

Innovation in the biological control of codling moth and oriental fruit moth with MADEX TWIN

Andermatt Biocontrol Switzerland is to release a new baculovirus product for the combined control of codling moth (*Cydia pomonella*) and oriental fruit moth (*Grapholita molesta*). While current granulovirus products are used primarily in pome fruit today, the new virus strain provides oriental fruit moth control options for peaches, nectarines as well as pome fruits.

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Using a unique selection process, the R & D team of Andermatt Biocontrol successfully isolated a CpGV-M (*Cydia pomonella Granulovirus Mexican*) strain close isolate on an oriental fruit moth (OFM) population. After successful completion of laboratory biotests, it has been tested against the two key pest lepidopteran species in 25 field tests worldwide to date. Similar to the current range of granuloviruses (e.g. MADEX), the new strain produced by Andermatt Biocontrol will combine highly specific and residue-free insect control thus providing an IPM-friendly resistance management tool. Results from selected study sites and a summary covering two years of field tests are presented here.



Picture 1: Larva of the oriental fruit moth (*Grapholita molesta*)

Due to its heterogeneous migratory behaviour, OFM is very difficult to control. As well as its key role as a pest on stone fruit, OFM has become an economically important pest in pome fruits. This has particularly been the case in southern regions of Europe in recent years. OFM frequently migrates

to pome fruit orchards as soon as its original host fruit has been harvested and thus provokes severe fruit damage before harvest. Moreover, new studies in France (Siegwart et al, 2010) have confirmed that OFM has acquired the

ability to complete its entire life cycle on other fruit tree species, such as apple and pear, in certain regions. A combined effect on both pests is thus of key interest for producers.

Examples of field trials against codling moth and oriental fruit moth

MADEX TWIN was tested in a pilot peach tree orchard in the USA (California) at different dose rates in 2011. Two applications were made within each of two OFM generations based on a temperature-dependant predictive phenological model. The assessment prior to harvest provides information about shoot strikes and fruit damage (Chart 1). With a high infestation of 23% in the control, MADEX TWIN was able to reduce the total fruit damage (stopped and active damage) by 68%.

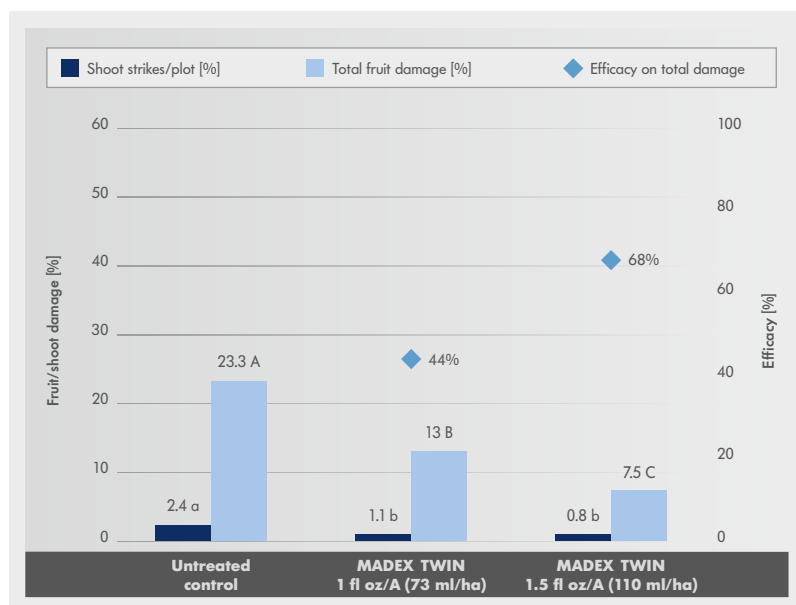


Chart 1: Field trial with MADEX TWIN against OFM in peach (California USA, Certis USA, 2011).

Another field experiment with MADEX TWIN in Switzerland resulted in an excellent efficacy of 90% prior to harvest against active fruit damage of codling moth (CM) in an apple orchard (Chart 2). The reduction of total fruit damage was 74%. ➔

MARKET INTRODUCTION

The active substance of MADEX TWIN has received Annex I inclusion and respective preparations for the zonal registration in Southern Europe are under way. Registrations outside Europe are also undergoing preparation. It is estimated that the new larvicide will be launched through Andermatt Biocontrol's existing distribution network all over the world between 2012 and 2014. At present, the new isolate is patent pending.

	Apple (CM)	Peach (OFM)	Nectarine (OFM)
Average efficacy on shoot strike reduction	————	56% (n= 8)	60% (n= 2)
Average efficacy on reduction of total fruit damage (incl. superficial damage)	66% (n= 5)	65% (n= 9)	67% (n= 3)
Average efficacy on reduction of deep damage	86% (n= 7)	85% (n= 1)	no data

Table 1: Average efficacy level of MADEX TWIN. Field trials from 2010/2011. 100 ml/ha (n= number of field trials)

Conclusions from two field trial seasons

Granuloviruses have an outstanding population control effect (Kienzle et al, 2001). Although they act slower than a chemical reference larvicide, they are absolutely host-specific, harmless to beneficial insects and residue free. To achieve accurate efficacy data with granuloviruses in field trials, a differentiation between stopped superficial damage and active damage should therefore be made whenever possible.

Superficial or stopped damage indicates that the larvae had been successfully infected and killed by the virus. Average efficacy levels from two years of field trials are presented in table 1.

As it is already the case in the current range of granuloviruses (e.g. MADEX),

the new strain produced by Andermatt Biocontrol will combine highly specific and residue-free insect control thus providing an IPM-friendly resistance management tool.

The application strategy does not differ considerably from the existing CpGV recommendation. As an excellent population management tool, MADEX TWIN complements IPM spray programs. To maximise benefit from this effect, applications should be focused on the larval hatching period of the earliest OFM generations using a standard dose of 100 ml/ha. Additionally, MADEX TWIN perfectly complements a mating disruption strategy in situations where OFM infestation is high.

Because OFM often migrates into pome fruit orchards late in the season and provokes fruit damage just

before harvest, fruit damage may not be fully prevented. Nevertheless, virus applications are still expedient in such cases, because overwintering larvae are thus decimated.

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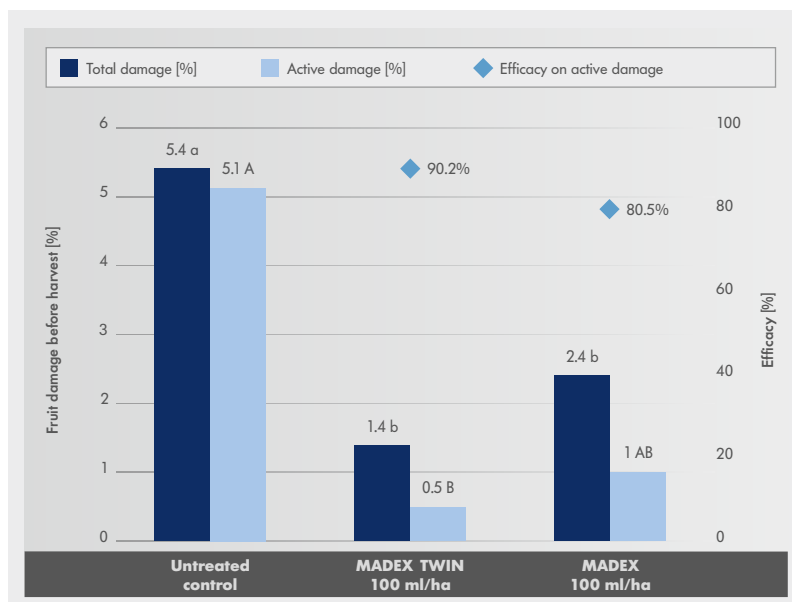


Chart 2: Fruit infestation of codling moth before harvest in an apple orchard, treated with MADEX TWIN (Andermatt Biocontrol, Switzerland 2010).

References

- Kienzle J., Zebitz C.P.W., Schulz C., Huber J. 2001. Persistence of the biological effect of codling moth granulovirus in the orchard. IOBC/WPRS Bulletin 26 (1), 2003. pp 245–248
- Siegwart, M., Bouvier F., Maugin S., Sauphanor B. 2010 Host plant differentiation in French populations of the oriental fruit moth, *Cydia molesta*. IOBC/WPRS Bulletin: Meeting of IOBC/WPRS Working Group "Integrated Protection of Fruit Crops", Vico del Gargano, Italy, 2010. In Press