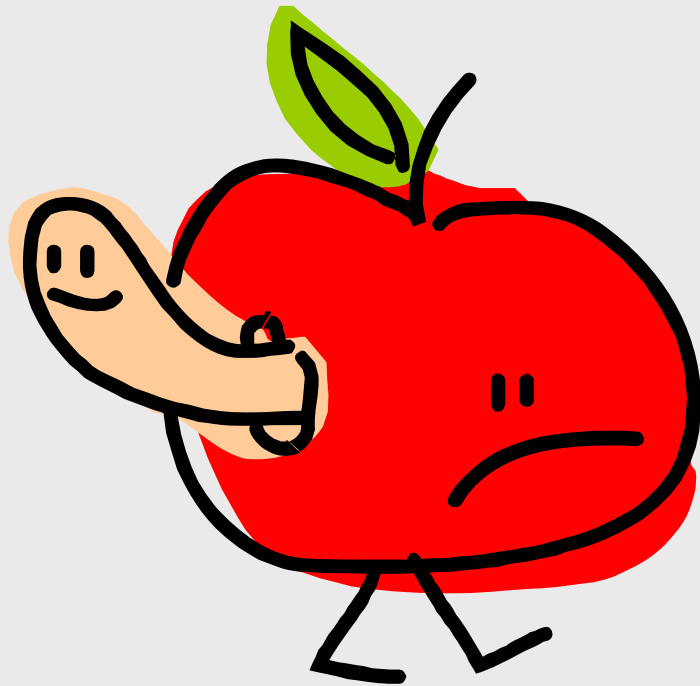


# History and New Developments of Codling Moth Granulovirus



Jürg Huber

BBA, Institute for Biological Control,  
Darmstadt



# Tanada 1964: J. Insect Pathol. 6, 378-380

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NOTES

a nuclear-polyhedrosis virus of a different type than the one isolated from *B. brassicae*.

Department of Virology  
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and the  
Institute of Phytopathological Research  
Wageningen  
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D. J. DE JONG *D.J. de*

Accepted April 15, 1964

## A Granulosis Virus of the Codling Moth, *Carpocapsa pomonella* (Linnaeus) (Olethreutidae, Lepidoptera)

The codling moth, *Carpocapsa pomonella* (Linnaeus), is one of the most important pests of deciduous fruits in America. Polyhedrosis-virus disease has been reported from this insect (see K. M. Hughes, *Hilgardia* **26**, 597-629, 1957), but I am not aware of any published record of a granulosis-

In October, 1963, four dead larvae of the codling moth were received from G. L. Finney, Division of Biological Control, University of California, Berkeley. The specimens had been collected on September 12, 1963, by L. E. Caltagirone of the same Division on apple and pear trees growing near Valle de Allende, Chihuahua, Mexico. Some of the specimens were infected with the fungus *Beauveria bassiana* (Balsamo) Vuillemin, and others with a granulosis virus.

The codling moth is such an important pest and because of the apparent high virulence of the granulosis virus towards the larva, a brief note on the discovery of the virus, its measurement, and pathogenicity seems warranted. We had difficulty in releasing the virus particles from the inclusion bodies (capsules). In other granulosis viruses that we had studied, the liberation of the virus particle from the capsular matrix was easily accomplished with weak alkali because of their differential solubility. In the case of the codling-moth virus, weak alkalies, such as 0.01 N NaOH or

NOTES

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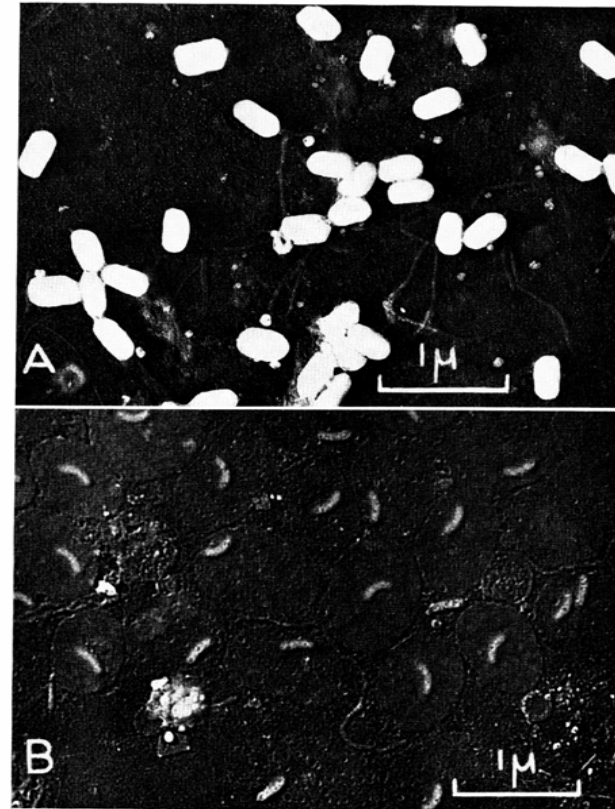
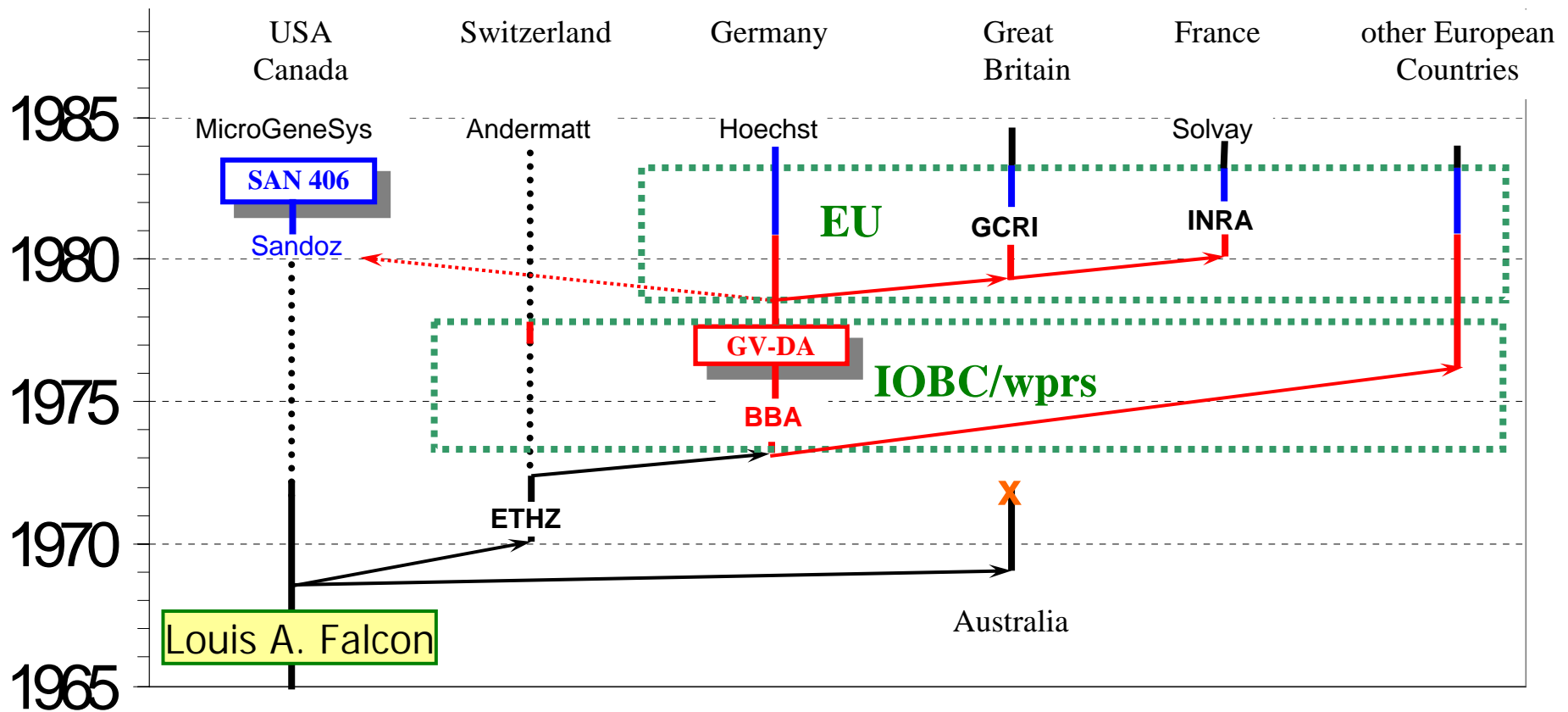
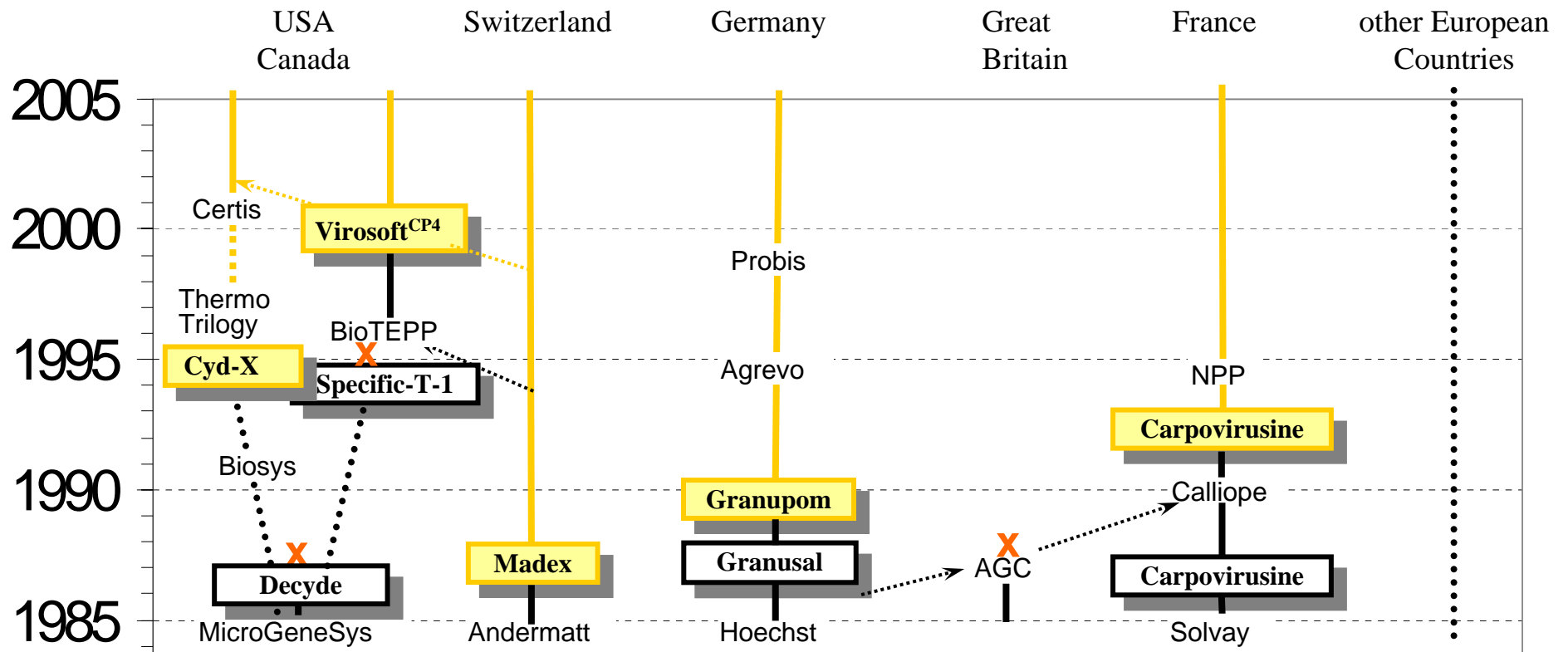
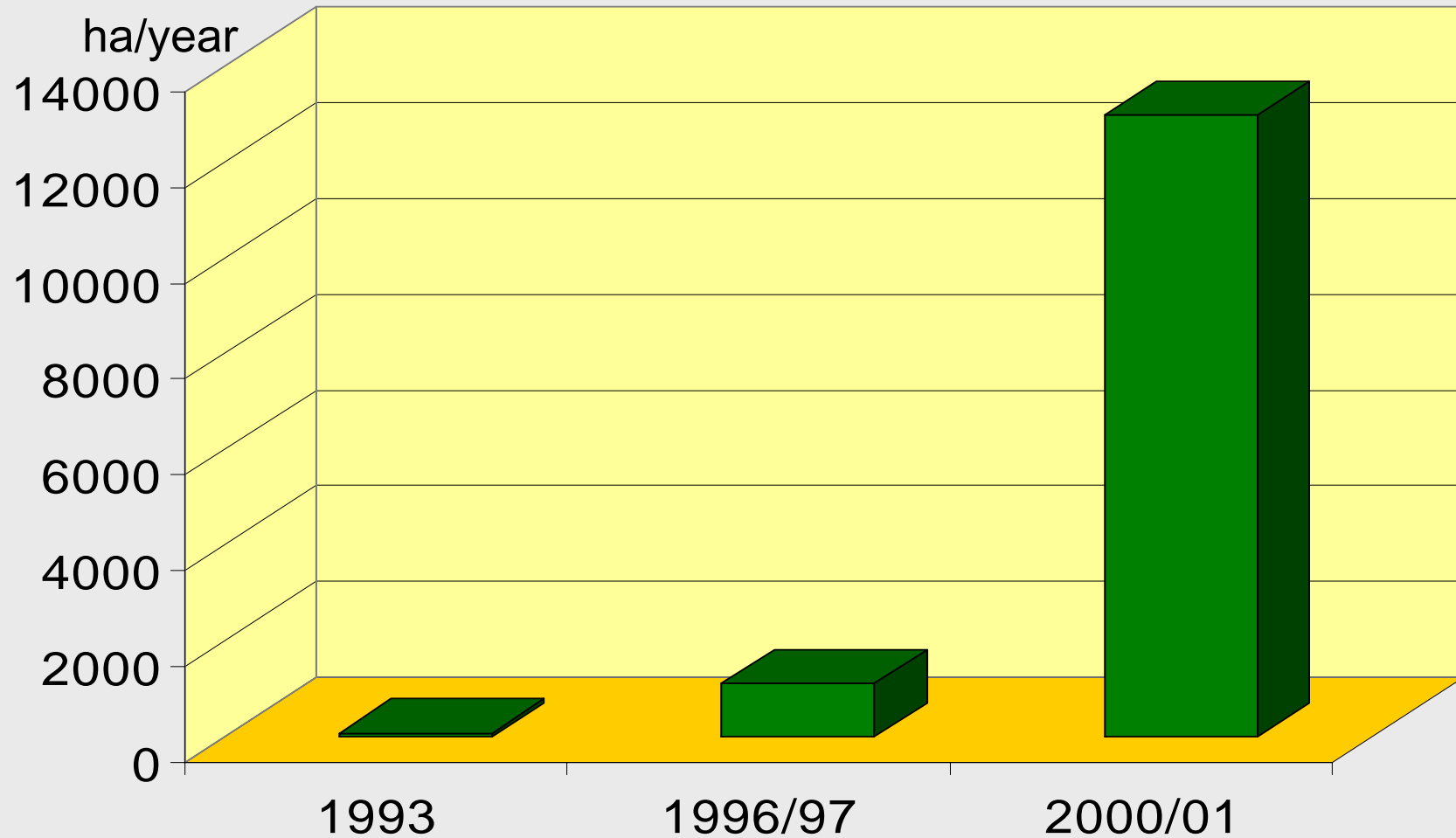


FIG. 1. Electron micrographs of a granulosis virus of *Carpocapsa pomonella*. (A) Capsules; (B) virus particles surrounded by the partially dissolved matrices of the capsules. Some of the virus particles have a pitted surface indicating partial dissolution by the alkali treatment. Electron micrographs were prepared by Miss Ruth Leutenegger.





# Field use of baculovirus in Germany



# Huber & Dickler 1977: J. Econ. Entomol. 70, 557-561

October 1977

HUBER AND DICKLER: EFFICIENCY OF CODLING MOTH GRANULOSIS VIRUS

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## Codling Moth<sup>1</sup> Granulosis Virus: Its Efficiency in the Field in Comparison with Organophosphorus Insecticides<sup>2,3</sup>

J. HUBER and E. DICKLER

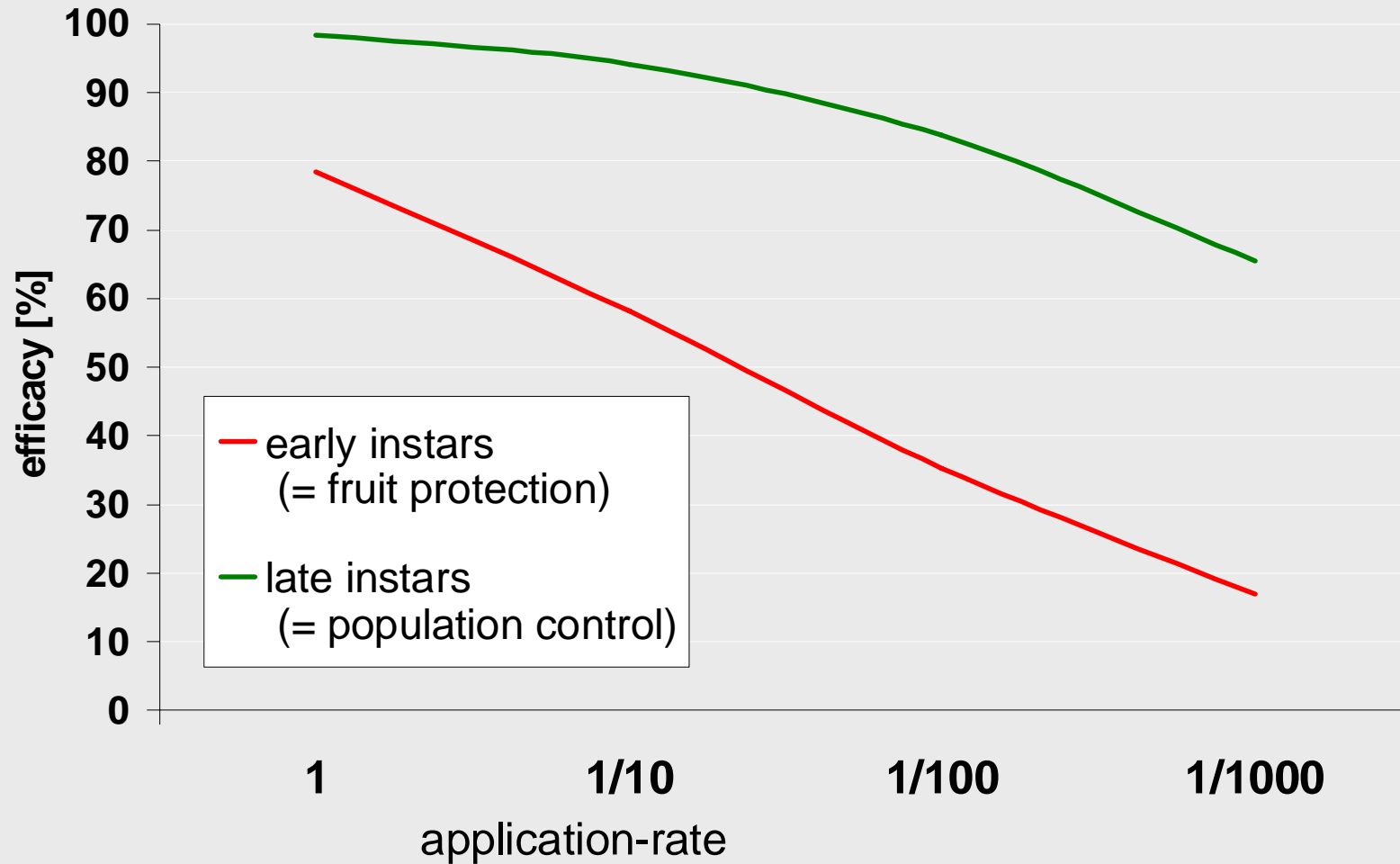
Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für biologische Schädlingsbekämpfung, Darmstadt, and Institut für Obstkrankheiten, Dossenheim, Germany, F.R.

### ABSTRACT

A granulosis virus for control of *Laspeyresia pomonella* (L.) was tested during 2 successive years in a commercial apple orchard in comparison with organophosphorus insecticides. The efficiency of the virus was influenced by the soil management used in the orchard. In all but the chemically treated plots, codling moth infestation over green covered soil was significantly lower than over clean cultivated soil. Four virus sprays at a

concentration of ca.  $10^{11}$  capsules/liter gave equal or even better protection against codling moth damage over green cover than the same number of chemical insecticide treatments. Reduction of the population, estimated by sampling diapausing larvae in corrugated paper bands, was much better by the virus than by the insecticides, reaching 100% in the 2nd year. No virus persisting from the previous season could be found.

# dose-response relationship





# Influence of addition of CpGV on CM population

## A: without granulovirus

## B: same as A + granulovirus

date	treatment	kg;l/ha/m	treatment	kg;l/ha/m
06. May	Appeal			
13. May	ME 605 Spritzpulver	0,25	Granupom	0,015
18. May			Granupom	0,075
08. Jun	Insegar	0,2	Granupom	0,015
28. Jun	Mimic	0,25	Granupom	0,015
06. Jul	Appeal			
21. Jul	Insegar	0,2	Granupom	0,015
02. Aug	Insegar	0,2	Granupom	0,015
08. Aug	ME 605 Spritzpulver	0,25	Granupom	0,015
19. Aug			Granupom	0,045

2.43 larvae / tree

0.14 larvae / tree



Andermatt  
**Biocontrol** AG

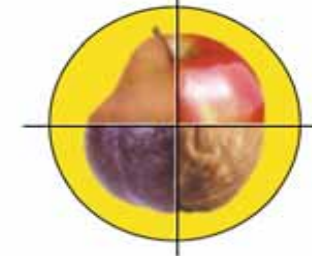
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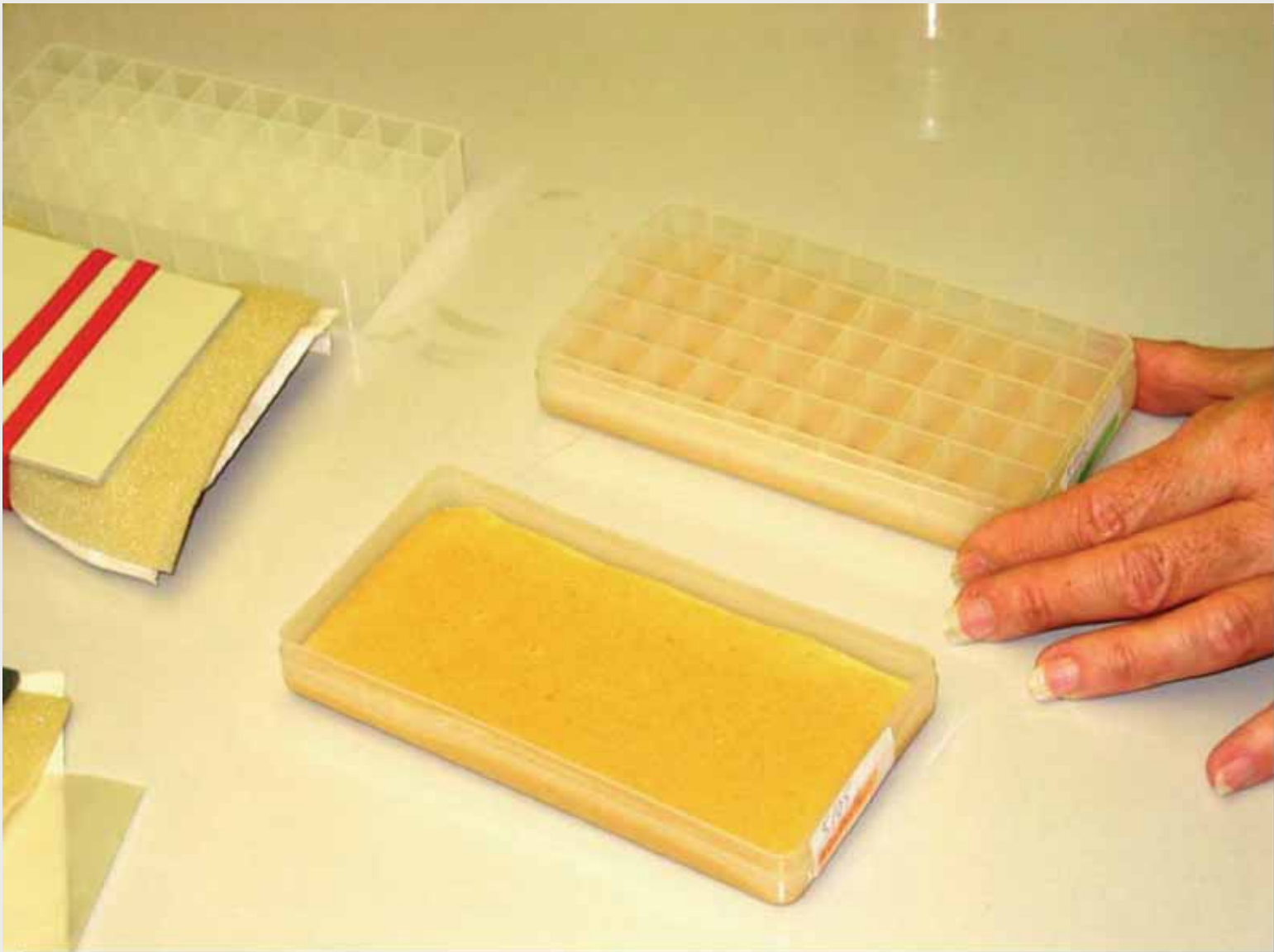
BIOTEPP

## orchards used in the sampling of codling moth populations in 2003

<b>Orchard</b>	<b>Exposure to CpGV</b>	<b>CM control</b>
<b>BW IM 03</b>	<b>2 – 5 years</b>	<b>good</b>
<b>BW FN 03</b>	<b>11 years</b>	<b>sufficient</b>
<b>BW FI 03</b>	<b>7 years</b>	<b>poor</b>
<b>lab-strain</b>	<b>none</b>	

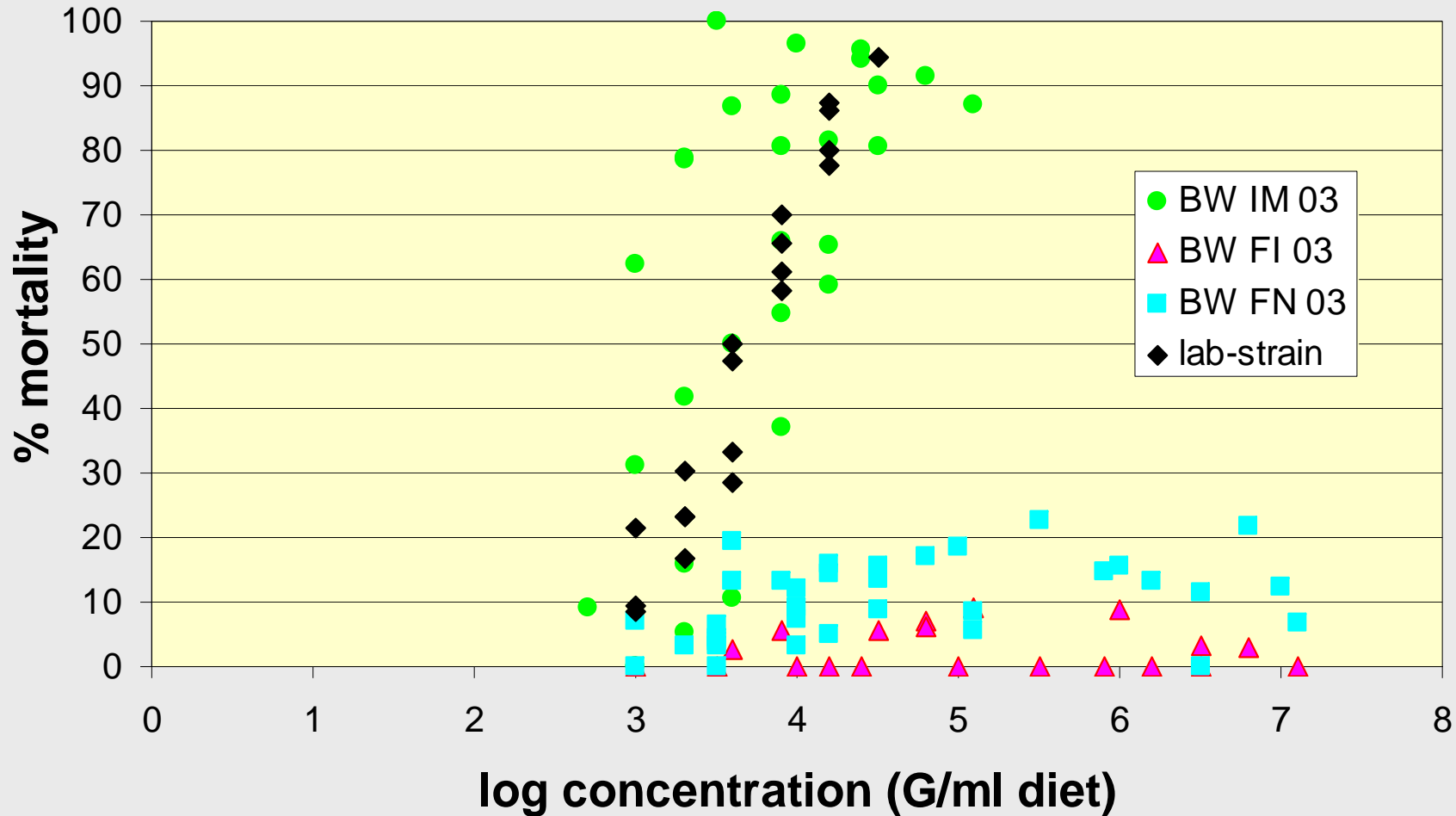






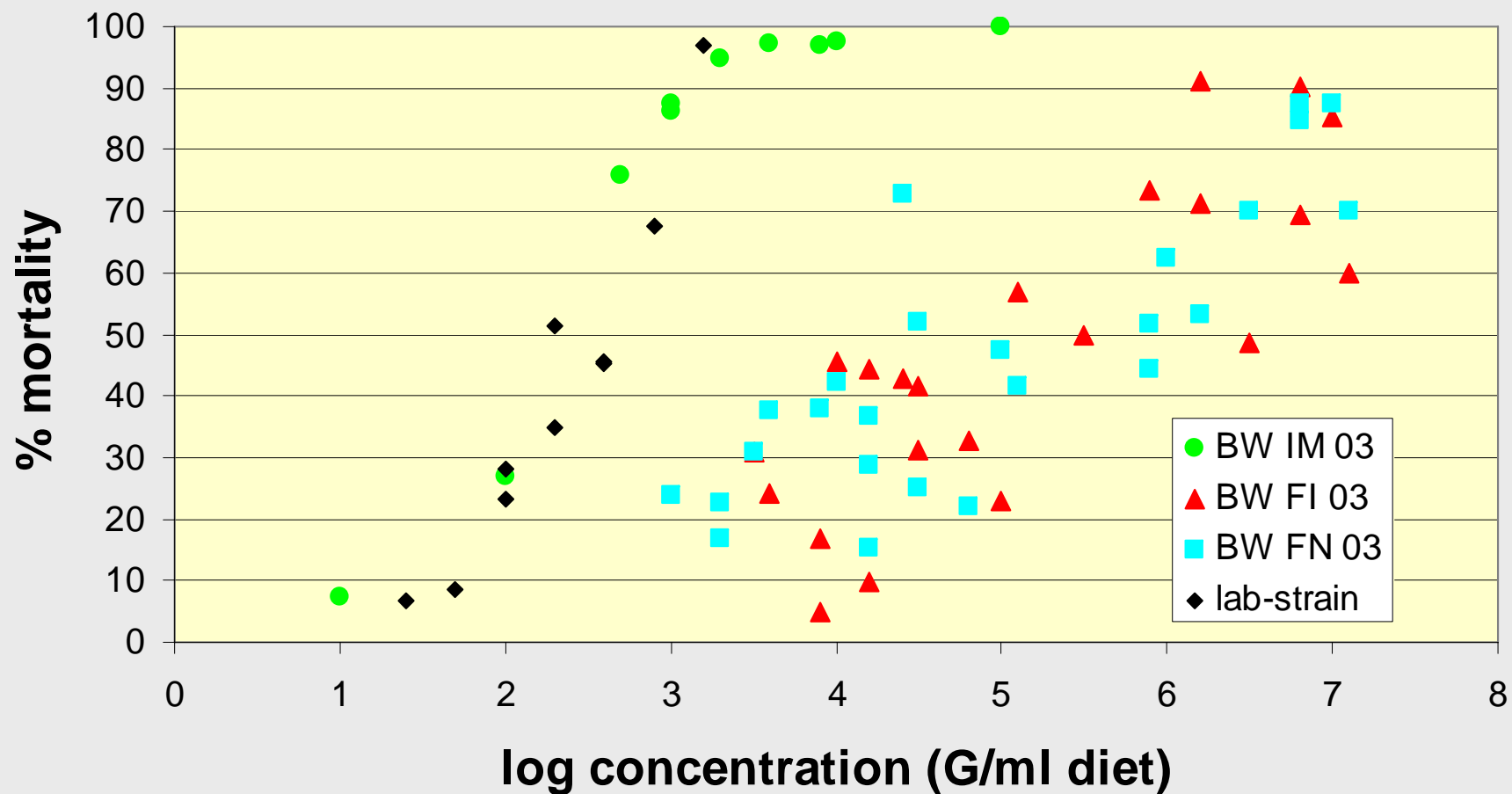
# Mortality in bioassays in 2004, after 6 days

(Fritsch et al., 2005: Nachrichtenbl. Deut. Pflanzenschutzd., 57 (2), 29-34)



# Mortality in bioassays in 2004, after 14 days

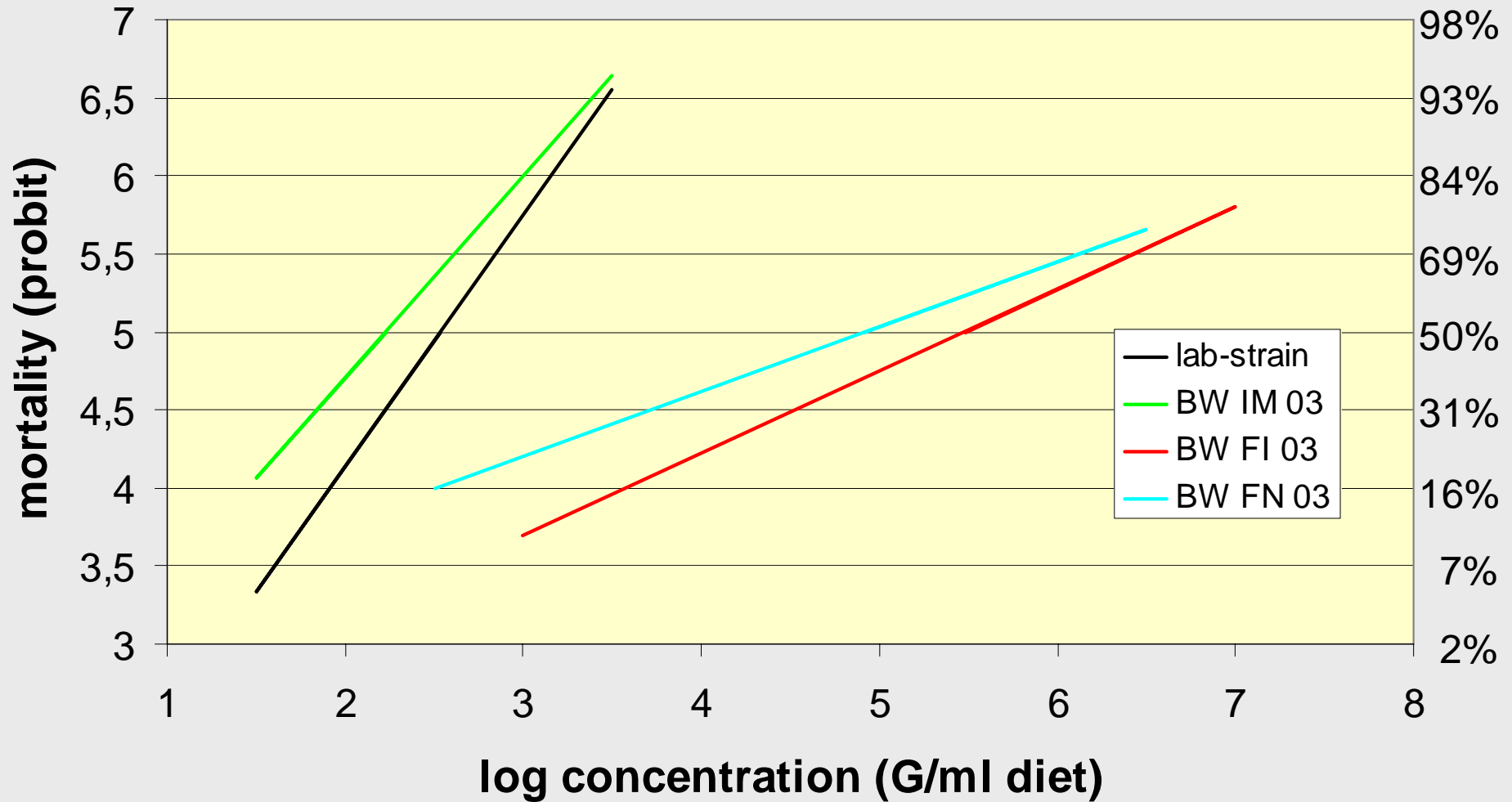
(Fritsch et al.,2005: Nachrichtenbl. Deut. Pflanzenschutzd., 57 (2), 29-34)





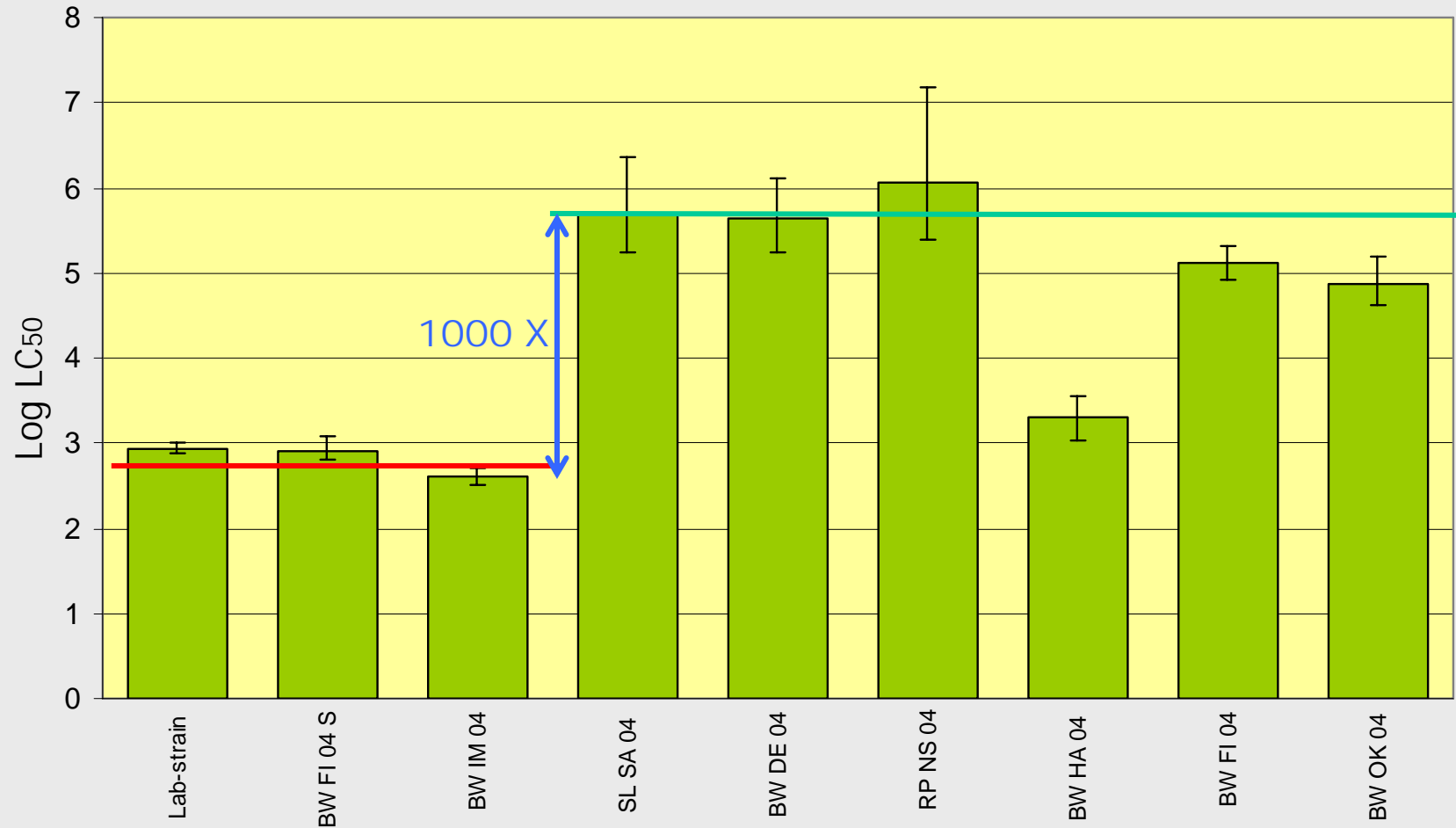
# dose response regression lines from bioassays (in 2004) after 14 days

(Fritsch et al.,2005: Nachrichtenbl. Deut. Pflanzenschutzd., 57 (2), 29-34)

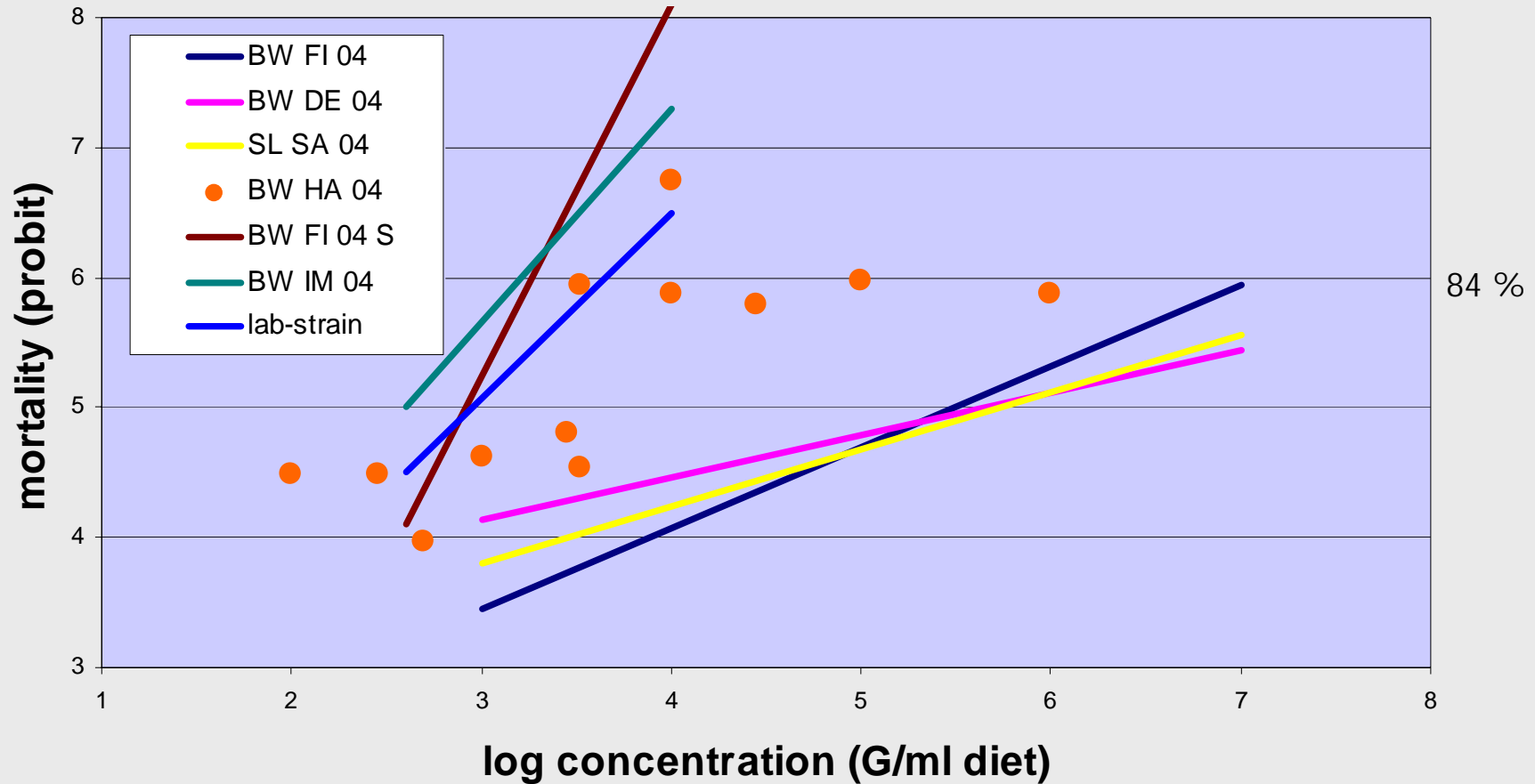


# bioassay-data 2005 (strains collected fall 2004)

(Undorf-Spahn et al., unpubl.)

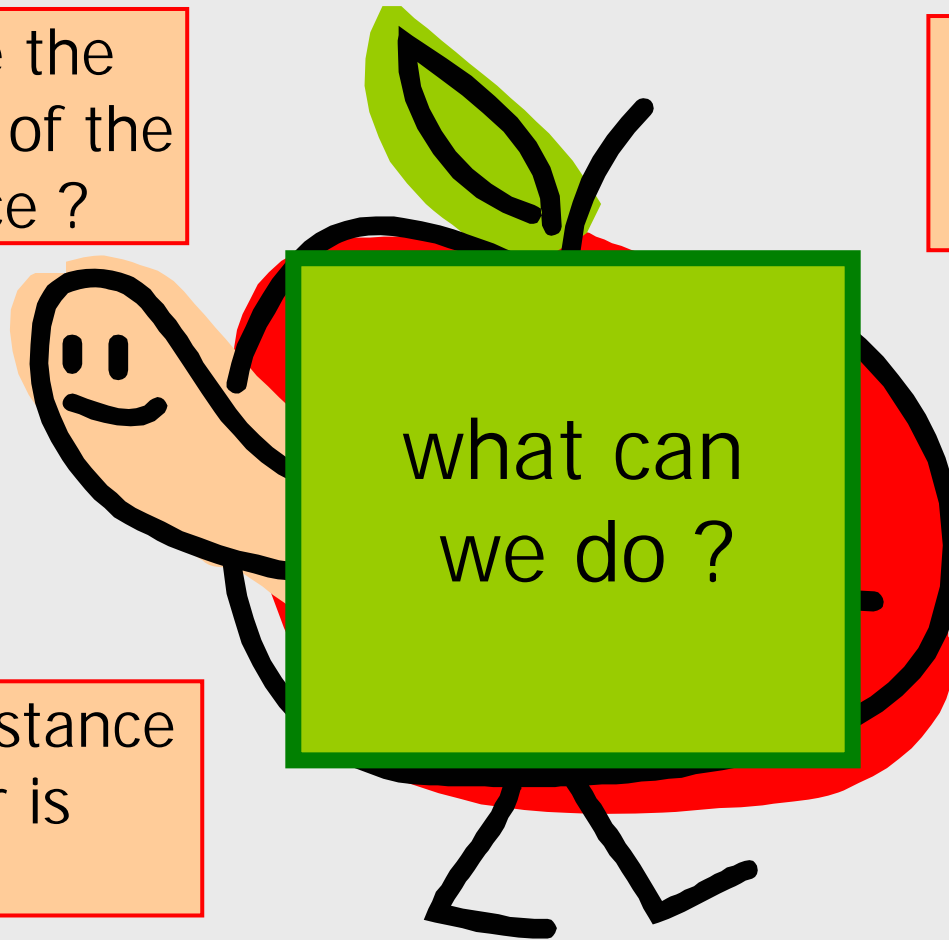


**dose response regression lines from bioassays (in 2005) after 14 days**  
 (Fritsch et al., 2006: Proceedings FÖKO Conference 2006, Weinsberg, 7-13)



what are the genetics of the resistance ?

how stable and how persistent is the resistance ?

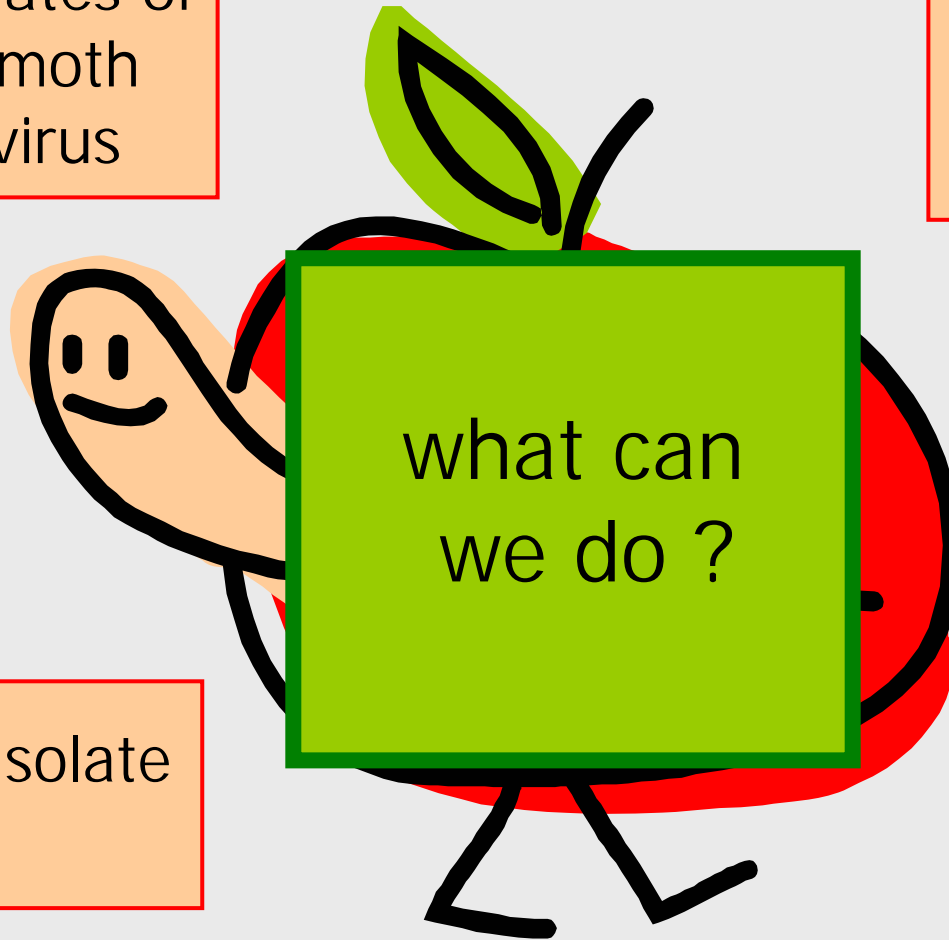


does resistance spread or is it local ?

is it already present in some CM populations ?

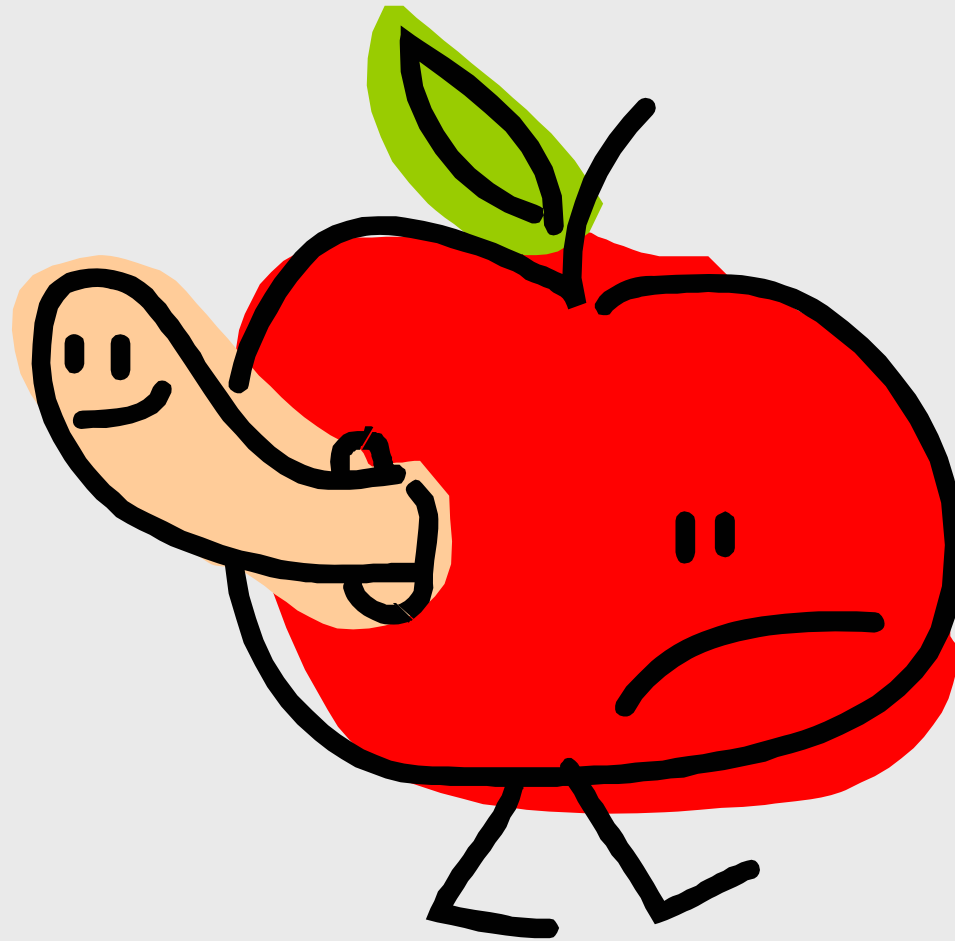
new isolates of  
codling moth  
granulovirus

Madex plus



Iranian isolate  
I 12

other new  
isolates ?



Thank You  
for Your  
Attention !

