

# Concealed Damage Field Studies

## Project Leader: Franz Niederholzer

University of California Cooperative Extension, Colusa County, P.O. Box 180, Colusa, CA 95932  
(530) 458-0570; fjniederholzer@ucdavis.edu

### PROJECT SUMMARY

#### Objectives:

- Test the role of different field conditions and practices on the development of concealed damage (CD) in nuts of the Monterey variety.

#### Background and Discussion:

Concealed damage can significantly reduce grower returns in years with late harvests and/or early rains. Following roasting, the kernel interiors turn darker than undamaged nuts and flavor can be bitter. In extreme cases, kernel internal color and flavor are altered before roasting.

Prolonged moisture at elevated temperatures (above field temperatures) appears to contribute to this condition, but the influence of specific combinations of field moisture, temperature, and orchard practices between harvest and pick-up on the appearance of concealed damage has not been extensively examined – especially for the Monterey variety.

This project was begun in an effort to better understand the field conditions that contribute to concealed damage and management practices that can reduce the risk of concealed damage when rain is forecast.

Field work was conducted at the Nickels Soil Lab near Arbuckle, CA during the 2011, 2012, and 2013 harvests and coordinated with ongoing studies led by Alyson Mitchell at Food Science and Technology, UC Davis.

2012 field work demonstrated the value of

conditioning. Under good drying conditions and following several conditioning treatments, initially dry Monterey nuts that received 1” of artificial rain dried to acceptable moisture levels for nut pickup 14 days being wetted. Conditioning once before rain and once 3 days after rain resulted in the lowest hull (<11%) and kernel (<6%) moisture levels. Furthermore, conditioning before and 3 days after wetting produced the highest quality in-shell product in this study. Single post-rain conditioning produced better results (lower hull and kernel moisture levels) than a single pre-rain conditioning. Conditioning before rain limited the increase in hull and kernel moisture after 1” water, but conditioning after rain was needed for hulls and kernels to re-dry to commercially acceptable pickup levels in 14 days. In contrast, unconditioned nuts did not begin to dry after two weeks in the field following rain.

Interior temperatures within the mass of the harvested crop did not exceed 100°F in any of the treatments. No symptoms of concealed damage (internal browning) were apparent in any of the treatments after four months in storage.

Details and results of 2013 studies, which included “rolling” wetted crop on the ground prior to windrowing and conditioning wetted crop after windrowing, will be presented at the 2013 Almond Conference.

**Project Cooperators and Personnel:** Alyson Mitchell, University of California, Davis; Stan Cutter, Nickels Soil Lab, Arbuckle, CA; Bruce Lampinen, University of California, Davis; Andrew (Bob) Johnson, University of California, Davis.

#### For More Details, Visit

- Poster location 26, Exhibit A and B during conference; or on the web (after January 2014) at [www.almondboard.com/researchreports](http://www.almondboard.com/researchreports)
- 2012.2013 Annual Report CD (12-HORT14-Niederholzer); or on the web (after January 2014) at [www.almondboard.com/researchreports](http://www.almondboard.com/researchreports)