitic wasp - *Aphidius ervi*)



- When the first aphids are detected in the crop, introduce 0,1 – 0,25 *Aphidius ervi*/m²/week until an equilibrium is reached.
- Introduce the parasitic wasps at the bottom of the plant, preferably in the neighbourhood of aphid hot spots.

Adalia-System

(larvae of the ladybird - *Adalia bipunctata*)



- Introduce *Adalia*-larvae purposefully in the immediate neighbourhood of aphid hot spots.
- Remark: Introduce the larvae as soon as possible. If necessary, the material can be stored for a short time at ± 6°C.

Banker-System

(*Rhopalosiphum padi* - open rearing system for the control of aphids)



- Introduce the Banker-Systems together with the first release of beneficials.
- Introduce minimum 3-4 Banker-Systems/ha/week until there are minimum 10 Banker-System/ha.
- Introduce 1 week after the introduction of the first Banker-Systems, 0,1 *Aphidius colemani*/m² until the first parasitized cereal aphids are detected.
- When hyperparasitizing occurs, *Aphidius colemani* can be replaced by *Aphidoletes aphidimyza*.
- Remark: Put the Banker-System in the sunlight.

BIOLOGICAL CONTROL OF WHITEFLY

Encarsia-System

(parasitic wasp - *Encarsia formosa*)



- Preventive: Introduce 1,5 *Encarsia formosa*/m² during min. 3 weeks. Discuss further steps with your advisor.
- Curative: After detection of whiteflies, introduce during min. 4 weeks minimum 3 - 4 *Encarsia formosa*/m² until a sufficient number of whiteflies are parasitized (80 - 90 %).

Eretmix-System

(mix of *Eretmocerus eremicus* & *Encarsia formosa*)



- A mix of *Eretmocerus eremicus* + *Encarsia formosa* (50/50) for the control of the greenhouse whitefly (*Trialeurodes vaporariorum*).
- Curative: As from February introduce during 4 weeks minimum 3 - 4 *Eretmocerus eremicus* + *Encarsia formosa*/m² until a sufficient number of whiteflies are parasitized (80 - 90 %).

Eretmocerus-System

(parasitic wasp - *Eretmocerus eremicus*)



- As from February introduce during minimum 4 weeks min. 2/m² until a sufficient number of whiteflies are parasitized. (80 - 90 %)

Macrolophus-System

(predatory bug - *Macrolophus caliginosus*)



- Preventive:
 - As from February release in 2 introductions minimum 0,5 *Macrolophus*/m².
 - Use Nutrimac for alternative food.
- Curative: (whitefly is observed in the crop)
 - Introduce in 2 to 4 introductions minimum 0,5 – 1 *Macrolophus*/m².
 - Introduce in whitefly hot spots 5 to 10 *Macrolophus*/m².
- Remark:
 - Introduce *Macrolophus* always in the crop, use a Bio-Box for the introduction.
 - Per packing maximum 5 – 10 introduction points.

Nutrimac

(*Ephestia kuehniella*)



- Alternative food for *Macrolophus*.
- Introduce weekly during 2 to 4 weeks a dose of 10 - 20 gram/ha.
- Introduce Nutrimac always in the crop on a protected spot on the leaf.

BIOLOGICAL CONTROL OF LEAFMINER

Dacnusa-Mix-System / Diglyphus-System
(parasitic wasps - 90 % *Dacnusa sibirica* & 10 % *Diglyphus isaea*)



- When the first leafminers are detected, introduce minimum 0,25 *Dacnusa* / *Diglyphus* (90 % - 10 %)/m² per week, until an equilibrium is reached.
- When the leafminer infestation increases, introduce 100 % *Diglyphus* at a dose of minimum 0,1 *Diglyphus*/m²/week during minimum 3 weeks or until a sufficient number of leafminers are parasitized.
- Remark: Samples of the leaf should be tested regularly to determine the percentage of parasitized leafminers. To have a satisfying control, the percentage must be 80 - 90 %.

BIOLOGICAL CONTROL OF CATERPILLARS

Attract[®] pheromone lures



- For the detection of the first moths in the greenhouse.
- Hang minimum 2 **Attract[®]** pheromone lures per ha.
 - ⇒ Hang the **Attract[®]** pheromone lures minimum 50 m from each other to prevent a mixture of the pheromones.
 - ⇒ Replace the pheromone capsules regularly (every 4 weeks).