

# Interspecific Breeding Germplasm for Rootstock Research and Development

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## PROJECT SUMMARY

### Objectives:

- Compile information from UCD interspecific breeding populations for dissemination to interested public and private researchers.
- Propagate the most promising selections for transfer to the USDA Germplasm Repository for public access.
- Determine the value of marker assisted selection (MAS) in characterizing and prioritizing populations of differing interspecific backgrounds.

### Background and Discussion:

Changes in planting practices, including the quantity and quality of land and irrigation water, have led to the need for a new generation of almond rootstocks and a number of public and private efforts have been initiated to develop and test new candidates. Germplasm derived from other species, either directly or through species hybridization, is often pursued to attain the greatest range of vigor, stress and disease tolerance and desirable horticultural traits.

However, the acquisition of such exotic germplasm is often difficult and time-consuming. At UC Davis (UCD), a diverse germplasm has already been developed combining almond, peach as well as related species including *P. argentea*, *P. bucharica*, *P. davidiana*, *P. fenzliana*,

*P. domestica*, *P. mira*, *P. orthosepala*, *P. scoparia*, *P. tangutica* and *P. webbii*.

In this project, selected germplasm from the UCD almond and peach breeding programs with value for rootstock improvement are being identified, catalogued and propagated. Detailed pedigree relationships as well as trait expression data have been transferred to the RosBREED web-site (<http://www.rosbreed.org/>) to allow end-user analysis.

This germplasm demonstrates extensive diversity both genetically and in the range of traits useful to rootstock improvement programs. Field evaluations have identified unique and potentially useful characteristics in parents and progeny, including modification of tree architecture by *P. scoparia* hybrid rootstocks, drought tolerance in a peach by *P. argentea* hybrid, and a pronounced invigoration of scion growth in several advanced interspecies introgression lines.

Disease and nematode evaluation plots are concurrently being developed in cooperation with UCD, USDA, nursery and grower cooperators.

The genetic characterization of parent species, species-hybrids and subsequent breeding progeny is continuing with their genotyping for over 500 molecular markers showing a fairly uniform distribution over all eight of the *Prunus* chromosomes. Initial inheritance studies indicate that some markers may be unreliable as indicators for specific trait selection, presumably a unique consequence genetic masking resulting from their inter-species origin.

**Project Cooperators and Personnel:** J. Fresnedo, C. Crisosto, M.A. Thorpe, Bruce Lampinen, S. Marchand, P. Martinez, UC Davis

### For More Details, Visit

- Poster location 49; Exhibit Hall A + B during the Almond Conference; or on the web (after January 2015) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- 2013-2014 Annual Reports CD (13-HORT10-Gradziel); or on the web (after January 2015) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- Related projects: 14-HORT4-Duncan; 14-PATH1-Browne; 12-HORT16-Aradhya/Ledbetter; 12-PATH7-Baumgartner