

Developing an Internet-Based Model for Predicting Cross-Pollination and Nut Set in Almonds

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PROJECT SUMMARY

Objectives:

As the last phase of a multiyear program is to develop an Internet-based pollination model and to provide it with inputs.

- Determine the progression of bloom for almond cultivars based upon temperature.
- Estimate the number of bees on trees of different cultivars throughout bloom.
- Estimate the proportion of bees carrying cross-pollen while foraging in almond blossoms.
- Estimate cross-pollination rates and time of nut set.
- Initiate programming of the ALMOPOL software package, and establish an area on the Carl Hayden Bee Research Center website for the public dissemination of information on almond pollination and this project's latest findings.

Background:

The purpose of this program has been to develop a reliable predictive model, named ALMOPOL, for almond growers to use in anticipating the timing of cross-pollination and nut set, and in estimating their need for pollinating bees.

Among the time-dependent seasonal variables of critical concern to almond growers are the

springtime reawakening of the trees, the availability and activity of pollinating bees, and the trees' progression through cross-pollination to nut set—all within the context of local weather patterns.

Accordingly, the model was planned to cover the key decision factors, including orchard layout and the placement of cultivars, the required number and strength of bee colonies, and temperature and other weather conditions.

In addition, it was designed to accommodate growers' preferences for using not only honey bees but also blue orchard bees as pollinators.

Discussion:

The final phase of ALMOPOL's development is focused chiefly on data acquisition, analysis, and model validation. This includes using both field data and historical data sets. These materials have been and are being used to derive and fine tune prediction equations.

Significant progress has been made and model simulations indicate cross pollination by honey bees is most affected by colony strength, weather, and choice of varieties in the orchard.

The current version of ALMOPOL is available on the Internet at

<http://gears.tucson.ars.ag.gov/almopol/>

Project Cooperators: Ruben Alarcon, California State University, Channel Islands; Bruce Eckholm, University of Arizona; Robert Curry, Crystal River Inc., Tucson, AZ.

For More Details, Visit

- 2009-10 Annual Report CD (09-POLL1-DeGrandi); or on the web (after January 2011) at AlmondBoard.com/ResearchReports