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## GENERAL

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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.

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## SCOUTING AND MONITORING

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Use yellow Bug-Scan<sup>®</sup> sticky traps for (timely) detection of flying insects. Hang during the heating of the greenhouse min. 20 yellow sticky traps per ha to detect the first flying insects.

Also use yellow Bug-Scan<sup>®</sup> sticky traps during the cultivation. Count and register during **minimum the first 10 weeks** of your cultivation the different kinds of flying insects which are captured on the sticky traps.

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## CONTACT WITH BENEFICIALS AND BUMBLEBEES

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

Introduce beneficials and bumblebees 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.

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## CHEMICAL CORRECTIONS

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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 Effect Manual which is available on [www.biobest.be](http://www.biobest.be).

## BIOLOGICAL CONTROL OF THRIPS

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

(predatory mite - *Amblyseius cucumeris* in breeding sachets)



- Introduce before the plant reaches the suspension wire ( $\pm$  3 weeks after planting or sooner)
- Introduce minimum 4.000 sachets/ha (in total minimum 1 million *Amblyseius cucumeris*/ha).
- **1<sup>st</sup> cultivation:** Introduce minimum 1 sachet per 5 plants when no thrips are detected in the crop. When thrips are detected in the crop, introduce minimum 1 sachet per 3 plants.
- **2<sup>nd</sup> and 3<sup>rd</sup> cultivation:** Introduce minimum 1 sachet per 3 plants.
- **Remark:**
  - Disperse in and around thrips hot spots extra *Amblyseius cucumeris* as sprinkling material.
  - The crop must be 100 % free of harmful residues. If you doubt about the side effects of chemical products, contact your advisor.
- **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.

### Orius-System

(predatory bug - *Orius* spp.)



- **Preventive:** start at the first bloom. Introduce minimum 1 *Orius*/m<sup>2</sup> divided in 2 introductions.
- *Orius* can be useful if max. 2 cultivations occur per year.
- At thrips detection early in the second cultivation: minimum 1 *Orius*/m<sup>2</sup> over the whole greenhouse.

## BIOLOGICAL CONTROL OF WHITEFLY

### Encarsia-System

(parasitic wasp - *Encarsia formosa*)



- Available as sprinkling material and on cards.
- **Preventive:** Introduce 1,5 *Encarsia*/m<sup>2</sup> per week. (3 weeks after planting)
- **Curative:** After detection of whiteflies, introduce minimum 3 *Encarsia formosa*/m<sup>2</sup> until a sufficient number of whiteflies are parasitized (80 - 90 %).
- Introduce in hot spots 5 - 10 *Encarsia*/m<sup>2</sup> per week until an equilibrium is reached.

### Eretmix-System

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



- A mix of *Eretmocerus eremicus* + *Encarsia formosa* (50/50) for whitefly control. (*Trialeurodes vaporariorum*)
- **Curative:** As from February introduce during 4 weeks minimum 3 – 4 *Eretmocerus eremicus* + *Encarsia formosa*/m<sup>2</sup> 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. 3/m<sup>2</sup> until a sufficient number of whiteflies are parasitized. (80 - 90 %)

**BIOLOGICAL CONTROL OF SPIDER MITE****Phytoseiulus-System**(predatory mite - *Phytoseiulus persimilis*)

- Introduce minimum 4 *Phytoseiulus*/m<sup>2</sup> as soon as the first spider mites are detected. The exact amount depends on the severeness of the spider mite infestation.
- In and around hot spots: 20 *Phytoseiulus*/m<sup>2</sup>
- Spread well in the working direction.

**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.
- Introduction: 8 pots/ha 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.

**Californicus-System**(predatory mite - *Amblyseius californicus*)

- Introduce preventively *Amblyseius californicus* on places where spider mites are early expected, minimum 4 predatory mites/m<sup>2</sup>.
- Introduce preventively *Amblyseius californicus* over the whole greenhouse minimum 2 predatory mites/m<sup>2</sup>.

**BIOLOGICAL CONTROL OF APHID****Aphidius-System**(parasitic wasp - *Aphidius colemani*)

- Preventive: Introduce 0,15 *Aphidius colemani*/m<sup>2</sup> per week.
- Curative: As soon as aphids are detected: introduce minimum 0,5 *Aphidius colemani*/m<sup>2</sup> per week, until an equilibrium is reached.
- When there is enough parasitization: introduce minimum 0,15 *Aphidius colemani*/m<sup>2</sup> per week to maintain the balance.
- Disperse *Aphidius* in bioboxes (± 25 boxes/ha).

**Aphidoletes-System**(gall midge - *Aphidoletes aphidimyza*)

- Preventive: Introduce 0,1 *Aphidoletes*/m<sup>2</sup>/week
- Curative: When aphids are detected in the crop, introduce 0,5 – 1 *Aphidoletes*/m<sup>2</sup>/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*)

- Introduce *Aphidius ervi* if *Macrosiphum euphorbiae* (Potato aphid) or *Aulacorthum solani* (Glasshouse potato aphid) are occurring.
- Introduce 2 *Aphidius*/m<sup>2</sup> in and around the hot spots.

**Aphelinus-System**(parasitic wasp - *Aphelinus abdominalis*)

- Introduce *Aphelinus abdominalis* if *Macrosiphum euphorbiae* (Potato aphid) or *Aulacorthum solani* (Glasshouse potato aphid) are occurring.
- Introduce 2 *Aphelinus*/m<sup>2</sup> in and around the hot spots.

**Adalia-System**(ladybird - *Adalia bipunctata*)

- Introduce 50 - 100 *Adalia*-larvae/m<sup>2</sup> in the immediate neighbourhood of aphid hot spots, to support *Aphidius* and *Aphidoletes*.

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## BIOLOGICAL CONTROL OF LEAFMINER

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**Dacnusa-System / Diglyphus-System**(parasitic wasps - *Dacnusa sibirica* & *Diglyphus isaea*)

- Introduce when the first leafminer infestation is detected:

Spring & fall: minimum 0,5 *Dacnusa* / *Diglyphus* (90 % - 10 %) m<sup>2</sup> per week, until an equilibrium is reached.

Summer (or at a higher infestation): introduce 100 % *Diglyphus* in a dose of minimum 0,1 *Diglyphus*/m<sup>2</sup>/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 %.

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## BIOLOGICAL CONTROL OF CATERPILLARS

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### Attract<sup>®</sup> pheromone lures



- Hang 2 catch lamps/ha above the crop, to catch as many *Duponchelia* as possible.
- Hang minimum 2 **Attract<sup>®</sup>** pheromone lures per ha.
  - ⇒ Hang the **Attract<sup>®</sup>** pheromone lures minimum 50 m from each other to prevent a mixture of the pheromones.
  - ⇒ Replace the pheromone capsules regularly (every 4 weeks).