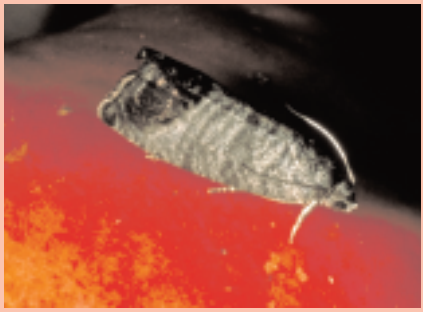
Andermatt Biocontrol

MADEX®

Granulovirus preparation for the biological control of Codling Moth (*Cydia pomonella*)



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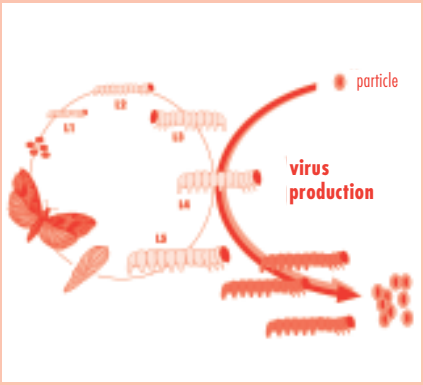
General information

The codling moth (*Cydia pomonella*) is a world wide pest in fruit orchards. Besides its main host, the fruit of apples and pears, it also attacks quinces, walnuts, apricots, peaches, almonds, kakis, medlars (Mespilus) and oranges.

Depending on geographical location 1 to 3 generations are produced annually. The larvae hibernate in impermeable silk-lined cells (cocoons) usually under the bark at the base of the trunk. In spring they pupate and complete their development. They can be seen flying around the fruits when evening temperatures rise above 18 °C. After copulation a female can oviposit up to 300 eggs. The eggs of the first generation are usually deposited on the leaves, while later egg generations are deposited on the fruits.



Within 5 to 15 days the eggs develop and the larvae appear. The young larvae crawl in search of suitable fruits to complete their development. The larvae chew their way into the fruits, usually entering at contact points between fruits, by the stalk end or by the blossom end. Their spiral feeding tunnel finally leads towards the core.

Control of codling moth

Codling moth populations are naturally regulated by various mechanisms. On the one hand birds and other bigger animals feed on the caterpillars and moths, while on the other hand different diseases caused by naturally occuring microorganisms or viruses help to prevent a population explosion.

One of these natural regulators, the *Cydia pomonella* Granulovirus (CpGV), can be isolated, multiplied in host cultures and then used in biological control measures. Andermatt BIOCONTROL AG has successfully been producing virus preparations for many years.

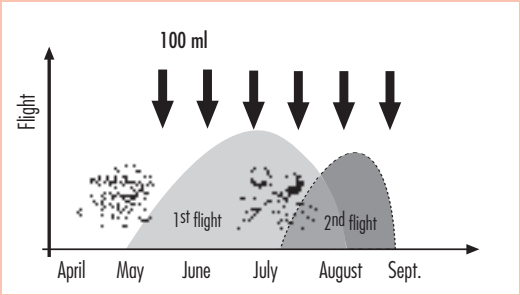
Use of MADEX

The efficacy of MADEX towards the first generation of codling moth is higher than towards the second. The timing of the first application is of primary importance. The first virus application must take place just before the first larvae hatch from the eggs. While searching for an ideal fruit to bore into, the young larvae come into contact with so much virus material that they die soon after. A few larvae will nevertheless manage to chew on some fruits, but these wounds manage to heal well (cork up) before harvest.

The advantage of a virus application over conventional chemical pesticides is that the virus preparation is very specific and only acts against the codling moth. It is non-toxic to other insects. There is also no danger what-so-ever for warm-blooded animals.

Strategies of use

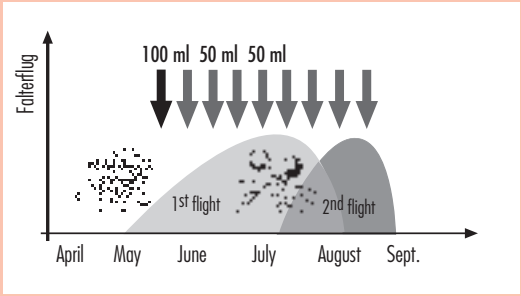
Standard method



3 treatments per generation with 100ml MADEX/ha each.

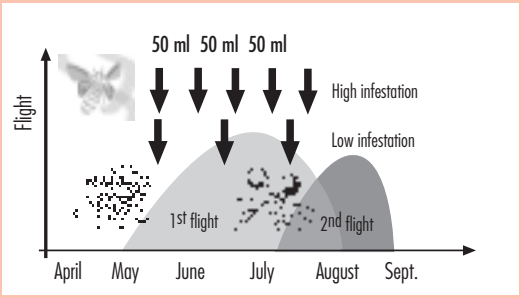
Practical strategies

a) MADEX intensive



4 - 6 treatments per generation:
1st treatment 100 ml MADEX/ha,
50 ml MADEX/ha afterwards

b) MADEX + Mating disruption



1 - 6 treatments per generation (depending on the infestation):
50 ml MADEX/ha each

c) MADEX + chemical insecticides

To reduce the risk of resistance of the codling moth towards chemical insecticides, MADEX can be combined with chemical products. In this case MADEX is used at the beginning of the first generation and the treatment is repeated if necessary.

Population management

MADEX® reduce fruit damage already in the first year. In addition many larvae die due to the virus in later instars or during diapause. Therefore MADEX® will also reduce the population of the codling moth in the following year. The virus can persist in the ground or in its natural host and will also have a long-lasting effect on the population of the pest.

Application timing

The success of a granulovirus application is directly dependent on a precise spraying schedule. The first application of MADEX® must take place just before the first larvae hatch from the eggs (85 day degrees after the first warm evening with flight activity. Zero point of development of the codling moth is 10°C).

Application recommendations

- Dosage per ha: 100 ml MADEX® in 200 – 1600 liters of water.
  For traditional high stem trees 100 ml in 1000 liters of water.
- If possible, spray in the evening.
- A second application after 8 days of sunshine is recommended. Usually 3 applications of 100 ml/ha per generation in intervals of 8 sunny days (2 partially sunny days = 1 sunny day) are necessary. If the codling moth population is not high, applications of 50 ml/ha may be sufficient.

Other strategies

- Dosage of 50 ml/ha: treatment-intervall 6 sunny days. Advantages: Less product needed.
- Combination with mating-disruption: use MADEX® against the first generation.
- Combination with chemical insecticides: in tankmix or in alternation. Use MADEX® mainly against the first generation.

MADEX® can be combined with wettable sulphur and conventional fungicides or insecticides, but not with Myco-San, Myco-Sin, Ulmasud, products containing copper, or highly alcaline substances such as lime sulphur or soaps (pH values of the sprayed mixture should lie between 5 and 8).

Storage

MADEX® can be stored in the refrigerator (≤ 5°C) for at least 2 years. Frozen it can be kept for years without any loss of activity.