

Project No.: 93-BF2 - Almond Culture and Orchard Management

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- Objectives:**
1. Boron nutrition on productivity of the Padre almond variety
 2. Evaluation of alternate methods of potassium application
 3. Comparison of almond tree growth, production and hull rot under various drip irrigation management systems.
 4. Comparison of low volume irrigation systems for almonds.
 5. Soil-building with covercrops in almond orchards.
 6. Effect of trunk damage on hull split and productivity of Nonpareil almond.
 7. Investigation and control of apple leafhopper.
 8. Evaluate the control of ring nematode in almond orchards with the fumigant Enzone applied through a micro sprinkler system.

Results:

**BORON NUTRITION EFFECTS ON PRODUCTIVITY OF THE PADRE ALMOND VARIETY.
Wesley Asai, U.C. Farm Advisor in Stanislaus County.**

Boron soil and foliar treatments were used in this project to try and correct nonproductive ("bull") symptoms in the Padre variety that appeared to be hampering productivity. The results from the 1992 data indicated a trend in increased percent set and production per acre from the boron treatments. The orchard started out with a low (19 ppm) boron leaf analysis.

The 1993 data was inconsistent with the 1992 results. In 1993, there was no significant difference in percent set between the treatments. In 1992, the yields (although not significant) showed a trend with the foliar treatments being higher than the soil treatments which were higher than the untreated check. In 1993, there was a reversal. The untreated check was significantly better than the foliar treatment which was significantly better than the soil treatment.

The conclusion from this study is that the "bull" symptoms exhibited by the Padre may have been initially related to juvenility and low boron levels and was corrected by the initial treatments. In the second season, it appears that the boron may have reached toxic levels and had detrimental effects on productivity.

EVALUATION OF ALTERNATIVE METHODS OF POTASSIUM APPLICATION. Joseph Connell, U.C. Farm Advisor in Butte County.

Potassium deficiency is common in northern California orchards. Mass dose applications (2000 lbs/ac) of potassium sulfate in bands on each side of every tree row once every four years is expensive. More frequent applications of one potassium band in every middle or in alternate middles may effectively maintain potassium leaf levels at a lower cost.

The alternate middles treatment has received three mass dose bands of potassium. Analysis of soil profiles below this treatment were completed this past summer. Elevated potassium levels were found in a 2 to 3 foot wide zone in the orchard middle extending 18" deep. Penetration of potassium with this method of application was no deeper than that found using the standard method. Leaf analysis from both treatments receiving potassium soil applications showed numerically higher values than the untreated checks, but, due to variability, the differences were not statistically significant.

COMPARISON OF ALMOND TREE GROWTH, PRODUCTION AND HULL ROT UNDER VARIOUS DRIP IRRIGATION MANAGEMENT SYSTEMS. Wilbur Reil, U.C. Farm Advisor in Yolo and Solano Counties.

The comparison of almond tree growth, production and hull rot under various drip irrigation management systems trial was expanded to also consider the effect of excess boron and the moisture status of the tree at hull split on the mummies remaining after harvest. This year hull rot was not a major problem in the trial although some was present.

Applying excess boron to trees in the spring caused an average of 500% increase in the number of mummies after shaking on four varieties of almonds (101 mummies on trees with moderate boron vs. 498 mummies on trees with high boron) although there were very few visual symptoms of boron excess on the tree. No gumming was visible between the nut and peduncle or on the peduncle. Reducing water to 50% ET. at the beginning of hull split reduced the number of mummies after harvest also. Thus, it appears that there may be at least two causes for nuts (mummies) remaining on trees after shaking. Two years of data suggests a slight to moderate stress occurring at early hull split may be beneficial for nut removal as well as possibly a reduction in hull rot.

COMPARISON OF LOW VOLUME IRRIGATION SYSTEM FOR ALMONDS. John Edstrom, U.C. Farm Advisor in Colusa County, and Larry Schwankl, U.C. Irrigation Specialist.

Following the fourth year of operation of the three types of irrigation systems (surface drip, micro-sprinklers, and subsurface drip) on the 22-acre addition to the Nickel's Soils Laboratory, all three irrigation systems were found to continue to work well with irrigation uniformities in excess of 85%. All plots showed comparable growth with the subsurface drip (2 lines per tree row) looking particularly healthy during this last year.

Extensive soil moisture monitoring and irrigation scheduling efforts will be implemented this upcoming spring to characterize root development, water uptake, and water movement.