Fertigation: Interaction of Water Management and Nutrient Management in Almond

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PROJECT SUMMARY

Objectives:

- As part of the larger fertilizer study by Patrick Brown, document the amount and timing of water applied to each study site
- Monitor plant water potential at each of the fertilizer/nutrient study sites to determine whether irrigation and fertilization levels independently influence tree nutrient status.
- In the southern San Joaquin Valley site, use soil moisture, meteorological, and satellite-based remote sensing methods to monitor non-stressed almond evapotranspiration (ET) under both drip and microsprinkler irrigation. Assess the impact, if any, of fertility on almond ET through replicated sites in this one orchard.

Background and Discussion:

Water and nutrient management are both key factors for maximizing almond yield and minimizing environmental impact. This project focuses on the interplay between these factors, and, among others, the question of whether or not the nutrient status of the plant can influence plant water demand, or the water status of the plant can influence nutrient demand. This effort is part of a multiyear, multidisciplinary, and multi-location project "Revisions to a Nutrient-Budget Approach and to Leaf Sampling Methods for Fertilizer Management in Almonds" being conducted by Patrick Brown and colleagues.

Optimal nutrient and water management will depend on both soil and environmental conditions, and hence both water and nutrient status of trees at 4 orchards across the state are being monitored with pressure chamber and leaf sampling methods, respectively. In these orchards, irrigation is managed by growers to address a variety of factors such as minimizing hull-rot or ensuring a dry ground for harvest, any of which may affect tree water and nutrient status as well as yield. Results to date indicate significant differences in tree water status between sites, with kernel size showing a positive relation to tree water status across all sites.

At one site in the southern San Joaquin Valley, a variety of fertilizer treatments are being applied and canopy evapotranspiration (ET) is being measured. The data so far do not indicate a strong influence of nutrient status on ET, but do indicate that almond trees have a higher ET than previously thought. These results should lead to more accurate estimates of the almond crop coefficients used to estimate irrigation needs.

Project Cooperators and Personnel: Patrick Brown, Bruce Lampinen, Saiful Muhammed, William Stewart, Jeremy Nunes, University of California, Davis; John Edstrom, University of California Cooperative Extension - Colusa County; Roger Duncan, UCCE - Stanislaus County; Richard C. Rosecrance, California State University, Chico; Bob Beede, UCCE - Kings and Tulare counties; Franz Niederholzer, UCCE - Sutter and Yuba counties; William Stewart and Andres Olivos, UCCE

For More Details, Visit

- Poster locations 19 and 20, Exhibit Hall, Session 2; or on the web (after January 2012) at AlmondBoard.com/AICposters
- 2010 - 2011 Annual Report CD (10-HORT11-Shackel/Sanden and 10-HORT11A-Sanden/Shackel); or on the web (after January 2012) at AlmondBoard.com/ResearchReports
- Related projects: 11-PREC2-Brown, 11-PREC5-Brown, 11-PREC4-Hopmans, and 11-AIR2-Smart