

Elucidation of a novel mode of resistance of codling moth against *Cydia pomonella granulovirus* by homogenization experiments

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In nearly all growing regions of apple and pear worldwide, the codling moth (CM, *Cydia pomonella*) is the most devastating pest; CM has developed resistance to many chemical insecticides. An alternative to the application of chemical insecticides is the use of *Cydia pomonella granulovirus* (CpGV, Baculoviridae). CpGV products are applied in both organic and integrated production.

Since 2005, codling moth populations with a reduced susceptibility to CpGV, products have been reported from about 40 European orchards. The resistance could be traced back to a single, dominant, sex-linked gene. Currently, resistance management strategies are based on the application of improved CpGV products containing resistance-overcoming CpGV isolates.

Recently, two CM field populations (NRW-WE and SA-GO) with a reduced susceptibility to even these improved CpGV products were found. First single pair crossing experiments between individuals of these resistant field colonies and a susceptible laboratory CM strain (CpS) indicated that the inheritance of resistance of these populations did not follow the previously

described pattern of Z-linked, dominant resistance. In single-dose bioassays the susceptibility of neonates of the resistant CM colonies NRW-WE and SA-GO to different CpGV isolates (CpGV-M, -S, -V15 and -E2) was estimated.

The aim of the current study was the genetic homogenization of the genetically heterogeneous field populations NRW-WE and SA-GO by two different methods: (i) repeated single pair crossings followed by family selection and (ii) successive mass crossing experiments under virus pressure. The resulting homogenous strains of NRW-WE and SA-GO with fixed resistance were used for backcrossing experiments with CpS to elucidate the mode of inheritance of their resistance. Single or multiple resistance genes, completely dominant as well as intermediate inheritance patterns are possible. Furthermore, the two different homogenization methods as well as the two different resistant field colonies NRW-WE and SA-GO will be compared based on potential differences in their mode of resistance. The intended reciprocal backcrossing experiments followed by bioassays can also define sex-linkage of the resistance.