

Rootstock Breeding and Development

Project Leader: Tom Gradziel

Department of Plant Sciences, University of California, Davis, One Shields Ave., Davis, CA 95616
(530) 752-1575, tmgradziel@ucdavis.edu

PROJECT SUMMARY

Objectives:

- Separate hybrid-vigor effects from major gene effects for individual rootstock traits to improve breeding efficiency.
- Compile current knowledge of resistance value as well as risks for this genetically diverse rootstock germplasm.
- Improve methods to generate the large segregating populations of interspecies-hybrids required for rootstock breeding.
- Develop and test methods for generating potentially useful binary-rootstocks.

Background and Discussion:

Changes in almond cultural management patterns have led to the need for a new generation of rootstocks. Responding to this need, a number of public and private efforts have been initiated to research, develop and test new rootstocks for almond and related stone fruit. Germplasm derived from interspecies hybrids is often pursued to attain the largest possible range of vigor and desirable horticultural traits. The acquisition of such exotic germplasm is difficult and time-consuming, however. As part of the long-term almond and peach scion development programs at UCD, breeding methods have been developed for combining almond, peach and plum as well as related wild *Prunus* species including *P. argentea*, *P. bucharica*, *P. davidiana*, *P. fenzliana*, *P. mira*, *P. orthosepala*, *P. scoparia*, *P. tangutica* and *P. webbii*. Early selections within this breeding germplasm have demonstrated

traits which are desirable for rootstocks, including possible salinity and disease tolerance as well as improved tree architecture, and this interspecies germplasm has been propagated for regional testing in breeding plots at UCD as well with Sacramento and San Joaquin Valley cooperators. Currently, over 50 UCD breeding clones as well as over 2000 segregating seedlings from UCD interspecies crosses are being evaluated in UCD and cooperator trials in the Sacramento Valley as well as the North, Central, in Southern San Joaquin Valley. The germplasm being evaluated includes crosses within the related species *Prunus argentea*, *P. bucharica*, *P. davidiana*, *P. mira*, *P. persica*, *P. scoparia*, *P. tangutica*, *P. webbii* and *P. blirieana*. Multiple cooperative projects are currently assessing resistance to nematodes, phytophthora, armillaria, crown gall, botryophacteria, oxyporus and other wood rot diseases, as well as replant disease. In addition, promising germplasm is being evaluated for tolerance to drought and high temperatures, salinity, compatibility with Nonpareil, and beneficial effects on tree architecture. Related collaborative projects are pursuing methods for improved propagation/regeneration of interspecies hybrids as well as development of novel binary rootstocks.

Project Cooperators and Personnel:

M. Aradhya, G. Browne, P. Brown, J. Chaparro, A. Dandekar, R. Duncan, D. Doll, G. Drakaki, C. Fleck, A. Iezzoni, D. Kluepfel, B. Lampinen, A. Langford, J. Preece, T. Michailides, D. Rizzo, J. Slaughter, A. Volder, and A. Westphal. Co-funded by IAB.

For More Details, Visit

- Poster location 93; Exhibit Hall A + B during the Almond Conference; or on the web (after January 2018) at Almonds.com/ResearchDatabase
- 2016 - 2017 Annual Report (16-HORT10-Gradziel) on the web at Almonds.com/ResearchDatabase
- Related project: 17-HORT16-Aradhya/Ledbetter