

## Powerful Dual Action Biological Insecticide for Codling Moth & Oriental Fruit Moth

### Target pest

For the combined control of

- Codling moth (*Cydia pomonella*)
- Oriental fruit moth (*Grapholita molesta*; *Syn. Cydia molesta, Laspeyresia molesta*)

### Crops

Stone fruit and pome fruit.

### Formulation

Suspension concentrate containing  $> 3 \times 10^{13}$  OB (occlusion bodies) of *Cydia pomonella granulovirus* per litre.

### Standard dosage

100 ml/ha (hectare).

### Timing

At hatching of first larvae. Acts by ingestion.

### Water volume

200 – 1600 L/ha. This should be adjusted according to leaf area index and spraying equipment.

### Standard interval between sprays

Repeat after 8 days of full sunshine. This can be modified depending on the specific pest control strategy.

### Withholding period (WHP) and re-entry period (RP) restriction

Leaves no residues. No WHP or RP restrictions apply to GRANDEX so it is safe to use right up to harvest.

### Toxicity profile

No maximum residue levels (MRLs) are defined. Contains no chemical ingredients and leaves no residues on the crop.

Complies with both domestic and international organic farming standards.

No side effects on non-target organisms.

### Compatibility

Compatible with most insecticides, fungicides and fertilizers. A pH level between 5 and 8.5

in the tank mix has to be respected. Avoid tank mixes with copper if possible. Spray a few days before or after a copper spray.

### Storage

Storage stability: > 2 years at  $-18^{\circ}\text{C}$ , 2 years at  $5^{\circ}\text{C}$ , 3 months at  $20^{\circ}\text{C}$ . Avoid temperatures above  $40^{\circ}\text{C}$ .

### Rainfastness

Good rain resistance 3 to 4 hours after spraying.



## High selectivity and safety

The active substance of GRANDEX is a *Cydia pomonella* granulovirus (CpGV) that was selected on an oriental fruit moth population. These viruses belong to the family of insect pathogen baculoviruses that occur naturally in lepidopteran species.

- GRANDEX causes no phytotoxic symptoms on plants after application.
- The formulation only contains food grade additives; therefore the use of GRANDEX does not leave any chemical residues, making it suitable for low residue or organic food production.
- No maximum residue levels (MRLs) are defined for GRANDEX.
- The product is free of genetically modified organisms.
- Baculoviruses are safe and cause no hazards to human health (OECD Consensus paper, 2002)

## No side effects

GRANDEX preserves natural antagonists due to its specific host range. Aquatic species, birds, beneficial insects, mammals and bees are not affected.

## Rainfastness

Virus particles naturally have lipophilic properties, favouring a strong adherence to the plant surface. GRANDEX is rain resistant within 3 to 4 hours of application. No additives are necessary to improve rainfastness.

## Use of adjuvants

GRANDEX is ready to use. It is thus not necessary to add feeding stimulants, surfactant/wetting agents or other adjuvants. However under some circumstances where an adjuvant may be required we recommend Synertrol Horti Oil.

## Mode of action

Young larvae that are actively moving and feeding on twigs, leaves or fruits will ingest the virus that was sprayed onto the plant surface. Following ingestion, the virus particles enter the larval midgut, where the protein capsules dissolve due to the high pH level (pH higher than 10). **Within 2 – 4 days, the viruses infest most organs of the host and the larva stops feeding.** Upon

death, the larval body liquefies and releases millions of new viruses into the environment, infecting other larvae.



Codling moth larva infected by granulovirus.

## General instructions

**For best crop protection, the first GRANDEX spray is applied right before first egg hatch, and before the larvae enter the fruit.** Use local forecast system (based on phenology models) if available.

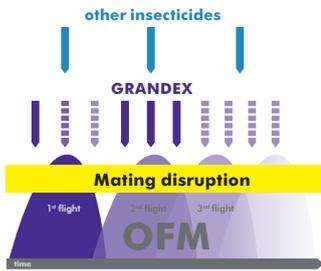
On sites with very high pest densities, it is recommended to combine fast acting larvicides at the peak of larval hatching, in order to keep superficial and stopped damage low. GRANDEX reduces the overall population on a long term basis.

**As viruses are sensitive to UV radiation and especially stone fruit trees have a strong vegetative growth, sprays must be repeated at an interval of 8 days of full sunshine to assure a constant coverage** (2 partly sunny days are equal to one sunny day) during the larval hatching period. Application in the late afternoon or early evening hours is recommended.



## Strategy for the control of OFM and CM

### Control of OFM in stone fruit



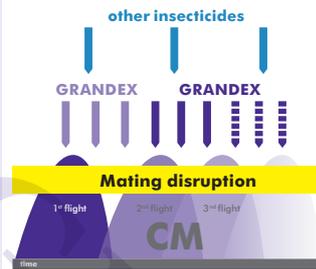
#### Application timing

- First application: at hatching of larvae in 1st or 2nd OFM generation
- Repeat every 8 days of full sunshine

#### Application rate

- 100 ml/ha

### Combined control of CM and OFM migrating to pome fruit



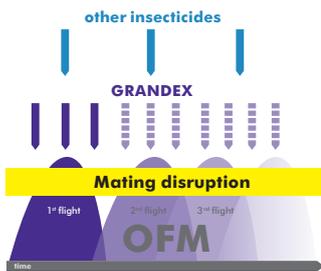
#### Application timing

- If other insecticides are used, GRANDEX should be placed preferably during the 1st OFM and CM generation or at the beginning of every generation

#### Application rate

- 100 ml/ha every 8 days of full sunshine (standard)

### Combined control of CM and OFM with entire life cycle on pome fruit



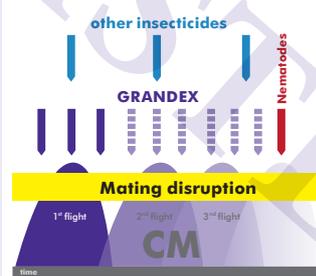
#### Application timing

- Right before egg-hatching of 1st OFM generation (target stage majority eggs)
- If other insecticides are used, GRANDEX should be used preferably during the 1st OFM and CM generation or focused at the beginning of every generation

#### Application rate

- 100 ml/ha every 8 days of full sunshine (standard)

### CM moth in pome fruit



#### Application timing

- Right before egg-hatching of 1st codling moth generation.
- If other insecticides are used, GRANDEX should be used preferably during the 1st codling moth generation or focused at the beginning of every generation.

#### Application rate

- 100 ml/ha every 8 days of full sunshine (standard)

## Monitoring of population

ISCA Tech Codling moth and Oriental fruit moth lures and plastic delta traps can be purchased direct from the OCP website or your local distributor. We also recommend the use of **MyTraps** Software to provide hand held and desktop based management of all your pest monitoring and spray data. Ask an OCP Territory Manager for further advice on any of the InsectTech range.

## Beneficial safety profile of GRANDEX (CpGV)

It is expected that *Mastrus ridibundus* (Codling moth pupate parasitoid) and *Heringia calcarata* (Woolly aphid nymph and adult parasitoid) are as sensitive to the listed sprays as other parasitoids. It is very important to consider the use of sprays like GRANDEX to support the biological control platform needed to keep other pest species in check.

Beneficial insect	Antagonist of	GRANDEX®	Insect growth regulators						Oxadiazins	Bacterial products			Plant extracts	Neonicotinoids	Organophosphates			Pyrethroids
			Rynaxypyr	Diflubenzuron	Tebufenozid	Fenoxycarb	Flufenoxuron	Methoxyfenozid		Indoxacarb	Spinosad	Bt toxins			Emamectine benzoate	Pyrethrin	Thiacloprid	
Predatory mites	Spidermites																	
Flowerbugs	Mites Aphids																	
Lacewing	Aphids, wolly apple aphid																	
Ladybirds	Aphids, scale, mites				n.a.													
Parasitoids	Wolly apple aphid, scale, aphids, lepidoptera																	
Bumble bees																		
Water organisms																		

Maximal percent of population reduction per application

- 0% non-toxic
- 40% slightly toxic
- 60% moderate toxic
- 100% highly toxic

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