

The role of the *avrRpt2_{EA}* gene in the host-pathogen interaction *Malus × robusta* 5 - *Erwinia amylovora*

Isabelle Vogt, Thomas Wöhner, Magda-Viola Hanke, Henryk Flachowsky, Andreas Peil
Julius Kühn-Institut, Institute for Breeding Research on Horticultural and Fruits Crops
Isabelle.vogt@jki.bund.de

The enterobacterium *Erwinia amylovora* is a quarantine pathogen, which causes the necrotrophic fire blight, a disease of plants of the rosaceous family (pear, apple, quince etc.). The relevance of this disease, especially in the apple production, is immense and the only effective control by antibiotics restricted. Therefore, resistant wild species like *Malus × robusta* 5 (Mr5) are important for both breeding and genetic studies on the resistance mechanism. Until now, only a few genes are known to be involved in the resistance mechanism. One of these genes encodes the effector protein AvrRpt2_{EA} from *E. amylovora*, which is homologue to the initial found effector protein *avrRpt2* of *Pseudomonas syringae*. Surprisingly, an *avrRpt2_{EA}* mutant strain, in which the gene was disrupted and replaced with an antibiotic resistance cassette, could break the resistance of *Malus × robusta* 5. This result suggests that

the *avrRpt2_{EA}* gene plays an important role in the resistance. To get a better understanding of the mechanism, the first step was to compare the nucleotide sequence and the resulting amino acid sequence of the *avrRpt2_{EA}* gene of different *E. amylovora* strains. Various genes were then used to complement the *avrRpt2_{EA}* mutant strain and several wild type strains. For the evaluation of the virulence, Mr5 shoots were inoculated and the susceptibility to the bacterium was evaluated by determining the necrotic shoot length. Furthermore, the interacting partner of the AvrRpt2_{EA} protein in *Malus × robusta* 5 was studied. Therefore, the Yeast Two-Hybrid System, a method to determine protein-protein interactions, was used. In this system the *avrRpt2_{EA}* gene acts as "bait" and was screened against putative interacting partners in Mr5.