Plant-Based Measures of Water Stress for Irrigation Management in Multiple Almond Varieties

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PROJECT SUMMARY

Objectives:

- Determine whether differences in water-stress responses among selected almond varieties, as measured by stem water potential (SWP), occur across a range of soil and orchard conditions.
- Determine whether there are differences in response to water stress among selected almond varieties, and whether any observed differences are related to inherent physiological differences among the varieties.
- Determine whether there is a reliably consistent relationship between SWP measures and other candidate plant-based and soil-based measures of water stress, particularly those that can be automated.

Background:

Accurate and timely irrigation management is a key to both successful almond production and appropriate environmental stewardship, especially in times of protracted water shortages.

In recent years, in deciding when and how best to irrigate, growers have relied increasingly on gauging the trees' level of water stress by using a pressure chamber—"the Bomb"—to measure SWP.

Although this method is reliable, is does have some drawbacks. A significant one is that it requires the use of quite a bit of time, and is not amenable to being automated.

Further developing the Bomb's potential as a basic management tool is one of the two principal goals of this new, multiyear research project.

The researchers plan to build on the baseline (nonstressed) SWP values that have been developed for Nonpareil, and also on David Doll's preliminary work, to explore comparable values for other varieties—and whether they carry the same implications as those in Nonpareils.

The researchers' other principal goal is to examine and compare a variety of other commercially available methods of measuring water stress. They will focus on advanced automated technologies, as well as on portable devices said to be inexpensive and easy to operate.

They plan to determine what SWP measures versus what those other methods measure, allowing for the possibility that the non-SWP methods may be more closely related to tree productivity.

The eventual outcome of this project is likely to be a useful-in-times-of-water-shortages study of how selected almond varieties respond to water stress.

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- Poster location 7, Exhibit Hall, Session 3; or on the web (after January 2011) at AlmondBoard.com/AICposters