Development and Testing of a Mobile Platform for Measuring Canopy Light Interception

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PROJECT SUMMARY

Objectives:

- Utilize the mobile platform light bar to complete collection of light interception and yield data for long term studied orchards with the goal of determining what happens to this relationship as orchards age.
- Complete and release a working version of the iPhone application to calculate canopy light interception and release it in the Apple store.

Background and Discussion:

Data collected on tree canopy light interception has shown that it is a valuable indicator of an almond orchard's potential productivity. Results suggest that 50 kernel pounds of almond can be produced for each 1% of total incoming midday canopy photosynthetically active radiation (PAR) that is intercepted. These data are also valuable in evaluating new cultivars to assess whether higher yields can be attributed to higher efficiency or whether they simply grow faster.

Traditionally, obtaining the PAR data has been a slow and labor-intensive process based on use of a hand-held lightbar. Consequently, data gathering has often consisted of only limited and small-scale sampling and of collecting PAR data from only a portion of the row where yield data was collected.

Starting about 7 years ago, a mobile platform lightbar was developed on a Kawasaki Mule. It can span an entire row (up to 32 feet), and includes an advanced data logger and accurate GPS. With this setup, it is possible to gather data at a high rate of speed.

In 2016, research concentrated on collecting light interception data on the orchards that had the longest-term data sets with the goal of understanding what factors lead to yield declines as orchards age. A number of orchards that maintained relatively high productivity per unit light intercepted have been identified. Work was also done looking at light interception over the course of the day in very high-density orchards versus more traditional plantings.

A working version of the iPhone app for estimated midday canopy PAR interception has been completed and was released in the Apple store under the iPAR name in the fall of 2016. This app gives growers a tool to estimate yield potential and estimated nitrogen needs of a given orchards based on canopy size.

Overall, this project has the potential to significantly improve orchard design and management by providing a basis for better managing water, as well as estimating productivity and crop nitrogen needs.

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For More Details, Visit
- Poster location 90, Exhibit A + B during the Almond Conference; or on the web (after January 2018) at Almonds.com/ResearchDatabase
- 2016 - 2017 Annual Report (16-HORT13-Lampinen) on the web at Almonds.com/ResearchDatabase
- Related Projects: 17-HORT5-Duncan, 17-HORT3- Yaghmour (Lightle)