

FIELD TESTING TRANSGENIC GRAPEVINE ROOTSTOCKS EXPRESSING CHIMERIC ANTIMICROBIAL PROTEIN (CAP) AND POLYGALACTURONASE-INHIBITING PROTEIN (PGIP)

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REPORTING PERIOD: The results reported here are from work conducted between July 2017 and Dec 2018.

FINAL PROJECT SUMMARY

The goal of this project was to evaluate the field efficacy of transgenic grapevine rootstocks expressing a chimeric anti-microbial protein (CAP) or a polygalacturonase inhibitory protein (PGIP) to provide protection to the grafted scion variety from developing Pierce's Disease (PD). We concluded a part of the field evaluation where four CAP and four PGIP expressing Thompson Seedless (TS) were tested as rootstocks to protect grafted wild type TS scions.

- The objective of the concluded part of the study was to evaluate the rootstock-based expression of four chimeric antimicrobial proteins (CAP) and four polygalacturonase inhibitory protein (PGIP) expressing lines to investigate if they could provide trans graft-mediated protection of the grafted scion grapevine variety against PD.

-The data generated in this part of the study clearly indicated that both rootstocks were able to provide trans graft-mediated protection to the scion at a point that was over 100 cm above the graft union.

-Grapevine scions were inoculated in spring each year and evaluated over four growing seasons.

-A significant decrease in vine mortality was observed in vines grafted to either PGIP or CAP expressing rootstocks.

-Vines grafted to transgenic rootstocks harbored a lower pathogen titer as compared to those grafted to wild type rootstocks.

- Spring bud break was significantly higher in vines grafted to transgenic rootstocks compared to those grafted to wild type rootstocks.

-The second objective of this proposal was to express the PGIP and/or CAP transgenes in a relevant commercially acceptable rootstock background (110-14 and 1103) and to develop and test versions of these transgenes that would enhance their efficacy and social acceptability. Five additional versions of both CAP and PGIP transgenes were developed in previously funded projects. Plants for six CAP and six PGIP lines were successfully developed and made ready for field-testing. Transgenic rootstocks corresponding to all these transgenes have been successfully generated, propagated and grafted with wild type Chardonnay, a PD susceptible scion, and were introduced into the field in August 2018.