



HAL
open science

The Tomato-Potyvirus system, a comparative system for natural and induced resistances associated with the initiation factors 4E

Camille Gauffier, Caroline Lebaron, André Moretti, C. Constant, F. Moquet, G. Bonnet, Carole Caranta, Jean-Luc J.-L. Gallois

► To cite this version:

Camille Gauffier, Caroline Lebaron, André Moretti, C. Constant, F. Moquet, et al.. The Tomato-Potyvirus system, a comparative system for natural and induced resistances associated with the initiation factors 4E. XVIIIth Eucarpia Meeting, Vegetable section, Tomato Working group, Apr 2014, Avignon, France. 1 p. hal-02798800

HAL Id: hal-02798800

<https://hal.inrae.fr/hal-02798800>

Submitted on 5 Jun 2020

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.



T017 - Camille Gauffier

The Tomato-Potyvirus system, a comparative system for natural and induced resistances associated with the initiation factors 4E

Gauffier, C.(1), Lebaron, C.(1), Moretti, A.(1), Constant, C.(2), Moquet, F.(3), Bonnet, G.(4), Caranta, C.(1), Gallois, J.L.(1)

(1) INRA, Génétique et Amélioration des Fruits et Légumes, Montfavet, France

(2) SAKATA VEGETABLES EUROPE SAS, Uchaud, France

(3) GAUTIER SEMENCES, Eyragues, France

(4) Syngenta Seeds SAS, Sarrians, France

Tomato (*Solanum lycopersicum*) is one of the most cultivated vegetable in the world, but suffers from important yield losses caused by viral diseases. Therefore, the development and use of cultivars that are genetically resistant to viruses has become a critical factor of competitiveness for both breeders and producers and one of the key stakes for sustainable agriculture. In this context, generating new resistance alleles using biotechnological approaches (e.g., TILLING) appears as a powerful tool to diversify host targets to promote resistance against viruses.

Most characterized recessive resistances to potyviruses so far are natural variant of the translational initiation factor eIF4E. Those variants often encode functional eIF4E proteins but have lost the ability to interact with the viral protein VPg. In tomato, a broad-spectrum resistance to Potyvirus is associated with the natural resistance allele *pot1 - eIF4E1* from *Solanum habrochaites* PI247087. More recently null *eIF4E* alleles were obtained by TILLING but strikingly, the resistance spectrum associated with the null *eif4e1* allele is considerably narrower than the one associated with the natural resistance allele *pot1-eIF4E1*. Understanding the apparent discrepancies between those two resistances -natural and induced- could be important to help developing more efficient TILLING-based resistances to pathogens.

Therefore, we are investigating the differences between the lines harbouring those two alleles, as well as the implication of the others tomato *eIF4E* genes – *eIF4E2* or *eIFiso4E*. As a first step, genetic effects are investigated by swapping the genetic backgrounds between the natural and induced *eIF4E1* resistance alleles but also by combining KO mutations affecting several *eIF4E* genes to see whether this will impact on the plant resistance spectrum to potyviruses. Secondly, the type of mutation affecting *eIF4E1* (AA changes vs KO mutant) is also investigated and especially the incidence that a null mutation may have on the protein level accumulation of the other *eIF4E*.

Besides its applications on crop breeding, these experiments could shed new light on the Tomato/potyvirus pathosystem and redundancy among *eIF4E* genes.

Keywords: *S.lycopersicum*, *S.habrochaites*, eIF4E, potyvirus, TILLING