Defining a Central Valley Almond ET/ Yield Production Function for Almonds

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PROJECT SUMMARY

Objectives:

1) Quantify kernel yield in lbs/inch actual ET (applied water + soil moisture depletion – leaching) under non-limiting fertility levels by varying depths of applied irrigation and total seasonal ET.
2) Quantify the interaction of hull-split Regulated Deficit Irrigation on the yield function. Use precision/variable rate irrigation scheduling to maintain uniform RDI plant stress across Hull Split RDI treatment replications.
3) Using NO_3 and Cl^- movement in the rootzone to determine nitrogen and water use efficiency as a function of applied water.
4) Assess long-term tree health and orchard profitability given differing amounts of applied water and scheduling methods.
5) Assess the impact on ET and yield of "pulsed" vs. continuous irrigation (Kern only).

Background and Discussion:

According to UC publications and trials in the 1980's and 1990's almond crop water use (evapotranspira-tion, ET) for micro irrigated orchards in the Central Valley was estimated to be about 42 inches. Average California yields were less than 1,500 lb/ac, with a 2,500 lb/ac kernel yield considered a rare exception.

Growers began adopting long pruning and closer spacing in the mid 1990's with some growers and a lone Kern County Farm Advisor saying that almonds in the San Joaquin Valley needed more water. Work by Dave Goldhamer showed that post-harvest irrigation was critical for next year's bloom. Average Kern County yields shot past 2,000 lb/ac in 2002 and have been around 2,500 lb/ac for 2010-11.

A five year trial monitoring tree nutrition, yield, and ET by varying nitrogen fertilizer rates in Kern County has shown that almonds can use as much as 56 inches of water over the season for a vigorous full canopy orchard and produce over 4,800 lb/ac of kernels. Some growers have attained similar yields in production orchards from Modesto south. But virtually all of these high production orchards see increased disease problems – especially from hull rot and loss of lower canopy spurs and limbs. Maintaining a low-stress tree water status until very close to harvest also makes more trees susceptible to barking.

Using three 7th leaf (starting 2013) orchard sites in Kern, Merced and Tehama Counties we will vary applied irrigation rates from 70 to 110% of this high rate of ET, monitor yield and disease, and try to document the most profitable/sustainable level of almond irrigation over the life of the orchard.

Project Cooperators: Patrick Brown, Jan Hopmans, David Smart, Bruce Lampinen, Mike Whiting, University of California, Davis

For More Details, Visit

- Poster location 8, Exhibit Hall A & B during conference; or on the web (after January 2013) at www.almondboard.com/researchreports
- Related Projects: 12.HORT11A.Sanden/Shackel