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UNIVERSITY OF CALIFORNIA ● COOPERATIVE EXTENSION

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GENETIC MARKERS HELP SPEED UCR CITRUS BREEDING PROJECT

RIVERSIDE--Use of genetic markers is helping to speed the progress of a University of California scientist's project here aimed at developing improved cultivars for this state's citrus industry.

Emphasis of the project is on rootstocks. Genes being sought in the breeding work would provide disease and nematode tolerance and enhance fruit yield, tree size, compatibility with the scion (fruiting part of the tree), and fruit quality. Mikeal L. Roose, UC Riverside assistant geneticist, heads this long-term research work.

The first objective, Roose explains, is to identify those genetic markers which are linked to genes for desirable traits. Once they're all identified, selection of seedlings carrying the desired combination of markers will significantly increase the frequency of the desired traits in hybrids being evaluated in the field.

Several of the markers are already known, according to the UCR scientist, and work is continuing to identify more of them and to test for associations between markers and desired traits. "Existing techniques are being used to identify hybrids and self-pollinated progeny which will be tested as rootstocks," Roose reports. Also, he adds, genetic markers have been used to identify the rootstock of individual trees in field plantings, information which can be valuable in identifying the cause of tree health problems.

Roose is encouraged by the genetic marker systems studied to date. He says they indicate that patterns of gene expression are similar in most citrus species and first generation hybrids.

(more)

"This suggests that combining different genomes shouldn't be difficult," he says. "However, these studies haven't been extended yet to second generation hybrids where viability problems are more frequently encountered."

Roose is continuing four major rootstock trials established in 1977 at the UC Lindcove Field Station near Exeter. The trials include Parent navel and Olinda valencia oranges, Lisbon lemon and Minneola tangelo budded to eight available rootstocks and 11 experimental ones that showed good disease resistance in earlier trials. Here's his latest summary progress report on their status:

The highest yielding rootstocks for navel and Valencia oranges and Minneola tangelos are Yuma Ponderosa lemon and C-32 citrange. Navel orange trees on India lemon, Pomeroy trifoliate, Troyer, Carrizo, and Limoneria rough lemon also are yielding well. Results for Valencia orange, Minneola tangelo, and Lisbon lemon are generally similar to those with navels except that trees on C-35 citrange and 4475 citrumelo also yield relatively well. Rangpur lime rootstock is performing well only with Valencia and Lisbon lemon scions. Internal fruit quality is high with trifoliate orange and its hybrids but lower with the other rootstocks.

New rootstock trials with navel orange and lemon scions are starting this year. Citrus Research Board funding helps support Roose's project.

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Source: Dr. Mikeal L. Roose (714) 787-4137