

Final Summary Report for CDEA Agreement Number 16-0612-SA

RESISTANCE TO GRAPEVINE FANLEAF VIRUS IN ROOTSTOCKS

Principal Investigator:	Collaborator:
Marc Fuchs	Deborah Golino
Plant Pathology and Plant-Microbe Biology	Foundation Plant Services
Cornell University	University of California
Geneva, NY 14456	Davis, CA 95616
mf13@cornell.edu	dagolino@ucdavis.edu

Accomplishments

- No source of resistance to GFLV is known in wild or cultivated *Vitis* species
- RNA interference (RNAi) is exploited to confer resistance to GFLV in rootstocks
- Conserved nucleotide sequences were identified in the GFLV genome
- A silencing suppressor of GFLV was identified
- RNAi constructs were designed in conserved regions of the two GFLV genomic RNAs, including the viral suppressor of silencing
- Most RNAi constructs were concatenated to substantially reduce the probability that genetically diverse GFLV variants from vineyard populations will defeat the resistance
- The anti-GFLV potential of RNAi constructs was tested in transient assays in *Nicotiana benthamiana*, a systemic herbaceous host, by agroinfiltration followed by mechanical inoculation
- A few promising concatenate RNAi constructs were identified
- Promising concatenate RNAi constructs were transferred into embryogenic calli of grapevine rootstock genotypes 101-14 MGT, 110R, 3309C and 5C via *Agrobacterium tumefaciens*-mediated transformation
- Putative transgenic plants of 101-14 MGT and 3309C were obtained and transferred to soil in the greenhouse
- The integration of RNAi constructs in transgenic rootstocks was confirmed by PCR and Northern blot hybridization
- The expression of RNAi constructs in transgenic rootstocks was verified by reverse transcription-PCR
- Some transgenic rootstock plants were phenotyped via agroinfiltration of infectious GFLV clones but the establishment of GFLV infection was unsuccessful
- Screening transgenic rootstock clones for resistance to GFLV will be the next step

Value of the funded research

- Explored innovative solutions to confer resistance to GFLV in grape rootstocks
- Identified a silencing suppressor in GFLV
- The silencing suppressor provides new avenues to facilitate the activation of RNAi
- Information on research progress was disseminated to stakeholders through presentations at meetings