

## **Optimizing Mating Disruption Against Navel Orangeworm in Almond**



### **Meeting Description**

Pheromone-based mating disruption (MD) has become an increasingly important tool for managing navel orangeworm (NOW) in almond as well as pistachio and walnut. Results of University of California and industry-based research projects indicate that NOW MD can provide an effective tool, albeit gaps in our understanding of how to optimize its use persist. Speakers at this meeting **will** present up-to-date information on utilizing MD in almond. Topics will focus on current and new NOW monitoring tools, and effective insecticide application strategies in conjunction with NOW mating disruption.

### **Date and Time:**

September 25<sup>th</sup>, 2018, 8:00 am to 1:30 pm

### **Location:**

Kearney Agricultural Research and Extension Center  
 9240 S. Riverbend Ave., Parlier CA, 93648  
 Nectarine room

**Please RSVP:** [ketollerup@ucanr.edu](mailto:ketollerup@ucanr.edu)

**Note:** We have applied for 2.5 hours of (other) continuing education units associated with this meeting.

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|------------------------|---|
| <b>Coffee:</b>         | 7:30 – 8:00 am  |
| <b>8:00 – 8:15 am:</b> | Introduction  |
| <b>8:15 – 9:00 am:</b> | <b>Mating disruption: Efficacy and economics</b><br>Speaker, David Haviland, University of California Cooperative Extension Advisor,<br>Kern County   |
| <b>9:00 – 9:30 am:</b> | <b>NOW mating disruption: Product options, field application, and other considerations</b><br>Speaker, Jhalendra Rijal, University of California Cooperative Extension Advisor,<br>San Joaquin, Stanislaus, and Merced counties |

- 9:30 – 9:50 am:**      **Monitoring for navel orangeworm in orchards under mating disruption:  
Some tools of the trade**  
Speaker, Kris Tollerup, University of California Cooperative Extension Advisor,  
Kings, Tulare, Fresno, and Madera counties
- 9:50 – 10:00 am:**      **Almond Sustainability Program**  
Speaker: To be determined , Almond Board of California, Sustainability Program
- 10:00 – 10:30 am:**      **Traps and lures for monitoring in the presence of mating disruption**  
Speaker, Chuck Burks, USDA, ARS, Parlier, CA
- 10:30 – 11:15:**      **Efficient management of NOW under mating disruption in almonds**  
Speaker, Brad Higbee, Trécé Inc. Research Entomologist, Field Research and  
Development Manager
- 11:15 -11:45:**      **Insecticide strategies for almonds under mating disruption**  
Speaker, Joe Coelho, Valley Orchard Management, Fresno
- 11:45 ~1:30 pm:**      **Lunch provided**  
Open discussion period facilitated by Kris Tollerup
- Suggested topics:**      What worked and what did not work last year?  
New research topics.

**CORRECTION FROM LAST NEWSLETTER:** I stated that you could soil apply Solubor at 50 lbs/acre, when I should have stated Borax, which is approximately 10.5% boron (Solubor is 20%), and added the pounds of actual boron/acre. The corrected sentences now read:

**"Major boron deficiencies can be corrected via a soil application (major deficiencies would be far below the critical value). In both almonds and pistachios, broadcast 25 to 50 lbs of Borax per acre (about 2-4 lbs of actual boron). Make sure to take into account soil texture: lighter textured soils should have lower rates of application."**

The corrected full article is below.

## **Boron Deficiency in Almonds and Pistachios**

As appears in the Dispatches from the Orchard Newsletter

By Phoebe Gordon

Boron is a weird nutrient in orchard crops, particularly in California. It's needed in very small amounts, and some crops, like almonds, do not tolerate soil levels much above 1 ppm. To complicate things, boron tends to be deficient in some parts of the valley, such as sandy soils where canal water is the primary water source, and at toxic levels in areas in soils formed by old marine deposits.

Boron is an important nutrient to get right, however, as it is necessary for effective pollination. Mild deficiency symptoms can first manifest themselves as disappointingly low yields or heavier than normal 'June' drop. Boron is also necessary for cell wall development, so more severe deficiency symptoms can include deformed leaves and shoot and tip dieback.



Note the deformed leaves of this pistachio leaf suffering from boron deficiency.  
Photo: Phoebe Gordon

Boron behaves differently across tree species. Understanding the differences in mobility is important because it determines what tissues you will be monitoring for deficiencies and toxicities, as well as how to rectify deficiencies. In most tree crops, for example pistachios, boron is immobile, which means once the plant has taken up the nutrient and transported it into the growing tissues, it stays there. This means that when evaluating deficiencies and toxicities, you should be monitoring leaves. Deficiency symptoms are cupped and deformed leaves, though they retain their green color. In more severe deficiencies, flower panicles can drop from the tree. Boron toxicity symptoms are necrotic leaf margins, however in pistachios, toxicity symptoms can still be associated with high yielding orchards. In plants where boron is immobile, foliar sprays will only affect the current season's growth, and severe deficiencies are better addressed through soil applications.

In almonds and other *Prunus* species, boron is mobile, since it is involved in the transport of photosynthesized sugars. You should be monitoring deficiencies and toxicities in the location where the season's photosynthate ends up: the fruit (and specifically, the hull). Severe deficiency symptoms manifest as shoot tip dieback, whereas more mild deficiencies can show up as internal gumming in the fruit. Severe toxicities will cause gumming in the trunk as well as tip dieback, though the reason why is unknown. Since boron is mobile, foliar sprays can affect future year's crops, though the effect is more limited than with soil applications.

In order to first assess your field's boron levels, it's important to have your soil and irrigation water tested. In some areas, groundwater is a significant source of boron. I would never advise embarking on a fertilization regime unless you know that both your water and soil levels are low. If both show low levels of boron, next you'll need to test your plants to assess how deficient they are in boron. As boron is immobile in pistachios, you should be monitoring leaf levels with your July leaf tests. Start thinking about it now – if you're like me, July will be here sooner than you think! In almonds, you should be monitoring boron with hull samples pulled at harvest time. I want to stress that boron deficiencies do not show up in almond leaves, so you can't rely on your spring time or July leaf samples to ensure your plants are adequately fertilized.

Crop	Leaf critical value	Hull critical value
Almond	N/A	80 ppm
Pistachio	90 ppm	N/A

The table above states the critical values for almond and pistachio; these are values below which you will see deficiency symptoms manifest in the plant. Actual sufficiency values, which are levels where yield is not negatively affected are much higher; in pistachios it is between 150 and 250 ppm, and in almonds between 100 and 160 ppm.

To correct minor boron deficiencies, conduct spring foliar sprays in pistachios, using 2.5 to 5 lbs of Solubor in 100 gallons of spray at the bud swell period (early to mid-March, depending on spring temperatures). Use much lower rates in almonds – 1 to 2 pounds of Solubor in 100 gallons of water. Almond sprays should be timed after harvest before leaves fall for best effects, or at bud swell but before the trees are in bloom. Boron sprays during bloom can damage flowers and interfere with bee pollination.

Major boron deficiencies can be corrected via a soil application (major deficiencies would be far below the critical value). In both almonds and pistachios, broadcast 25 to 50 lbs of Borax per acre (about 2-4 lbs of actual boron). Failure to broadcast applications can result in toxicity symptoms. Make sure to take into account soil texture: lighter textured soils should have lower rates of application. Monitor leaf tissue levels closely to ensure the deficiency has been corrected. In pistachios, which have a greater need for boron and higher tolerance toxic levels, severe deficiencies may need to be treated with both soil and foliar sprays.



## Walnut Short Course

**November 5-7, 2018**



Plan to join us for this integrated orchard management short course featuring UC faculty, Cooperative Extension specialists and farm advisors, and USDA researchers who will provide an in-depth, comprehensive study of all phases of walnut culture and production.

The program is based on the latest information and research and will cover the fundamental principles that form the basis for practical decisions and include Q&A for each session, quality time with instructors and networking opportunities.

Who should attend: New and experienced growers as well as other industry members interested in commercial walnut production.

**Registration available  
September 1**

**Registration includes:**

- Three Full Days of Instruction with over 45 Presentations
- Binders with presentations
- PCA & CCA credits  
(pending approval)

**ARC Ballroom  
UC Davis**

**Davis, California**

**For more information visit**

**<http://ucanr.edu/sites/WalnutS>**

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# In a Nutshell

## September 2018

Elizabeth Fichtner  
Farm Advisor

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