Integration of Tree Spacing, Pruning, and Rootstock Selection for Efficient Almond Production

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PROJECT SUMMARY

Objectives:

In support of a major ongoing 20-year project:

- Continue to evaluate the interactive effects of three key management factors—tree spacing (planting density), rootstock selection, and training/pruning techniques—on tree size, structural integrity and short-term and long-term yield in almond orchards.
- Continue to evaluate the associated economic advantages and disadvantages.

Background and Discussion:

To prune, or not to prune, and when and how to prune—collectively, tree training—are critical issues in orchard management, in conjunction with choice of tree density and rootstock.

Pruning-related questions abound, and this two-decade project, initiated in 1999, continues to explore them. Meanwhile, it is apparent that minimal pruning, or even nonpruning, of almond trees is gaining in popularity among growers.

Central to this long-term research project has been the use of a single, integrated trial to examine the interactive consequences of decisions made about tree spacing, pruning, and rootstock selection.

This approach is expected to lead in time to a better understanding of canopy management on the short-term and long-term sustainability of almond production.

The trial began with three varieties on three kinds of rootstocks, planted at four tree densities ranging from 90 to 198 trees per acre on the east side of Stanislaus County. The trees have been subjected to four training/pruning strategies ranging from annual standard practices to no scaffold selection to completely unpruned other than for equipment access.

High density planting and minimal pruning resulted overall in maximum early yields. This remains true after 14 years, especially for the smaller Carmel variety on Nemaguard. However, cumulative yields for the larger Nonpareil variety on the vigorous Hansen rootstock are similar at all tree spacings.

The farther trees are planted apart, the larger they have grown. Over the course of this project, widely spaced trees have larger trunks, wider canopies, are slightly taller, had significantly more mummies in the winter, had more scaffold breakage and tree blow over problems, and have accumulated more trunk shaker injury. It is possible that higher density trees may sustain yields and survive longer than widely spaced trees.

Unpruned almond trees have produced as well as or better than trees pruned annually in the conventional manner – at least through the first half of the orchard's life.

Worth noting, during the early development years untrained trees and trees trained to multiple scaffolds were more susceptible to blow over and scaffold failure than young trees that were trained. One solution would be to train the trees during the initial two years and then subsequently reduce or abandon pruning activities.

The long-term impacts require continued monitoring and documenting the effects of minimal pruning and high density planting. Time will tell how lack of pruning and close spacing will affect longer-term production and profits.

Project Cooperators and Personnel: Bruce Lampinen, University of California, Davis

For More Details, Visit

- Poster location 68, Exhibit Hall A and B during conference; or on the web (after January 2014) at www.almondboard.com/researchreports
- 2012.2013 Annual Report CD (12-HORT5-Duncan); or on the web (after January 2014) at www.almondboard.com/researchreports
- Related Project: 13-HORT6-Niederholzer