

Specificity of eIF4E factors towards resistance to potyviruses in *Arabidopsis thaliana*

Aramata Marena, Caroline Callot, André Moretti, Jean-Luc Gallois

► **To cite this version:**

Aramata Marena, Caroline Callot, André Moretti, Jean-Luc Gallois. Specificity of eIF4E factors towards resistance to potyviruses in *Arabidopsis thaliana*. 14. Rencontres de Virologie Végétale (RVV 2013), Jan 2013, Aussois, France. hal-02745414

HAL Id: hal-02745414

<https://hal.inrae.fr/hal-02745414>

Submitted on 3 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.

Specificity of eIF4E factors towards resistance to potyviruses in *Arabidopsis thaliana*

Aramata MARENA, Caroline CALLOT, André MORETTI et Jean-Luc GALLOIS

INRA-UR 1052. Génétique et Amélioration des Fruits et Légumes (GAFL)

Domaine St Maurice, CS 60094. F-84143 Montfavet cedex

e-mail : jlgallois@avignon.inra.fr

The translational initiation factors eIF4E represent the main resistance to *Potyvirus* as well as to other families of plant RNA virus. Although those factors are encoded by small multigenic families, it has been shown that each virus can only use specific eIF4E to perform its cycle in plants. Often, this coincides with the ability of the virus VPg to interact with those host proteins. Using *Arabidopsis* transgenic approaches, we aimed at better understanding the basis of the virus specificity for eIF4E.

First, we looked at the interaction pattern of the *Clover Yellow Vein Virus* (CIYVV) VPg with all five *Arabidopsis* eIF4E proteins and found that it interacts with three of them. However, *Arabidopsis* mutant studies have shown that only *eIF4E1* is necessary to allow CIYVV infection. This suggests that unlike what has been shown for other plants (as pepper and tomato), not only the eIF4E protein sequence but also its gene expression pattern may have a key role in susceptibility, as we investigated by studying various eIF4E over-expressions.

Then we looked at a case in which the same virus can use very different eIF4E in separate species: the *Tobacco Etch Virus* (TEV) relies on eIF4E1 in tomato and pepper but on its isoform eIFiso4E in *Arabidopsis*. To see whether this specificity depends on those eIF4E isoforms only, or rather on a more general host protein complex, we over-expressed pepper eIF4E in TEV-resistant *Arabidopsis* to see whether it can restore host susceptibility to TEV.

As a result from those idiosyncratic eIF4E requirements, broadening the resistance spectrum of plants to viruses may require the inactivation of different *eIF4E* genes, a process which may be detrimental to the plant development. Indeed, we show that the double mutant *eif4e1; eifiso4e* is lethal in *Arabidopsis*. As an alternative, we aimed at creating new resistance alleles in *Arabidopsis* by mimicking natural –and possibly functional- resistance alleles that have been characterized in other species. We hope this may help developing new resistance alleles to *Potyvirus*, including in plants species for which none has been described so far.

Comment citer ce document :

Marena, A., Callot, C., Moretti, A., Gallois, J.-L. (Auteur de correspondance) (2013). Specificity of eIF4E factors towards resistance to potyviruses in *Arabidopsis thaliana*. Presented at 14. Rencontres de Virologie Végétale (RVV 2013), Aussois, FRA (2013-01-13 - 2013-01-17).