Almond Fruit Phenology Model

Project Leader: Tom Gradziel
Dept. of Plant Sciences, University of California, Davis, One Shields Ave., Davis, CA 95616
(530) 752-1575, tmgradziel@ucdavis.edu

PROJECT SUMMARY

Objectives:

- Recover as complete a data set as possible from Dr. Kester's almond bloom and fruit phenology studies. Attempt to complete the development of a fruit/embryo growth phenology model for the variety Nonpareil in a form useful to farm advisors and other almond researchers and as a possible extension publication.
- Test the proposed model for its value as an early predictor of developmental times for full bloom, seed development and in particular, hull-split for Nonpareil
- Evaluate seed development data from the 1980s and more current research to assess the role of incomplete seed fill as a determinant in final variety yield potential.

Background:

An ambitious attempt at modeling almond fruit development or 'phenology' was undertaken in the early 1980s by Dr. Dale Kester and cooperating Farm Advisors including Joe Connell, Mario Viveros, and Mark Freeman and while extensive and detailed data was collected for several varieties including *Nonpareil*, final analysis and information extension was never completed.

The 1982, 1983, and 1984 data sets were recovered and analyzed.

The ultimate objective of this early research was the use of accumulated degree days to develop a better prediction of the time of hull-split initiation for facilitating navel orangeworm control.

While this approach (using 1980's data) provides only a relatively good prediction of kernel development, its ability to predict hull-split initiation was even poorer than the much less tedious approach of predicting hull-split based solely on calendar date (Julian date). The poor correlation between accumulated degree days and key almond phenological stages such as hull-split appeared to be the consequence of sizable regional differences in cultural practices, fruit set, and level of fertilization and irrigation.

The data sets have been given to Ted DeJong and Bruce Lampinen in support of their current modeling effort (See 10-PREC1-DeJong, Assessing the Carbon Budget of Almond Trees and Developing a 3-D Computer Model of Tree Architectural Growth and Dry-Matter Partitioning in Almond).

The apparent failure of this type of preliminary model is, in fact, one of its benefits since when the model fails in predicting real-world responses it directs us to specific limitations in our knowledge. In that sense, this past effort and the data derived from it is assisting the current more sophisticated effort underway.

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Project Cooperators and Personnel: Carlos Crisosto, Bruce Lampinen, S. Metcalf, M. A. Thorpe, Plant Sciences, UC Davis; Joe Connell, University of California Cooperative Extension, Butte County; Mario Viveros, UCCE Emeritus, Kern County; Mark Freeman, UCCE Emeritus, Fresno County

For More Details, Visit

- 2009-10 Annual Report CD (09-HORT10-Gradziel); or on the web (after January 2011) at AlmondBoard.com/ResearchReports