

Rootstock Breeding and Evaluation

Project Leader:

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The general objectives of this project are to develop, test and evaluate citrus rootstocks for disease and pest tolerance, and to select stocks which impart to the scion high yield, superior fruit quality, acceptable fruit size, and other essential traits. This is a long-term project that has been supported by the CRB since 1982.

New potential rootstock hybrids are produced and screened for essential traits including tolerance or resistance to tristeza, Phytophthora, and nematodes. Promising hybrids and imported rootstocks are then tested for compatibility with scions important to the California citrus industry and for performance on various soil types including calcareous soils.

Progress on the eight specific objectives of the 2004-2005 proposal is listed below. Most are on schedule, but technical problems caused us to delay additional work on the last objective until improved facilities are available.

Evaluation of 20 existing rootstock trials: Tree size and health measurements were collected from four lemon rootstock trials in Ventura County and one calcareous soil trial in Tulare County. Yield records were collected from six trials as planned. Packout data was collected for the three Lindcove trials. Brief trial summaries and some detailed tables are available on the project web site (<http://plantbiology.ucr.edu/people/?roose>) (the ? is part of the address).

Plant a new tristeza resistance trial: Trees were budded in the greenhouse at UC/Riverside. Buds did not push as well as expected, probably because the greenhouse available to the project had old fiberglass with low light transmission. The fiberglass roof was replaced with Lexan in November 2005. Trees will be planted in spring 2006 at South Coast Research and Extension Center (Irvine), a climate where tristeza infection and symptom development are efficient.

Fukumoto budwood trial: This trial evaluates compatibility of Fukumoto navel budwood from several healthy and declining source groves with C35, Carrizo, and Volk rootstocks. The trial was planted at Lindcove in June 2005, adjacent to a companion trial of Craig Kallsen and Neil O'Connell that investigates stress effects on decline of Fukumoto. During propagation, buds collected from average trees in declining groves grew as well as those from healthy groves and the control (Foundation Block).

New trials for lemons and mandarin in the Coachella Valley: Seedlings of 23 rootstocks were budded at Riverside. The original plan included lemon and mandarin trials at CVARS and similar trials with a cooperator. The pending release of a low-seeded W. Murcott selection led to a revised plan that includes trials for lemon, the low-seeded W. Murcott, and a new low-seeded Fairchild selection. Planting is expected in 2006.

Screen selected hybrids for iron chlorosis tolerance: Seed of 52 hybrids and 8 standards (mostly African shaddock x Flying Dragon, taiwanica x sweet and Chandler pummelo x trifoliolate) was collected and planted. Of the hybrids, only 20 had adequate trueness-to-type and were transplanted into potting soil

containing 5 or 15% calcium carbonate. The plants were evaluated after 12 and 18 weeks. Standard varieties generally performed as expected, and some pummelo x trifoliolate hybrids with good tolerance were identified (see Figure 1).

Test hybrids for Phytophthora root rot resistance: Hybrids (mostly those included in the iron chlorosis test) were inoculated with *P. parasitica* in late July and evaluated after 10-12 weeks growth in sand beds. Data for the 2005 test have not yet been analyzed. In a 2003-2004 test, 17 different taiwanica x trifoliolate hybrids were generally tolerant, while nearly all taiwanica x sweet hybrids were susceptible.

Repropagate trees of about 200 selected genotypes: These selections must be repropagated because the land will be used for expansion at UCR. Rootstocks were grown but have not yet been budded.

Establish rooted cuttings for genetic mapping of rootstock traits: A 2003-04 experiment produced rooted cuttings of about 50 of the 100 trees in the mapping population. This success rate is not adequate for a genetic mapping experiment. The mist chamber used for propagation is being improved before another attempt is justified.

Contact Citrus Research Board for figure.