



**HAL**  
open science

## **Potato virus Y adaptation to various resistance QTL combinations in pepper and impact on host tolerance**

Thibaud Jayet, William Billaud, Lucie Tamisier, Marion Szadkowski, Catherine Wipf-Scheibel, Loup Rimbaud, Judith Hirsch, Gregory Girardot, Jonathan Gaudin, Alexandra Schoeny, et al.

### ► **To cite this version:**

Thibaud Jayet, William Billaud, Lucie Tamisier, Marion Szadkowski, Catherine Wipf-Scheibel, et al.. Potato virus Y adaptation to various resistance QTL combinations in pepper and impact on host tolerance. 18. Rencontres de virologie végétale (RVV2021), Cirad; Inrae, Sep 2021, Aussois, France. hal-03368394

**HAL Id: hal-03368394**

**<https://hal.inrae.fr/hal-03368394v1>**

Submitted on 3 Feb 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## **Potato virus Y adaptation to various resistance QTL combinations in pepper and impact on host tolerance**

**Thibaud Jayet**<sup>1,2</sup>, William Billaud<sup>1,2,3</sup>, Lucie Tamisier<sup>1,2</sup>, Marion Szadkowski<sup>1</sup>, Catherine Wipf-Scheibel<sup>1</sup>, Loup Rimbaud<sup>1</sup>, Judith Hirsch<sup>1</sup>, Grégory Girardot<sup>1</sup>, Jonathan Gaudin<sup>1</sup>, Alexandra Schoeny<sup>1</sup>, Karine Berthier<sup>1</sup>, Karine Nozeran<sup>1</sup>, Elise Lepage<sup>1</sup>, Sarah de-Colle-Guiheneux<sup>1,2</sup>, Thomas Presseccq<sup>1</sup>, Véronique Lefebvre<sup>2</sup>, Benoît Moury<sup>1</sup>

<sup>1</sup>*Pathologie Végétale, INRAE, 84140 Montfavet, France*

<sup>2</sup>*GAFI, INRAE, 84140 Montfavet, France*

<sup>3</sup>*Avignon Université, UMR Qualisud, 84916 Avignon, France*

Plant resistance is one of the best strategies to control pathogens for an environmentally friendly agriculture. Resistances are of two types: monogenic or polygenic, the latter frequently controlled by resistance quantitative trait loci (rQTL). However, both resistance types face pathogen adaptation, leading frequently to a complete breakdown. Pathogen adaptation may also have an impact on the plant tolerance, which is the ability of the plant to reduce the damages caused by pathogen infection. Studies of viral molecular mechanisms linked with resistance breakdown are frequent for monogenic resistance but scarce for adaptation to rQTL.

The main objectives of the current study are to (i) evaluate the adaptation of experimentally-evolved PVY strains on pepper lines containing various combinations of rQTL and tolerance QTL, (ii) determine tolerance changes induced by this adaptation, (iii) analyse mutations appeared during experimental evolution.

Two PVY strains were experimentally evolved for 9 months corresponding to 9 successive passages on 5 doubled haploid lines, each containing one specific combination of rQTL and tolerance QTL. Following the experimental evolution, quantitative ELISA and fresh weight measurements were performed to compare the fitness and virulence of ancestral and evolved strains. Significant adaptation was only recorded for one specific treatment (strain-pepper line combination). Two evolved strains from another treatment showed a fitness decrease compared to the ancestral strain. Sequencing and mutation validation of both adapted and maladapted strains is yet to be performed to understand the molecular mechanisms behind adaptation to pepper rQTL.