Tree Architecture and Development of New Growing Systems

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PROJECT SUMMARY

Objectives for current year:

- Identify almond varieties best suited for growing as narrow, upright trees in high density orchards.
- Establish field trials to evaluate minimal pruning systems used to produce narrow, upright almond trees planted at high density.
- Investigate light distribution in almond trees planted at high density.
- Evaluate use of trunk girdling to increase flowering and yields of young almond trees planted at high density.

Background and progress:

Almond orchards of the future will need to be more efficient, with more cost effective and sustainable growing and harvesting systems. This new program of collaborative research between Australian and Californian science groups will help address this challenge. It will be a multi-year program building on a similar program established in Australia in 2014.

Almond growers are well aware that current growing systems are not optimal for light interception and cropping performance. These current systems produce large multi-axis trees with canopies wider at their tops than at their base to form an “inverted pyramid” tree shape. Because fruit bud development depends on good exposure to sunlight, shading of the lower and inner canopy of the current systems results in most of the crop being produced in a relatively narrow zone at the canopy margins. In this research, we will develop growing systems to produce pyramid-shaped trees (wider at the base than at the top) with narrow canopies suitable for planting at high densities. From the tree fruit industry, it is known that this narrow or slender pyramid tree shape is the most efficient at capturing light and converting that light into high value crops.

Our strategy is to study the natural growth habit (or tree architecture) of the various almond varieties and identify those that are suitable for growing as narrow, upright trees in orchards planted at high density. Plant responses to a range of pruning and training, trunk girdling, and plant growth regulator treatments will also be investigated to ensure maximum productivity gains are obtained with no or minimal additional cost.

This year in California (Year 1), we have been working with Burchell Nursery and UC Davis to identify and characterize the best commercial scion varieties for establishment in “high density” field trials. The first set of trees have now been propagated and agreements made for these trees to be planted in winter 2018 in two new field trials at the CSU Fresno experimental farm in Clovis. A smaller field trial will also be planted at Burchell’s Nursery near Fowler. Trials have also been established to evaluate the use of trunk girdling to increase flowering and accelerate cropping on young trees.

Project Cooperators and Personnel: Bruce Lampinen, Tom Gradziel, UC Davis; John Slaughter, Kaylan Roberts, Burchell Nursery; Ann Smith, PFR Australia; Michelle Wirthensohn, University of Adelaide.

For More Details, Visit

- Poster location 84, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2018) at Almonds.com/ResearchDatabase
- Related Projects: 17-HORT5-Duncan; 17-HORT3-Yaghmour (Lightle)