

Is the efficacy of biological control against insect pests likely to be more durable than that of chemical pesticides? Lessons learned using CPGV to protect apples from codling moth

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IS THE EFFICACY OF BIOLOGICAL CONTROL AGAINST INSECT PESTS LIKELY TO BE MORE DURABLE THAN THAT OF CHEMICAL PESTICIDES? LESSONS LEARNED USING CPGV TO PROTECT APPLES FROM CODLING MOTH

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A meta-analysis of the scientific literature was conducted to assess the potential for insect pests to become resistant to biocontrol agents. Although many plant bioagressors are known for their capacity to develop resistance to chemical pesticides or to overcome varietal resistance, only few studies have explored their ability to potentially overcome the effect of biocontrol agents. This presentation will be focused on the resistance of codling moth to *Cydia pomonella granulovirus* (Mexican isolate) (CpGV-M). The case of resistance to plant diseases will be discussed in another presentation.
The codling moth is the major pest of apple orchards, showing resistances to most chemical insecticides. The use of CpGV-M represented a primary choice for organic producers and a useful alternative in IPM.
Generalization of use of the almost pure genotype CpGV-M against codling moth resulted in an increasing failure of apple protection in various orchards in Europe, due to selection of a CpGV-M resistant insect genotype. Previous work allowed the identification of virus isolates active against these CpGV-M resistant populations, by screening virus natural populations and by selection of existing isolates. However, the question of an "arms race" remained. To evaluate the risk of development of new resistances it is important to understand how, in the natural environment, equilibrium is reached between virus and host populations, and how populations containing mixed genotypes behave.
Various aspects have been addressed both by partners of the PURE project or by other research teams, particularly, the cost for a larva to become resistant; the cost for a virus to overcome this resistance; the possibility of new kinds of resistance, and the importance of retaining genetic variability on the virus population. We can now draw a more global picture allowing us to better protect our orchards reducing the risk of new outbreaks.

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