

Influence of Irrigation Management on Nitrogen Use Efficiency, Nitrate Movement, and Ground Water Quality in a Peach Orchard

FREP Contract 95-0214

Project Leader:

Scott Johnson
Dept. Pomology
UC Davis

Objectives

The project was initiated to assist growers to better manage fertilizer N application through drip irrigation systems in order to achieve profitable almond production and reduced possible adverse affects on the environment. The study was designed to address the following objectives:

1. Measure soil nitrate movement under different low-volume irrigation regimes.
2. Investigate the interaction of fertilizer use and irrigation on the yield and fruit quality of peaches.
3. Obtain information on water and fertilizer use patterns of stone fruit growers.
4. Summarize existing information from the literature on fertilizer use efficiency and nitrate leaching in stone fruit.
5. Disseminate the information obtained under the first four objectives to stone fruit growers.

Summary

The project covered a wide range of issues in irrigation and nutrient management for stone fruit orchards. Two literature reviews ("*The Effect of Various Cultural and Environmental Factors on Nitrogen Use Efficiency*" and "*Techniques for Sampling Soil Nitrates: Ceramic Cup Extractors*") were written and made available to UC Cooperative Extension stone farm advisors and CDFA.

A plot study of fertilization and irrigation regimes was also carried out in 1992. Multiple applications of N fertilizer applied through a low-volume system were compared to one-time applications within 3 different irrigation regimes (a high frequency 100% ET, low frequency 100% ET and high frequency 100% ET except for 150% ET during the final fruit grow stage). Single fertilizer applications were compared to multiple ones. The results showed that there were no significant effects of fertilization treatments on any measured yield or growth parameters. However, yield and number of fruit per tree were significantly reduced only in the 150% ET treatment.

Project Publications

Rosecrance, R.C., R.S. Johnson and S.A. Weinbaum. 1998. The effect of timing

of post-harvest foliar urea sprays on nitrogen absorption and partitioning in peach and nectarine trees. *Journal of Horticultural Science and Biotechnology* 73:856-861.

Rosecrance, R.C., R.S. Johnson and S.A. Weinbaum. 1998. Foliar uptake of urea-N by nectarine leaves: A reassessment. *HortScience* 33:158.