Spur Dynamics and Almond Productivity

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PROJECT SUMMARY

Objectives for Initial Phase:

- Quantify the dynamics of spur renewal, spur fruitfulness, and spur longevity in almond.
- Determine how these dynamics are influenced by using two key management variables in the form of differing application rates of nitrogen and irrigation water.
- Assess the effects on overall orchard development and productivity of applying the key management variables.

Objectives for Ongoing Phase:

- Reverting all treatments to only the optimal treatment combination and study the recovery of productivity of the different canopy structures that resulted from using differing irrigation/nitrogen combinations.
- With the canopy cover stabilized at 65-75% of midday light interception, continue monitoring spur activity and initiate further microclimate measurements of the canopy.

Background:

Initiated in 2001, this multiyear study was designed to take a close and long look at the almond tree's nut-bearing spurs, in the context of tree yield and canopy light intersection and various treatment scenarios.

Of key interest was learning more about the spurs' reproductive longevity and regularity of fruitfulness; how such properties bear on yield and are influenced by nitrogen- and water-application management decisions.

An existing 146-acre orchard was used for the study. Four treatments were initiated at 5th leaf for seven years: high water, high nitrogen (control); high water, moderate nitrogen; moderate water, high nitrogen; and moderate water, moderate nitrogen.

Discussion:

One of the researchers' major findings about the study's initial phase was that less than 20% of the monitored spurs in any treatment ever flowered. However, as they noted, non-stressed trees consistently bloomed earlier and more evenly than the moderately stressed ones.

They also found that, as the trees matured, the spur mortality rate was higher in the non-stressed trees than in the stressed ones but had more growth overall. One possible reason is that the non-stressed trees' heavier canopy shaded out the leaves near the spurs.

Another significant finding was that yields per unit of light intercepted (a standard comparative measure) were similar for the high-water/moderate-nitrogen and moderate-water/high-nitrogen treatments, while cumulative yields/A were less with the moderate stress.

Yields and trees recovered quickly when moved from moderate stress to non-stressed.

This study shows growers should seek a balance between developing the canopy rapidly and preventing tree loss from excessively wet conditions in mature orchards. The data suggest growers could irrigate to a stem water potential measured by a pressure chamber of -8 to -9 bars to develop the canopy when trees are young, then irrigate to -10 or -12 bars once a full canopy has developed and maintain productivity.

The team's analysis of the latest data on spur dynamics is now being prepared for publication.

Project Cooperators and Personnel: Ted DeJong, Sam Metcalf, and Loreto Contador, University of California, Davis; Mario Viveros, University of California Cooperative Extension, Kern County; Joe McIlvaine, Nadav Ravid, and Rob Baker, Paramount Farming Co.

For More Details, Visit

- 2009-10 Annual Report CD (09-HORT7-Lampinen); or on the web (after January 2011) at AlmondBoard.com/ResearchReports

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