COMMISSIE
COGEM
GENETISCHE
MODIFICATIE

BEZOEKADRES:
A. VAN LEEUWENHOEKLAAN 9
3721 MA BILTHOVEN

POSTADRES:
POSTBUS 578
3720 AN BILTHOVEN

TEL.: 088 689 2777
INFO@COGEM.NET
WWW.COGEM.NET

The Minister for the Environment and Public Transport
Ministry of Infrastructure and Water Management
Mr Ch.A. Jansen
P.O. Box 20901
2500 EX The Hague

**DATE** 11 March 2025
**REFERENCE** CGM/250311-02
**SUBJECT** Advice on containment measures for activities involving arthropod biological control agents

Dear Mr Jansen,

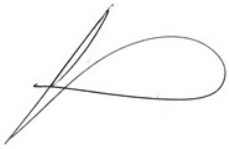
Based on previous advisory reports on activities involving biological control agents in greenhouses containing genetically modified (GM) plants, COGEM decided to draw up generic containment measures for activities involving arthropod biological control agents. Accordingly, COGEM informs you of the following.

**Summary:**
Biological control agents may be introduced into greenhouses and growth chambers where genetically modified (GM) plants are grown to protect the plants against pests. Adequate containment measures should be observed to prevent biological control agents from escaping, as they may be carrying pollen from the GM plant and subsequently come into contact with a crossable relative of the GM plant outside the greenhouse.

In previous advisory reports on containment measures to be taken when specific arthropod biological control agents are used in greenhouses, different containment measures were advised depending on the characteristics of the biological control agent. To simplify and streamline licence applications for new biological control agents, COGEM has drawn up a set of generic measures based on three characteristics of these arthropods: their capacity for flight, their size, and whether they can come into contact with pollen. Also, an overview of all the arthropod biological control agents in general use and the containment measures required for their release into a PKb-I research greenhouse containing flowering GM plants was prepared. If biological control agents are used in a PKb-I greenhouse containing GM plants that are not found in the Netherlands, do not have any crossable relatives here, or do not flower, no additional measures are necessary because the risk of outcrossing in these situations is negligible.

The attached report contains COGEM's advice and a discussion of the underlying reasoning.

Yours sincerely,



Professor Sybe Schaap
Chair of COGEM

c.c.
- Drs. Y. de Keulenaar, head of the GMO Office
- Environmental Safety and Risks Directorate, Directorate-General for the Environment and International Affairs, Ministry of Infrastructure and the Environment

# Advice on generic containment measures for activities involving arthropod biological control agents in PKb-I research greenhouses

## COGEM Advisory Report CGM/250311-02

### 1. Introduction

In the past five years, COGEM has issued advice on containment measures for 27 different biological control agents that are used in PKb-1 research greenhouses, where work with flowering genetically modified (GM) plants may be conducted. Containment measures are required when biological control agents are used, as some biological control agents, such as hoverflies, heteropterans, and mites, can act as pollinators.[1,2,3]

Under the Ministerial Regulation on Genetically Modified Organisms (GMO Regulation), facilities at containment level PKb-I must not contain pests and flying insects that are not part of the experiment (Annex 9, Article 9.1.3.2.2h), and flying insects that are included in the experiment must be kept in a sealed compartment to prevent them from escaping (Annex 9, Article 9.1.3.2.2i).[4,5] An exception is made for a few biological control agents, on the condition that a number of additional containment measures are implemented (Annex 9, Article 9.1.3.2.3.4).[4] This provision of the Regulation takes no account of the species of GM plants used. For this reason, when biological control agents are used, a 'worst-case scenario' is assumed in which a GM plant flowers, which means that containment measures are required under Annex 7 of the GMO Regulation because of the risk of outcrossing with plants outside the greenhouse.[6]

Because in the past species-specific containment measures were advised for different biological control agents, a plethora of containment measures has arisen. However, several biological control agents may be released into a greenhouse simultaneously which would require different containment measures for each control agent or result in unnecessary stacking of measures. This advice presents the results of COGEM's investigation into the possibility of setting generic containment measures for different categories of biological control agents.

Regarding the use of nematodes and microbial preparations (bacteria, fungi, or viruses) as biological control agents, COGEM has previously observed that these cannot distribute pollen and so no additional containment measures are needed when such preparations are used.[7] This present advice therefore concerns only the use of arthropods as biological control agents.

### 2. Background to the use of biological control agents in the presence of flowering GM plants

Pests are sometimes found in greenhouses containing GM plants. The GMO Regulation (9.1.3.2.2h) requires that these are controlled.[4] The use of chemical pesticides to control pests can be undesirable, for example because of side-effects on the plants or because of their limited effectiveness. Besides, some chemical control agents are no longer available. In such cases, biological control agents can be a

solution, as they are natural enemies of pest organisms on the plants. Biological control agents are also used as a precautionary measure to prevent pest infestations.

When biological control agents are used in greenhouses containing GM plants, there is a risk of pollen from the GM plants adhering to the body of a biological control agent which, if it escapes, could spread the pollen outside the greenhouse. To prevent biological control agents carrying pollen to flowers of a crossable relative outside the greenhouse, containment measures are necessary to prevent the biological control agent escaping from the greenhouse. The type of containment measures needed depends on the characteristics of the biological control agent concerned.

**3. Previous COGEM advice**

In the past, COGEM has commissioned research into the use of biological control agents during work with GM plants in greenhouses.[8,9] This research revealed that some biological control agents can come into contact with pollen and could spread it.

In 2020, COGEM advised on the PKb-I level containment measures required for several biological control agents: the predatory heteropterans *Macrolophus pygmaeus* and *Orius laevigatus*; the gall midge *Feltiella acarisuga*; the predatory mites *Stratiolaelaps scimitus, Phytoseiulus persimilis, Neoseiulus californicus, Amblydromalus limonicus* and *Amblyseius swirskii*; and the parasitoid wasps *Encarsia formosa* and *Eretmocerus eremicus*. COGEM was of the opinion that the parasitoid wasps *E. formosa* and *E. eremicus*, and the predatory mites *S. scimitus* and *P. persimilis*, could be released into PKb-I greenhouses – irrespective of the plant species in the greenhouse – without the need for additional containment measures. For the other species, COGEM advised the use of several general and species-specific containment measures.[10,12]

In 2022, COGEM issued advice on the containment measures for activities involving the use of these biological control agents in growth chambers (PC-I).[11,12,13,14] In addition, COGEM has issued advice on containment measures for the following biological control agents: the parasitoid wasps *Aphidius colemani*, *Aphidius ervi*, *Aphelinus abdominalis*, *Praon volucre*, *Trichogramma achaeae,* and *Ephedrus cerasicola*; the predatory mites *Neoseiulus cucumeris*, *Transeius montdorensis,* and *Macrocheles robustulus*; the gall midge *Aphidoletes aphidimyza* (including a revision of the containment measures for the gall midge *F. acarisuga*); the mite *Carpoglyphus lactis;* and the nematodes *Steinernema carpocapsae* and *Steinernema feltiae*.[11,12,13,14,7] Additional containment measures were not considered necessary for the predatory mite *M. robustulus* and the fruit mite *C. lactis*. COGEM noted that nematodes (including *Steinernema carpocapsae* and *Steinernema feltiae*), fungi, bacteria, and viruses used as biological control agents cannot spread pollen.[7,15f]

In 2024, COGEM issued advice on containment measures for the biological control agents *Chrysoperla carnea* (common green lacewing), *Franklinothrips vespiformis* (vespiform thrips), and *Cryptolaemus montrouzieri* (mealy ladybird).[16]

## 4. Considerations

The risk of GM pollen being spread by biological control agents is assessed based on three important characteristics of arthropods: their potential for coming into contact with pollen, their capacity for flight, and their size. These characteristics were linked to measures previously advised by COGEM and used to draw up generic containment measures for each category of biological control agent. The following sections describe how each characteristic can influence the likelihood that a biological control agents could spread pollen outside the greenhouse, further define these characteristics, and outline the containment measures that are required for each characteristic.

COGEM points out that the risk of outcrossing involves more factors than just the possibility of the biological control agent to transpor pollen. Other contributing factors include the amount of pollen that is transported, the distance to a crossable plant outside the greenhouse, the survival of the pollen and competition with native pollen, as well as the population density and size of the biological control agent.

### *4.1 Possibility of spreading transgenic material from GM plants*

For the containment of GM plants, it is important to avoid spread of transgenic material, such as reproductive parts of the plant, seeds, or pollen, to prevent the possibility of outcrossing.

A biological control agent mentioned in Article 9.1.3.2.3.4 of the GMO Regulation[4] may be used in combination with any of the GM plants mentioned in Annex 7 of the GMO Regulation. Annex 7 lists a wide variety of plant species, a number of which are not found in the Netherlands or have no crossable relatives in the Netherlands. For GM plants that are not found in the Netherlands, the environmental risk of a biological control agent spreading pollen outside the greenhouse is considered negligible. Where experiments involve non-flowering GM plants, the environmental risk associated with the use of biological control agents on these GM plants is also negligible.

### *4.2 Contact with pollen*

Arthropods that do not come into contact with pollen present no risk of pollen spread and therefore of spreading transgene sequences from the GM plant. As such, no additional containment measures are needed when these arthropods are used as biological control agents.

However, for biological control agents that do come into contact with pollen, measures are needed to ensure that they do not carry this pollen to crossable relatives outside the greenhouse. Many arthropods consume nectar or pollen as secondary food sources and are therefore capable of pollinating flowers, even if they are not primary pollinators.[1,2,3] Pollen from different plant species have different characteristics, some of which make pollen more likely to be transported by arthropods.[17]

Arthropods that consume pollen or nectar as their main or supplementary food source are likely to come into contact with pollen. This likelihood increases if biological control agents exhibit behaviours

that bring them close to pollen, for example during egg laying. Additionally, biological control agents are considered likely to come into contact with pollen when their prey exhibit any of these behaviours.

### *4.3 Capacity for flight*

Three categories of capacity for flight are identified: arthropods with true flight, arthropods that can be passively transported by air currents, and arthropods that can only move by walking.

In this advice, true fliers are defined as arthropods with wings capable of covering a distance of several metres or more under their own power in a single flight. These arthropods are more likely to escape through open doors but are also able to fly to a suitable trap.

Small arthropods, such as mites and thrips, can easily be carried along by air currents due to their size-to-weight ratio, a phenomenon known as passive flight.[18] This allows them to disperse through greenhouses more easily than non-fliers, although they cannot actively direct the course of their flight towards traps or exits. Some species, especially arachnids, produce silk threads to aid movement by air currents, also called ballooning.[19,20]

It can be assumed that arthropods that have no (working) wings and are too heavy to be transported by air currents are unable to move by air.[21]

### *4.4 Size of the biological control agent*

Smaller arthropods are less easy to see during work in the greenhouse, increasing the risk that they may be inadvertently carried out on greenhouse workers or researchers. In addition, there is a higher risk of small arthropods escaping through cracks and gaps in the greenhouse structure. In this advice, 'small' biological control agents are defined as being no more than 2 mm in size in the most mobile stages of their lifecycle.

## 5. Advice

### *5.1 Use of biological control agents in the absence of pollen or crossable relatives*

Several conditions have been identified under which the use of biological control agents in greenhouses containing GM plants may entail a risk of transgenic pollen spread:

- the GM plant species is found in the Netherlands or has crossable relatives in the Netherlands;
- the GM plant flowers in the greenhouse.

If these conditions are not met, COGEM is of the opinion that no additional containment measures are needed when using biological control agents.

### *5.2 Measures for arthropods that come into contact with pollen*

COGEM considers that several general measures are needed for the use of all arthropods that come into contact with pollen. It is important to prevent these arthropods from being carried out of the greenhouse on workers and researchers. This is why white work clothes without outside pockets must

be worn in the greenhouse and left in the antechamber upon leaving. The doors to the antechamber and the greenhouse must not be open simultaneously, to prevent a direct passage between the interior of the greenhouse and the outside environment. Door brushes must be fitted beneath the doors to prevent arthropods from crawling out. When the experiment comes to an end, the biological control agents must be destroyed.

#### 5.2.1 *Measures for flying arthropods*

With flying insects there is a risk of them escaping of the containment area through the antechamber. It is therefore necessary to instal insect netting between the greenhouse and the antechamber, with a mesh size appropriate to the biological control agent being used. However, if the flying insect is classified as small (see section 5.2.2), insect netting is not necessary. This is because when small biological control agents (<2 mm) are present on insect netting they can easily be overlooked, and so may be transported outside on the clothes of a research worker when walking through the netting. If both small and larger flying insects are used together, the use of insect netting is advised. To prevent flying biological control agents from escaping, sticky traps should be installed in the antechamber. Electronic or attractant traps may also be used if they are appropriate for the biological control agent being used.

These containment measures are not necessary when using arthropods that are capable of passive flight only or cannot fly at all.

#### 5.2.2 *Measures for small arthropods*

Because small arthropods (≤2 mm) are less easily seen by greenhouse workers, it is important that measures are taken to prevent biological control agents inadvertently being carried out of the greenhouse. To minimise this risk, greenhouse workers should wear overshoes as well as white clothing without outside pockets. In addition, as greenhouses are not routinely equipped to contain small arthropods, all joints and structural seams and cracks should be sealed to prevent escape of small biological control agents. Also, the insect netting covering ventilation openings of PKb-I greenhouses should have a mesh size small enough to obstruct arthropods. As a guideline, the mesh size should be no greater than the thorax width of the organism.[22] To ensure that small insects cannot move through the greenhouse door from different angles, COGEM advises fitting draft strips in the door frame rebates.

## 6. Conclusion

If flowering GM plants are grown in a greenhouse and native or crossable relatives are present in the Netherlands, there is a risk of introduction of transgene sequences into the environment via GM pollen carried by biological control agents that fertilize flowers outside the greenhouse. In such cases, the risk of biological control agents escaping must be assessed. In all other cases, the use of biological control agents in combination with GM plants do not pose an environmental risk and can be used without containment measures.

The characteristics of the biological control agent determine its likelihood of coming into contact with pollen from a flowering GM plant and its potential to escape out of the greenhouse. Its characteristics also guide the selection of appropriate additional containment measures to prevent escape.

In this advice, COGEM has set out which characteristics determine the specific additional containment measures that are necessary to prevent the spread of GM pollen by a biological control agent.

For all biological control agents that may come into contact with pollen, COGEM advises that the following measures are taken:

a) Biological control agents must be destroyed at the completion of the experiments.
b) The doors to the antechamber and the greenhouse must not be open simultaneously.
c) White work clothing without outside pockets must be worn, which must be left in the antechamber upon leaving the greenhouse.
d) Door brushes must be fitted beneath the greenhouse doors.

When flying arthropods are used, COGEM advises implementing the following additional measures:

e) If the arthropods are 2 mm or larger, the inside of the entrance to the greenhouse space must be fitted with insect netting.
f) The antechamber must contain sticky traps or other traps appropriate to the biological control agent being used.

When working with small arthropods, COGEM advises taking the following additional measures:

g) Overshoes must be worn and left in the greenhouse.
h) Cracks and joints in the greenhouse structure must be sealed.
i) Draught strips must be fitted to the sides and top of door frame rebates.

Table 1 lists COGEM's assessment of the potential for contact with pollen, the capacity for flight and the size of the most commonly used arthropod biological control agents.

**7. Additional observations**

Many biological control agents are supplied with food mites to ensure their survival if the supply of pest insects is (temporarily) insufficient. Because food mites may also spread pollen, their use is permitted only if they are included in Article 9.1.3.2.3.4 of the GMO Regulation.[4] However, food mites are often supplied with the biological control agent without this being mentioned on the packaging. Users should therefore be aware that in certain cases food mites may be present in packages containing biological control agents. If these food mites are not included in the GMO Regulation, authorization must be obtained prior to their use. If they are already included in the GMO Regulation, the containment measures for the species must be followed.

Table 1a. Overview of biological control agents in general use with the measures advised by COGEM, listed in alphabetical order.

| Order | Family | Species name | Comes into contact with pollen | Capacity for flight | Size | Required measures | Previous measures |
|---|---|---|---|---|---|---|---|
| Thysanoptera | Aeolothripidae (thrips) | *Franklinothrips vespiformis* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | *a,b,c,d,f,g,h,i* |
| Acari | Phytoseiidae (predatory mites) | *Amblydromalus limonicus* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Amblyseius andersoni* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | - |
| | | *Amblyseius swirskii* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Iphiseius degenerans* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | |
| | | *Neoseiulus californicus* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Neoseiulus cucumeris* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Phytoseiulus persimilis* | *no* | *passive flight* | *small* | - | - |
| | | *Transeius montdorensis* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | Laelapidae (predatory mites) | *Stratiolaelaps scimitus* | *no* | *passive flight* | *small* | - | |
| | Macrochelidae (predatory mites) | *Macrocheles robustulus* | *no* | *passive flight* | *small* | - | |
| Hemiptera | Anthocoridae (minute pirate bugs) | *Anthocoris nemoralis* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Orius laevigatus* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | *a,b,d,f,g,h,i* |
| | | *Orius majusculus* | *yes* | *true flight* | | *a,b,c,d,e,f* | - |
| | Miridae (capsid bugs) | *Dicyphus errans* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Macrolophus pygmaeus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Nesidiocoris tenuis* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Pentatomidae (shield bugs) | *Podisus maculiventris* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Neuroptera | Chrysopidae (lacewings) | *Chrysoperla carnea* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,c,e,f* |
| | | *Chrysoperla lucasina* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Hemerobiidae (brown lacewings | *Micromus angulatus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Coleoptera | Coccinellidae (ladybirds) | *Adalia bipunctata* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Cryptolaemus montrouzieri* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,c,e,f* |

| Order | Family | Species name | Comes into contact with pollen | Capacity for flight | Size | Required measures | Previous measures |
|---|---|---|---|---|---|---|---|
| | | *Delphastus catalinae* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Exochomus quadripustulatus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Propylea quatuordecimpunctata* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Rhyzobius forestieri* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Rhyzobius lophanthae* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Coleoptera | Staphylinidae (rove beetles) | *Dalotia coriaria* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Diptera | Syrphidae (hoverflies) | *Episyrphus balteatus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Eupeodes corollae* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Sphaerophoria rueppellii* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Cecidomyiidae (gall midges) | *Aphidoletes aphidimyza* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Feltiella acarisuga* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| Hymenoptera | Aphelinidae (parasitoid wasps) | *Aphelinus abdominalis* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Coccophagus scutellaris* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | | *Encarsia formosa* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | - |
| | | *Eretmocerus eremicus* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | - |
| | Braconidae (braconid parasitoid wasps) | *Aphidius colemani* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Aphidius ervi* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Aphidius matricariae* | *yes* | *true flight* | | *a,b,c,d,e* | |
| | | *Ephedrus cerasicola* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Dacnusa sibirica* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Praon volucre* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | Encyrtidae (parasitoid wasps) | *Anagyrus vladimiri* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | | *Encyrtus aurantii* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Metaphycus flavus* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | | *Microterys nietneri* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Trichogrammatidae (parasitoid wasps) | *Trichogramma achaeae* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | *a,b* |
| | | *Diglyphus isaea* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Scelionidae (parasitoid wasps) | *Trissolcus basalis* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | Torymidae (parasitoid wasps) | *Torymus sinensis* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |

Table 1b. Overview of biological control agents in general use with the measures advised by COGEM, listed by containment measure.

| Order | Family | Species name | Comes into contact with pollen | Capacity for flight | Size | Required measures | Previous measures |
|---|---|---|---|---|---|---|---|
| Acari | Laelapidae (predatory mites) | *Stratiolaelaps scimitus* | *no* | *passive flight* | *small* | - | - |
| | Macrochelidae (predatory mites) | *Macrocheles robustulus* | *no* | *passive flight* | *small* | - | - |
| | Phytoseiidae (predatory mites) | *Phytoseiulus persimilis* | *no* | *passive flight* | *small* | - | - |
| | | *Amblyseius andersoni* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | |
| | | *Iphiseius degenerans* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | |
| | | *Amblydromalus limonicus* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Amblyseius swirskii* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Neoseiulus californicus* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Neoseiulus cucumeris* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| | | *Transeius montdorensis* | *yes* | *passive flight* | *small* | *a,b,c,d,g,h,i* | *a,b,c,f,g* |
| Thysanoptera | Aeolothripidae (thrips) | *Franklinothrips vespiformis* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | *a,b,c,d,f,g,h,i* |
| Hymenoptera (parasitoid wasps) | Trichogrammatidae | *Trichogramma achaeae*[b] | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | *a,b* |
| | Aphelinidae | *Encarsia formosa*[a] | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | - |
| | | *Eretmocerus eremicus*[a] | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | - |
| | | *Coccophagus scutellaris* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | Encyrtidae | *Anagyrus vladimiri* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | | *Metaphycus flavus* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | | *Coccophagus scutellaris* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | Scelionidae | *Trissolcus basalis* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | Torymidae | *Torymus sinensis* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| | | *Coccophagus scutellaris* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | |
| Hemiptera | Anthocoridae | *Orius laevigatus* | *yes* | *true flight* | *small* | *a,b,c,d,f,g,h,i* | *a,b,d,f,g,h,i* |

| Order | Family | Species name | Comes into contact with pollen | Capacity for flight | Size | Required measures | Previous measures |
|---|---|---|---|---|---|---|---|
| | (minute pirate bugs) | *Anthocoris nemoralis* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Orius majusculus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Miridae (capsid bugs) | *Dicyphus errans* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Macrolophus pygmaeus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Nesidiocoris tenuis* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Pentatomidae (shield bugs) | *Podisus maculiventris* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Neuroptera | Chrysopidae (lacewings) | *Chrysoperla carnea* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,c,e,f* |
| | | *Chrysoperla lucasina* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Hemerobiidae (brown lacewings) | *Micromus angulatus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Coleoptera | Coccinellidae (ladybirds) | *Adalia bipunctata* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Cryptolaemus montrouzieri* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,c,e,f* |
| | | *Delphastus catalinae* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Exochomus quadripustulatus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Propylea quatuordecimpunctata* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Rhyzobius forestieri* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Rhyzobius lophanthae* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Coleoptera | Staphylinidae (rove beetles) | *Dalotia coriaria* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| Diptera | Syrphidae (hoverflies) | *Episyrphus balteatus* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Eupeodes corollae* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Sphaerophoria rueppellii* | *yes* | *true flight* | | *a,b,c,d,e,f* | |

| Order | Family | Species name | Comes into contact with pollen | Capacity for flight | Size | Required measures | Previous measures |
|---|---|---|---|---|---|---|---|
| | Cecidomyiidae (gall midges) | *Aphidoletes aphidimyza* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Feltiella acarisuga* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| Hymenoptera | Aphelinidae | *Aphelinus abdominalis* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | Braconidae (braconid parasitoid wasps) | *Aphidius colemani* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Aphidius ervi* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Ephedrus cerasicola* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Praon volucre* | *yes* | *true flight* | | *a,b,c,d,e,f* | *a,b,f* |
| | | *Aphidius matricariae* | *yes* | *true flight* | | *a,b,c,d,e* | |
| | | *Dacnusa sibirica* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Encyrtidae | *Encyrtus aurantii* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | | *Microterys nietneri* | *yes* | *true flight* | | *a,b,c,d,e,f* | |
| | Trichogrammatidae | *Diglyphus isaea* | *yes* | *true flight* | | *a,b,c,d,e,f* | |

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