

WHEN USING CHEMICALS,
PLEASE CHECK THEIR
COMPATIBILITY WITH OUR
BENEFICIAL INSECTS ON
OUR WEBSITE
WWW.BIOBEST.BE



CROP SHEET

STRAWBERRY



IPM strategy for strawberries

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STRAWBERRY



Why developing integrated pest management for your strawberry crop?

Strawberries are a healthy food, because it contains antioxidants. To meet the consumer's requirements, pesticide residues present in the fruit must be reduced. The use of beneficial organisms, which is part of an integrated pest strategy (IPM), will allow you to effectively limit the residues in your strawberry crops and bring you the following benefits:

- ✓ Your product will be of better quality. A plant receiving less chemicals will give a better return and a better fruit quality.
- ✓ Since you will reduce the number of applications of chemicals, the cultivation of your plants will be safer for the workers and, therefore, for the consumer with regard to the level of pesticide residues.
- ✓ The use of beneficial organism generally requires less labour ; once the insects have been released on the crop, they will work for you.
- ✓ These beneficials are the ideal tool to initiate pest control against resistant pests, allowing you to limit their presence in your crop in a sustainable manner.
- ✓ You can use the IPM strategy as a marketing tool.
- ✓ If you use pollination, the reduction in the number of sprays of chemicals will protect the bumblebees and increase their activity.

Advice

This leaflet is a tool intended to explain growers of our products what they can use against each pest present in their strawberry crops. The advice is based on a general strategy for areas with a temperate climate, and may vary from you specific situation. Contact your advisor to discuss an appropriate strategy to your conditions.

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Strawberry hive



Multi-Hive

Advantages of pollination by bumblebees

- ✓ increase the number of harvested fruits
- ✓ less deformed fruits will appear
- ✓ they are active at low temperatures and low light intensities
- ✓ they are not aggressive & they less suffer from orientation problems compare to honeybees.
- ✓ 1 bumblebee need to visit 4 to 5 times a flower while the honeybees need at least 15 times



How to use them?

For glass greenhouses : 1 (or 2) strawberry hives/ 1.000 m² (depending on the amount of flowers)

For plastic greenhouses: 1 (or 2) strawberry hives/ 1.000 m² (depending on the amount of flowers)

For tunnels:

- ✓ tunnels 50 m : 1 mini-hive
- ✓ tunnels 70 m : 1 strawberry hive
- ✓ tunnels >100 m : 2 strawberry hives

Change the hives every 6-8 weeks in everbearing varieties.

How to check pollination activity?

This intensity of pollination can be checked by the brown discoloration of the pistils. If the pistils are not pollinated, they remain yellowish green and the stamens are full of pollen. When the flowers are regularly visited by bumblebees, the petals base turn brown and then they fall after fecundation.

When the pistils do not totally turn brown within 5 days, it is possible that the fruit will not fully grow.



Not pollinated flower



Pollinated flower

THRIPS



The dosage are based on a standard advice, please check with your advisor to discuss the strategy adapted to your situation

Pest



Larvae



Pré-pupa

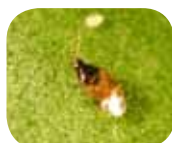


Adult

Damages



Beneficial insects



Orius-System (*Orius laevigatus* or *Orius majusculus*)

Preventive only: 0,5 to 1,5 ind/m² in 2 releases, 1 or 2 weeks interval.



Amblyseius-System or **Amblyseius-Breeding-System**

Preventive: 100 to 300 ind/m² or 1 ABS*/2 lm



Swirskii-Breeding-System or **Swirskii-System** (*T. swirskii*)

Preventive: 1 SBS*/2 lm or 20 to 50 ind/m²

Curative: 1 SBS/2 lm or 150 ind/m²



Thripser

Preventive or curative:

1 dispenser/100 m²

Change dispenser every 4 to 6 weeks

* SBS = Swirskii-Breeding-System; ABS= Amblyseius-Breeding-System; lm = linear meter

Scouting & monitoring



Thrips is a difficult pest to observe and scout. Bug-Scan B (blue sticky traps) are an excellent tool to help you detect the presence of the pest and evaluate its population densities.

This pest is very well attracted to our blue color and it is possible in case of an extreme situation to monitor intensively adults by the use of Bug-Scan B or Bug-Scan Roll B (blue roll trap) traps at high dosage. Our blue has been selected to be less attractive for *Orius* and gets slower dirty than dark blue.

Dosage:

- 20-40 Bug-Scan B/ha
- 1 Bug-Scan B/2 to 4 lm or unroll the Bug-Scan Roll B above the crop vertically, (for intensive monitoring)

SPIDER MITE



The dosage are based on a standard advice, please check with your advisor to discuss the strategy adapted to your situation

Pest



Nymph



Adult



Webbing

Damages



Beneficial insects

**Feltiella-System (*Feltiella acaridius*)**

Preventive : 2 pots/every 2 weeks

Curative : 5 to 6 pots/ha once

Need high humidity

1 pot= 250 pupae

**Phytoseiulus-System (*P. persimilis*)**

Curative generalized: 4-6 ind/m²

every week during 3 weeks consecutive

Curative hot spots: 1.000 ind in hot spots (depending on the amount of spider mites)

**Californicus-System or****Californicus-Breeding-System (*N. californicus*)**

Preventive: 1 CBS*/2 lm or 20 ind/m²

Curative : 50 à 60 ind./m² (focus on hot spots)

* CBS = Californicus-Breeding-System; lm = linear meter

Scouting & monitoring



Flying insects are not spider mites and are located under the leaves. We recommend to monitor 100 leaves/ha homogenously and scout mobile stages with your magnifier. Use Biobest Signal Clip-System® as a tool to indicate the hot spots. Each colour represents a certain pest. Use the red Signal Clip to indicate spider mites spots.

APHIDS



The dosages are based on a standard advice, please check with your advisor to discuss the strategy adapted to your situation

Pest



Chaetosiphon



A. gossypii



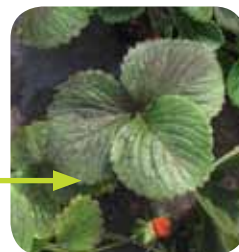
Rhodobium (INVENIO)



Macrosiphum spp. (INVENIO)

Note: The number of aphid species in strawberries is huge therefore we only present the 2 most common one.

Damages



Beneficial insects

Aphi-Mix-System or Aphidius-Mix-System: different mixes of parasitoids*

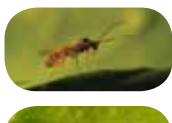
Preventive: 0,25 to 1,5 ind./m²



Aphidius-System (*A. colemani*)
for *Aphis gossypii* & *Myzus sp.*
Curative: 0,25 to 1,5 ind/m²



Adalia-System (*A. bipunctata*)
Curative: 10 to 20 ind/m²
(concentrate on hot spots)



Ervi-System/Aphelinus-System
(*A. ervi* or *A. abdominalis*)
for *Rhodobium porosum*, *Macrosiphum sp.*
Aulacorthum solani, *Acyrtosiphon malvae*
for the last one, only *A. ervi*
Curative : 0,25 to 1,5 ind/m²



Aphidoletes-System (*A. aphidimiza*)
Not compatible with *Swirskii*
Preventive: 0,25 ind/m²
Curative: repeat between 2 to 4 times depending on the pressure of the pest



Matricariae-System (*A. matricariae*)
for *Aulacorthum*, *Aphis sp.* & *Myzus sp.*
Curative: 0,25 to 1,5 ind/m²



Chrysopa-System (*C. carnea*)
Curative: 5 to 10 ind/m²
(focus the release on hot spots)

* ask your advisor to know which mix of parasitoids would be the most adapted to your conditions

Scouting & monitoring



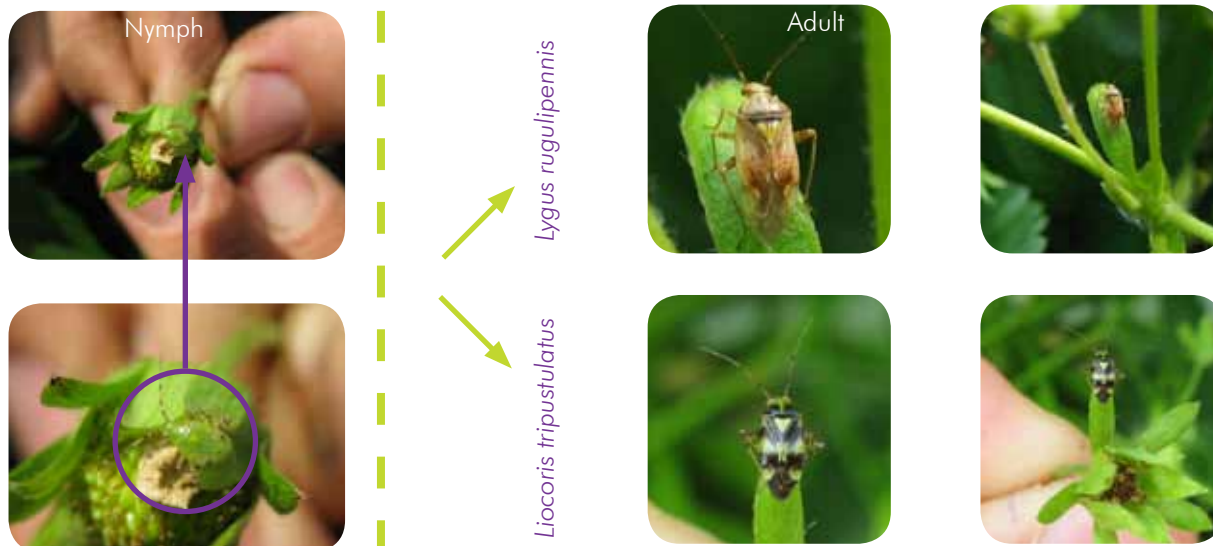
Aphids are flying and crawling insects and the base of the monitoring consist in checking 100 plants/ha to detect their presence. Ants make easier the detection of aphids but on the other hand, they protect it from beneficial insects. Use Biobest Signal Clip® as a tool to indicate the hot spots. Each colour represents certain pests. Use the green colour to indicate aphids spots. Use Bug-Scan Y (yellow sticky traps) to detect winged aphids.
Dosage 20-40 Bug-Scan Y/ha

PLANT BUGS



The dosage are based on a standard advice, please check with your advisor to discuss the strategy adapted to your situation

Damage



Damages



Beneficial insects

Actually, there is no biological control available against this pest. Use chemical control. Contact your advisor to discuss an appropriate strategy with selective and compatible chemicals.

Scouting & monitoring



The monitoring consists in tapping the plants on a white surface (textile) and scout all mobile stages of plant bugs.

The threshold is normally very low, because of the risk of fruitdamage.

BROAD MITES



The dosage based on a standard advice, please check with your advisor to discuss the strategy adapted to your situation

Pest



Damages



Beneficial insects



Californicus-System (*N. californicus*)
Curative: 50 to 200 ind/m² on hot spots
 repeate 2 or 3 times at one week interval



Amblyseius-System (*A. cucumeris*)
Curative: 100 to 300 ind/m²
 spots (more adapted to temperate
 climate) and repeate 2 or 3 times
 at one week interval



Swirskii-Breeding-System (*T. swirskii*)
Curative: 50 to 200 ind/m² on hot spots
 and repeate 2 or 3 times at one week interval

Scouting & monitoring



Broadmites are tiny mites, transparent color and you need the use of a 15x-20x magnifier or binocular to observe them. Most of the time, they are located on the heart of the plant or on buds. The monitoring is based on the detection of the symptoms. Mark the hot spots with a purple signal clip. It is recommended to use a selective and short persistant chemical at the beginning of the crop season or ones the first hot spot is detected, prior to the release of beneficials. Contact you advisor to discuss an appropriate strategy.