

Infrastructure for Armored Scale Research

Project Leader:

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California red scale (CRS) remains a primary pest of citrus in the San Joaquin Valley. As new pests enter California citrus, red scale research must develop efficacious control tactics that can integrate into new pest management practices. This ongoing project seeks to foster research by UC Riverside and industry scientists by providing CRS, their associated parasitoids, and assistance in experimental design to achieve this goal.

We continue to import and maintain red and yellow scale natural enemies for release in the San Joaquin Valley. These armored scale parasitoids, collected worldwide (1948 though 2001), continue to contribute to red scale research including augmentative and classical biological control.

This year we collaborated with Mike Roose and Joe Morse to provide crawler producing CRS for an experiment to evaluate the impact that CRS feeding has on the enzymes produced by the tree. The goal of this research is to evaluate the possibility of creating a tree less desirable to CRS. The more we understand about how the plant responds to stress, the more likely it is that we can devise an effective control.

We provide Dr. John Heraty (UCR) with scale for his systematics studies of armored scale parasitoids, particularly *Aphytis* and *Encarsia* species. Consequently, we now know that a complex of *Aphytis* species near *melinus* exists. Thus, additional *Aphytis* sources are available for CRS biological control. We can also use these techniques to identify immature field-collected parasitoids and to track their establishment and dispersal, impossible prior to the availability of these molecular techniques. We can also monitor our *Aphytis* colonies to insure their integrity. Such colonies are essential to answer practical ecological and taxonomic questions of importance to their exploitation for biological control.

We continued to supply the Richard Stouthamer Lab (CRB project 5500-161 *Wolbachia* project) with scale-infested fruit from our cultures for their experiments. The scale-infested fruit that we supply weekly to the Stouthamer lab is used to maintain their *Wolbachia* cured and infected *Aphytis* lines. With these lines, his lab conducts crosses between *Wolbachia* infected and uninfected strains of *Aphytis lingnanensis* and *A. melinus*.

We provided all of the scale infested lemons for CRB 5500-160 (Morse and Luck, integrating chloronicotinyl pesticides). We set-up and establish the pre-counts for all field out-plant lemons. We continue to provide crawler producing fruit to inoculate all on-tree field fruit for this project and for the additional research plots at UCR (Nick Toscano & Morse CDFR PD/GWSS Research Board Project #04-0530)

All of our scale production for experiments/research is reared on Lisbon lemons (Figure 1). We routinely provide scale and/or parasitoids for departmental teaching and graduate student research.

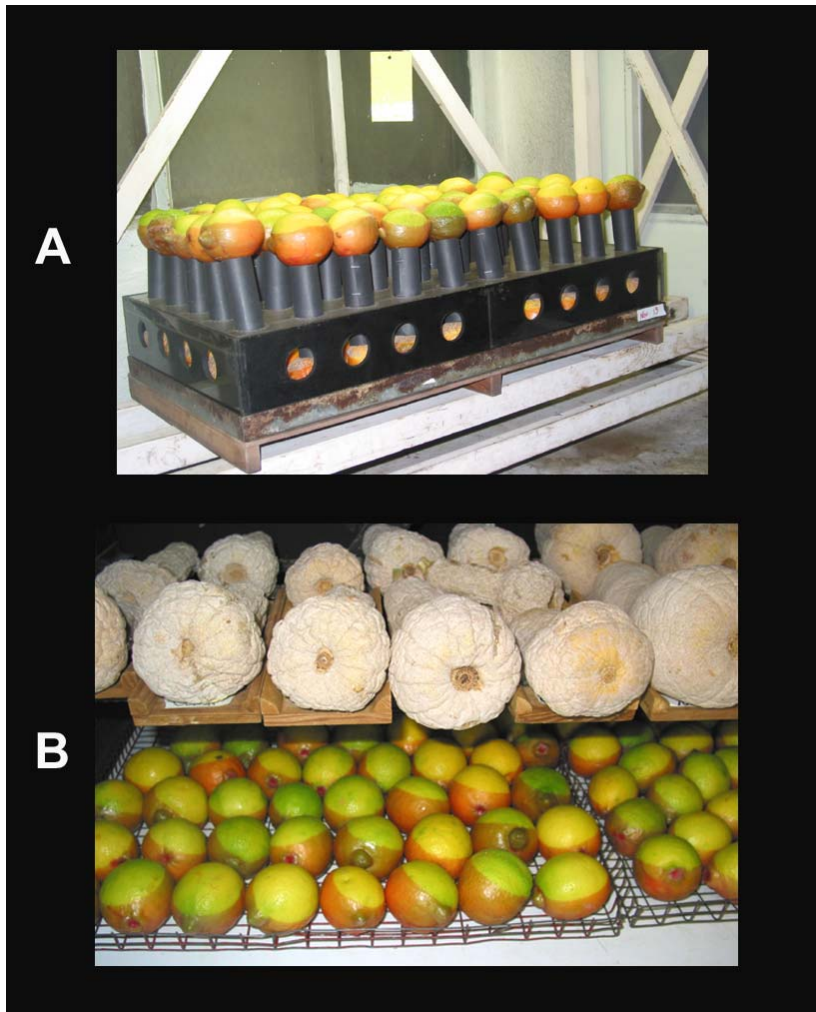


Figure 1. CRS (A) and oleander scale (B) inoculation units. Parental scale is produced on lemons for CRS and on butternut squash for oleander scale.