
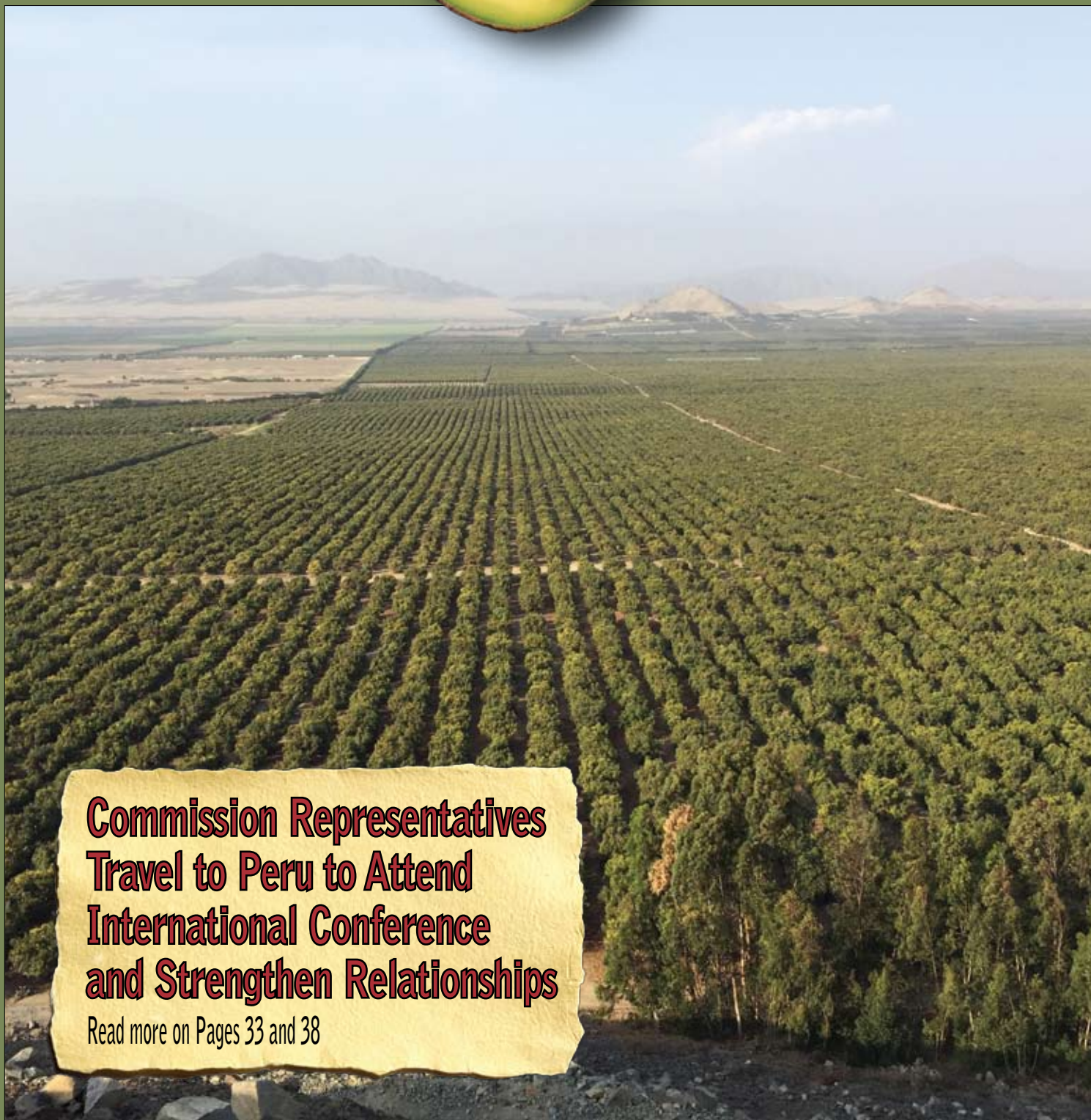


Winter 2015

*From the*  
**Grove**



The Latest News from the California Avocado Industry



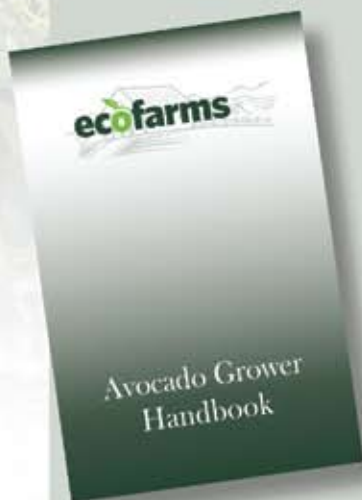
**Commission Representatives  
Travel to Peru to Attend  
International Conference  
and Strengthen Relationships**

Read more on Pages 33 and 38

# From Humble Beginnings



Eco Farms was established in 1974 by Steve Taft and Norm Traner. Steve and Norm have always been advocates for organic farming and continue to grow organic avocado and citrus to this day. From a small packing shed to a modern fruit packing facility Eco Farms has grown to meet the demands of the marketplace while maintaining relationships with California growers.



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# Grower Profile

**28** Shawn Martin  
La Conchita, CA



## From the Grove

Volume 5  
Number 4

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The articles, opinions and advertisements presented in this magazine are designed to offer information and provoke thought. Inclusion in this publication does not presume an endorsement or recommendation by the California Avocado Commission for any particular product or cultural practice.

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Tom Bellamore

## History in the Making

On November 19, at a regularly scheduled meeting of the California Avocado Commission's (CAC's) Board of Directors, something remarkable took place. Two representatives from the Asociación de Productores y Empacadores Exportadores de Aguacate de México (APEAM AC), Ramon Paz and Ron Campbell, presented Dr. Richard Stouthamer of the University of California, Riverside (UCR) with a check for \$50,000, in support of his continuing research on the polyphagous shot hole borer (PSHB). In so doing, they indicated that another contribution of \$50,000 would occur early in 2016. This generous show of support was certainly welcomed by the Commission Board, which has allocated over \$2 million toward the fight against PSHB since the pest was first discovered. Of greater significance, however, and transcending the simple exchange of funds, was the collaboration with an organization that had long been viewed as an adversary. As our APEAM AC guests rose to address the Board, the historic nature of the event was all but palpable. How far we have come.

For decades, avocado-infesting pests were at the center of the California avocado industry's dispute with Mexico over avocado imports. Although Mexico's requests for ac-

cess to the U.S. market pre-date 1994, it was only then that the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) began addressing the issue in earnest. The federal rule-making that ensued remains unprecedented, and many of us remember these milestones:

*February 1997: APHIS grants Mexico access to 19 northeastern states, with shipping limited to November through February only; only the Mexican state of Michoacán is approved for export to the U.S.*

*November 2001: Access to an additional 12 northern tier states is granted and the shipping period expands to October 15 through April 15*

*November 2004: Mexico is granted year-round shipping to all states except California, Florida and Hawaii*

*February 2007: Mexican avocado imports are permitted to enter California, Florida and Hawaii*

*February 2015: APHIS issues a proposed rule, which would allow Hass avocado exports from any location in Mexico (not just the state of Michoacán)*

If you were growing avocados in California in 1994, it seemed like the sky was falling. Mexico's Hass avocado production in the state of Michoacan alone was sufficient to bury the U.S. producer, and the array

of quarantine pests that could potentially accompany shipments from that country was gravely disconcerting. APHIS was just beginning to implement a risk mitigation methodology known as the systems approach, and confidence in the government — which appeared to favor foreign producers over domestic ones — was low in the wake of North American Free Trade Agreement negotiations.

Back then, you wouldn't have thought it likely that more than 20 years later Mexico would still be trying to gain access to the U.S. market for avocados grown anywhere in their country. The novelty of the systems approach, the variety of pests it sought to address, and the Commission's relentless efforts to ensure science-based decision-making resulted in a protracted regulatory path that has yet to come to an end. Even more unimaginable were the benefits that path yielded for both sides.

Ultimately, USDA exercised an abundance of caution when making regulatory decisions impacting the phytosanitary security of U.S. avocado growers, though perhaps not of its own choosing. Nonetheless, central to the systems approach was the idea of granting access in incremental steps or staging over time. The progression that started with Mexican avocado shipments to



Left to Right: Tom Bellamore (CAC), Dr. Richard Stouthamer (UCR), Ramon Paz (APEAM AC), Ron Campbell (APEAM AC), Doug O'Hara (CAC)

At a recent CAC Board meeting Ramon Paz and Ron Campbell of APEAM AC present UCR's Dr. Stouthamer with a check for \$50,000 in support of his continued research on PSHB

a limited area of the United States for a limited number of months to the present level of access, while implemented for phytosanitary reasons, also lent itself well to the task of market development. As the aggregate supply of avocados began to rise in the United States, promotional efforts undertaken by APEAM AC built new demand, particularly in distant East Coast markets such as New York, where media purchases are expensive. By targeting new avocado users, APEAM AC did some heavy lifting to expand the avocado category in the United States at a pace that helped preserve market values.

Fast forward to 2016 when Mexican avocado imports to this country could reach two billion pounds, the Food Safety Modernization Act becomes law and the most looming pest threat for avocados is the PSHB. On the marketing side, there is now a well-established record of discipline

with respect to weekly shipments to the U.S. market by Mexico that, while at times far from perfect, is evidence of mutual respect and collaboration between avocado interests in both countries. Given the sheer volume Mexico is capable of sending our way, even the most skeptical among us would have to admit that the economic impacts from their presence in the U.S. market could have been far worse.

Food safety concerns present another area for collaboration for obvious reasons. Though efforts here have been generally out of view, APEAM AC and CAC have been working together for quite some time to manage food safety risks stemming from bacterial contamination. A food safety incident potentially involving avocados would bring negative economic consequences for all, without regard to product origin, and sharing of information is critical to both or-

ganizations.

So it goes with PSHB. This pest or its closely related cousins can already be found in various avocado-growing regions around the world, proving that it, too, knows no boundaries. With its action at the Commission Board meeting, APEAM AC has demonstrated a willingness to once again be a collaborative partner with the California avocado industry. Despite our history of being at odds over pests, we have set the past behind us, and none too soon. The diversification of resources brought to bear in the fight against PSHB is a plus for California avocado growers, and may help keep PSHB from becoming rampant in Mexico. Perhaps, just perhaps, the historic event in the CAC boardroom foretells the beginning of other strategic collaborations of which few would dream – only time will tell. 🥑

# Chairman's Report



Doug O'Hara

Before I begin my column, I would like to express my gratitude to the Board for placing their trust in me by electing me as Chairman for the coming year. I believe the Chairman of the California Avocado Commission (CAC) position is very important and is sometimes the “face” of the industry. I have done, and will continue to do, my best for the growers and the industry as a whole and appreciate everyone’s confidence in me.

Now, on to business! I must admit, this is my favorite time of year – because the holidays also mark the start of a new California avocado season! One of the best things about a new season is that the past season is “in the books” and you can start fresh. Although I analyze the past season based on what I could have done better, I try to focus on the positive things to come. I realize there are many factors – water, pests and increased imports – that will challenge us, but they are mostly out of my control. There are several things I am looking forward to in the coming year that I think will benefit all California avocado growers.

Some of the biggest changes we will see this upcoming year will come from CAC’s new advertising agency. We all felt it was time to look toward the future and possibly shake things up a bit. The Board was lucky enough to see some of the agency’s preliminary work and it is outstanding. This is a top-notch agency and I commend Tom Bellamore, Jan DeLyster and staff for dedicating many hours choosing the perfect match for our industry. The rollout for the new campaign will be sometime in January — so we can look forward to some exciting stuff!

What good is advertising if we don’t have crop to support it? Luckily we have enough fruit to keep the marketing team busy most of the year. CAC’s crop volume used for budget purposes is 360 million pounds, but word on the street is that it could be higher. This is great for the California grower because a longer season means we will have supplies for our retailers during most of the holidays. We have made it through some of the tougher months, so I am hoping for a mild winter and early demand for California avocados.

Jan and the marketing team have talked with many retailers and the majority of them have indicated interest in California avocados. I have met with many retailers at different venues as well and can tell you many of them can’t wait for our season to begin. Because of the size of our crop and the early size of our fruit, I believe there will be early demand. This will allow growers to pick a little earlier than normal, remove some stress from the tree and help reduce the alternate bearing cycle.

As with every growing season, you never know what is in store for you. I think CAC’s years of marketing and California branding has prepared us for a great season and more to come. By adjusting the message and increasing communication with the retailers and packers, CAC has helped increase demand for California avocados and we should all look forward to a prosperous year. 🥑



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Leesa Eichberger

To contact a CAC representative, please visit:  
[CaliforniaAvocadoGrowers.com/Commission/your-representatives](http://CaliforniaAvocadoGrowers.com/Commission/your-representatives)



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Ventura & North Contact Joe Haslett at 805.748.4033 or joe.ecoflow@gmail.com

# The California Avocado Commission in the Words of our Trade and Marketing Partners

**T**he California Avocado Commission's (CAC's) partnerships with artisan chefs, food bloggers, retailers and foodservice operators are a critical part of its marketing and outreach efforts. Together, the Commission and its partners provide targeted consumers what they want and value most:

- Premium California avocados that are consistently of high quality
- Marketing support for California avocados
- Innovative California avocado recipes
- New usage ideas for the fruit
- Nutrition information
- Knowledge concerning where their avocados come from and how they are grown

As you will see from the testimonials that follow, these relationships are mutually beneficial. Our partners help us build brand awareness while we provide marketing support that drives sales and customer satisfaction. Ultimately, together we increase consumption of our premium fruit — and that benefits all of us.

## FOODSERVICE

### **Kevin Becthel, Senior Vice President, Shari's**

*(Family-Style Casual Restaurants with 96 locations)*

Our guests in the Pacific Northwest expect the freshest products available. And they demand that we serve products that are regional and seasonal whenever possible. That's why we value our relationship with the CAC. Obvi-



ously, we can't grow avocados year round in our climate, but we know that when California avocados are in season, our guests expect that we carry menu items that feature them. We typically develop strong LTOs (limited-time offers) in the late spring/early summer time period. And we know that CAC promotes the California avocado season with such strength that it allows us to piggyback our marketing and menu initiatives onto theirs with less money and effort.

I've personally toured California avocado farms and production facilities with CAC representatives. In my position, I make a lot of these types of tours. But I'm most impressed with the farmers and facilities on these CAC tours. And I like the fact that California avocados are another product that is grown in the U.S. And I know our guests do, too.





Growers are the heart and soul of our business.

We are proud of the lasting relationships we've built with many of the best, highly-skilled growers in California. We know you, as California growers, are ardent stewards of the land and take pride in the quality fruit you produce. We share your passion.

From the ranch to the market, we provide growers with timely cultural advice and guidance on timing harvest. As a global packer, we monitor the pulse of daily supply and demand, while servicing a worldwide customer base.

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**Doug Czufin,  
Corporate Chef,  
The Egg and I  
Restaurants**

*(Casual Restaurants  
with 115 locations)*

Working with the California Avocado Commission proved a wonderful experience for me. I found the real value in product education and training. The CAC team invited me to join an immersion tour of the California avocado groves and packing houses. From grower conversations to an overview of storage, ripening, packing and distribution processes, I was able to observe the industry's focus on freshness, safety, and delivering a quality product. Add to this a very focused and relevant avocado menu demonstration by a chef who was laser-focused to our specific menu applications. As a chef with over 30 years of experience, I don't know what else they could have done to make this a better or more productive experience. I used a number of the ideas and concepts that were presented, which resulted in our most successful LTO (limited time offer) of 2014/2015.



**Kevin Gin,  
Executive Chef,  
Bridges Restau-  
rant and Bar,  
Danville, CA**

Avocados are synonymous with California. Since California is the land of healthy living (haha) this is the perfect fruit to satisfy the craving



for something creamy and rich but also provides nutritional value. We have so many ways to prepare the avocado in addition to the popular peel and eat. Now we make salsas, puree, deep fry, turn into ice cream, wrap in phyllo, marinate, grill, bake, sauté — possibilities are endless. It is such a flexible fruit!

**RETAIL**

**Roger Schroeder,  
VP of Produce and  
Floral, Stater Bros.**

The California Avocado Commission, to me, is the most effective commission there is. They do what commissions were designed to do and that's increase consumption!!



**Jeremy Coleman,  
Produce Buyer,  
Sam's Club**

The California Avocado Commission is a great resource for our company. Their staff is phenomenal, always providing useful tools and insights to help drive consumption and awareness around the versatility of avocados. The demand continues to grow at such a rapid pace, and we truly appreciate the partnership with CAC to help us do our best to provide our members with the highest quality avocados and an extreme value.



**Jen Biesty, Co-owner and Executive Chef,  
Shakewell, Oakland, CA**

I love to use California avocados. They have a luscious flavor, smooth texture and satisfying richness. And, in my mind, they are superior to all other avocados. They bring Shakewell's food to life and put smiles on our customers' faces. California avocado smashed on some grilled levain bread with a touch of sea salt and a drizzle of sharp fruity green olive oil is my idea of a slice of heaven!



**Mark Carroll,**  
*Senior Director of Purchasing & Merchandising, Produce and Floral, Gelson's*

I enjoy working with the California Avocado Commission. They tailor programs for retailers that result in increased sales. We have worked with them on quite a few promotions enabling us to sell more avocados. I thought the category was saturated, I didn't know we could increase sales but every time we did a contest or other

promotion with California avocados we saw an increase in sales. It's a very nice surprise because avocados are our #1 selling item. We are really proud and happy to have the California Avocado Commission work with us to design opportunities that help us increase sales.

**Kayla Womeldorff,**  
*RD, CD,*  
*Harmons Station*  
*Park Dietitian*



During California avocado season, we sampled a Corn and Black Bean Salad with California Avocado and Fresh Steamed Shrimp in store and gave out the avocado materials the California Avocado Commission provided. It was a great recipe, easy to make and sample, and the customers loved it. I appreciate CAC's support!

## BRAND AMBASSADORS



**Sara O'Donnell,**  
*Blogger Ambassador,*  
*Average Betty*

As both a California resident and avocado lover, it's an honor to work with the California Avocado Commission. Creating and sharing different ways to enjoy avocados and lauding the

rich, buttery taste and superior quality of California avocados is in my blood. Avocados are a staple in my household and are routinely featured in my video recipes.

Interactions with the Commission are easy and smooth. The Commission carefully plans its programs and communicates their objectives and timelines clearly and professionally. The Commission's activities such as grove tours and California avocado themed dinners prepared by formidable chefs in exclusive restaurants have always been life-changing adventures, both educational and exciting!

Simply put, I am beyond proud to represent CAC as a California Avocado Ambassador.



**Lisa Schroeder,**  
*Mother's Bistro,*  
*Artisan Chef Partner*

I love working with the California Avocado Commission. They are great partners and we've worked together on wonderful press dinners. They've provided us with plenty of delicious California avocados for recipe-testing and pro-

motions and have included some of our recipes on their website. Our relationship definitely helps increase visibility for the Mother's Bistro brand and helps drive avocado lovers to our establishment.

## REGISTERED DIETITIAN AMBASSADORS



**Michelle Dudash,**  
*RDN, Dietitian,*  
*Cordon-Bleu-Certified*  
*Chef and Columnist of*  
*DinewithDudash.com*

Working with and representing the California Avocado Commission is a dream come true. I love eating and cooking with California avocados, so it is natural for me when

educating consumers about avocados' taste, nutrition and versatility. I can tell that the CAC team really cares about their spokespeople — they are passionate about what they do.



**Bonnie Taub-Dix,  
MA, RDN, CDN**

Collaborating with the California Avocado Commission has been very meaningful to me in so many ways. Although my family and I have enjoyed creatively consuming avocado for years, we have never

appreciated them as much as since I started working with CAC. There's comfort in knowing that I'm providing the best for my children (and hubby) and we enjoy swapping California avocados into some of our favorite recipes to replace less nutritious ingredients. Here's a perfect example: [www.bonnietaubdix.com/avocado-pumpkin-bread-with-dark-chocolate-chips-and-almonds/](http://www.bonnietaubdix.com/avocado-pumpkin-bread-with-dark-chocolate-chips-and-almonds/).

I look forward to many more delicious experiences together!



**Liz Weiss, MS, RD, *The Meal Makeover Moms*,  
Co-Author, *No Whine with Dinner* and  
*The Moms' Guide to Meal Makeovers***

As registered dietitians, cookbook authors and food bloggers, we eagerly await California avocado season and its beautiful bounty of luscious fruit. We've worked with CAC

for several years on recipe development and blog posts, and we've been thrilled to be part of grove tours and to represent CAC at professional conferences including the Food & Nutrition Conference & Expo. What excites us most about working with the California Avocado Commission is their ability to connect with consumers where it counts the most: the dinner table! CAC uses traditional and social media to communicate with their fans, and the recipes they create are always on trend, timely, and doable for home cooks and restaurant chefs alike. From their website to their lively Facebook page to the images they share on Instagram, the CAC team works hard to differentiate their fruit from avocados grown elsewhere. They have done a terrific job telling the sustainability story behind California avocados and showcasing the growers and groves themselves. CAC innovates and leads. 🥑

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# PSHB Detected in Ventura County

By Ken Melban

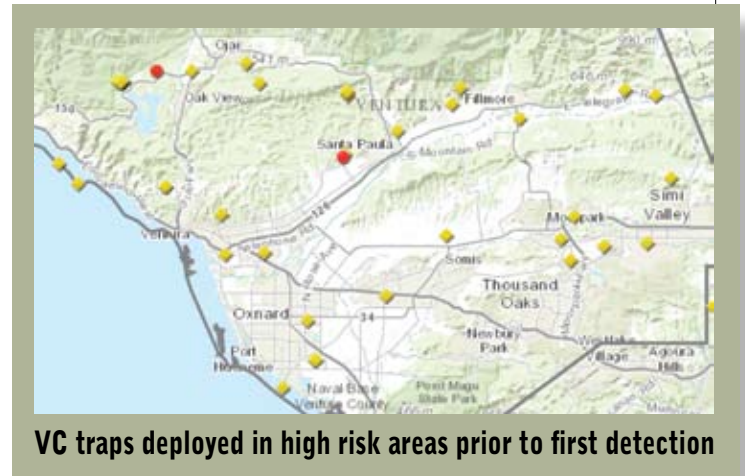
*Vice President of Industry Affairs*

In early November, four separate finds of the polyphagous shot hole borer (PSHB) and *Fusarium* Dieback (FD) occurred in Ventura County (VC). The first two beetles were caught in traps deployed as part of the California Avocado Commission's (CAC's) detection program and were located on the western end of Santa Paula and in Ojai. Both of these initial detections were not in avocado groves.

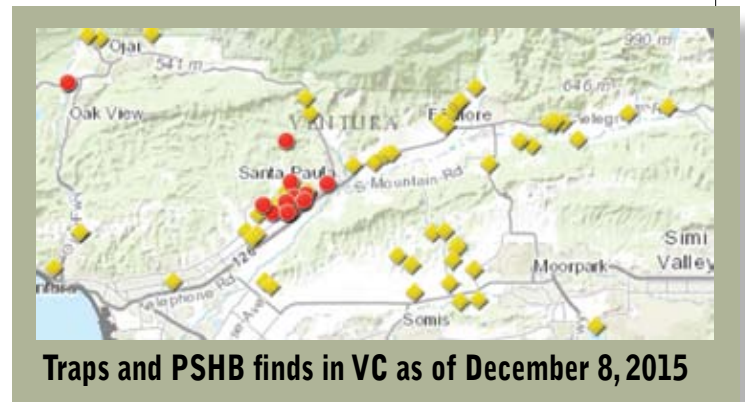
Within a few days, however, ground surveying by staff from the University of California at Riverside (UCR) and the Commission resulted in two beetle finds in an avocado grove just west of Santa Paula. A few days after this second find, another grower and his pest control advisor (PCA) confirmed a PSHB find in a grove west of Santa Paula. As of this writing, six additional groves to the west of Santa Paula have been confirmed to have PSHB.

Although the PSHB was known to be in Los Angeles County just a few miles from the Ventura County line, these were the first detections in Ventura County. The Commission had recently deployed a number of traps along the Ventura County side of the border with Los Angeles County and was hopeful the first detection would be in one of those traps, but unfortunately the beetles were able to bypass the perimeter traps. It's not certain how the PSHB made its way into Ventura County. It may have arrived through natural flight, but the beetles also could have been transported in green waste, firewood, nursery stock or other avenues.

Prior to these finds, the Commission's detection program in Ventura County had focused primarily on areas deemed a high risk for the importation of PSHB through the movement of green waste, firewood or nursery stock from infested counties. In fact, one of the two first detections occurred in a high-risk location. Once confirmation of the beetle in Ventura County was made, the Commission immediately began to move traps into avocado groves to determine how widespread the PSHB infestation was within the County and to delineate the boundaries. Traps were primarily positioned west and east of Santa Paula and along CA-118. To date there are 70 traps deployed in Ventura County, the



**VC traps deployed in high risk areas prior to first detection**



**Traps and PSHB finds in VC as of December 8, 2015**

majority of which are in avocado groves.

With such a large range of hosts – more than 200 trees and plants including Sycamore, Box Willow and Castor Bean – the threat of this invasive pest complex is not limited to avocado. The Commission continues its efforts to build awareness among other non-agriculture stakeholders and has met with large scale tree nursery representatives to educate them on the threat of moving infested trees. In addition, CAC and the agricultural commissioner are working to ensure green waste operators are not importing material



Linda Bellamy, VC Ag Commissioner's Office, inspects funnel trap for PSHB

that may have PSHB. In counties with previous PSHB infestations, the Commission has pushed the California Department of Agriculture (CDFA) to implement sanctions that would address the movement of green waste, but has not met with success. CDFA stated that the movement of green waste was a county-to-county agreement and they (CDFA) were unable to restrict such movement. The challenge appears to be that counties with large urban populations generate significant green waste and rely on the adjacent counties for disposal.

It is important that growers and PCAs near infested areas increase their vigilance in scouting for PSHB/FD. Any suspected finds should be properly submitted to UCR researchers. Growers who have the PSHB should remove and chip infested branches. More information on how to properly submit samples and treatment options may be found at: <http://eskalenlab.ucr.edu/>.

The Commission and UCR researchers will continue our aggressive research efforts to find additional control options that include new pesticide and fungicide registrations, trapping techniques and biocontrol. More specific information can be found in Dr. Tim Spann's article entitled "Shot Hole Borer Update" on page 23.

The Commission strives to share the most recent PSHB information with the industry through Green Sheet alerts. If you are not currently receiving these alerts, please email [cac.iaf@avocado.org](mailto:cac.iaf@avocado.org) or call the Commission's office at (949) 341-1955. 🥑



Researchers answer questions at recent PSHB grower meeting

# Fall 2015 Tracking Study Highlights

Since 1996 the California Avocado Commission (CAC) has conducted an Avocado Tracking Study to measure consumer attitude and usage preferences. The Hass Avocado Board took over the tracking study around 2005 and in 2012 changed it to focus on the avocado category and nutrition.

Because point of origin is a significant differentiator for the California avocado brand, since 2012 the California Avocado Commission has contracted with the independent research firm, Bovitz, Inc., to conduct the California Avocado Tracking Study focused on consumer perceptions of growing region, California avocado brand awareness and changes in avocado usage.

This year's study was conducted in September 2015 with a national sample of 1500 consumers, which is a large enough sample to measure differences by region. The data within this article reference the measures for CAC's targeted advertising markets (Los Angeles, San Diego, San Francisco/San Jose, Sacramento, Phoenix, Portland, Seattle, Denver and Salt Lake City).

## **Importance of Growing Region Remains Steady**

Point of origin remains a critical differentiator for California avocados as market share continues to decline in the face of increased supply of imported avocados. The good news is that consumer preference for avocados grown in the U.S. remains strong at 68 percent. The Tracking Study

also indicates that the percentage of consumers who check for country of origin when purchasing avocados remains steady at 42 percent.

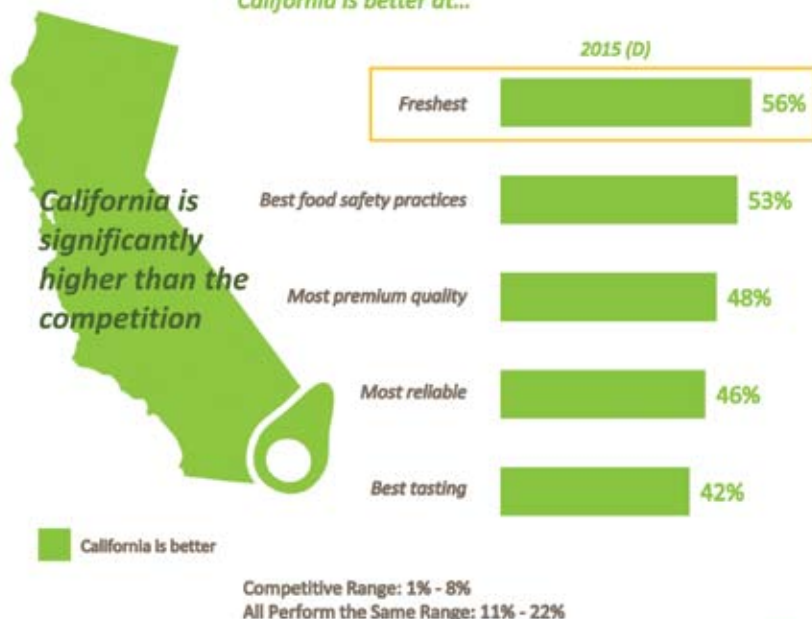
The combined preference for U.S. grown avocados and the tendency to check on-fruit labels is critical to the California avocado brand because this year the Tracking Study also indicated a jump in ad awareness for Mexican avocados, from 22 percent in 2014 to 26 percent in 2015. This increase was most likely fueled by Mexico's increased television spend.



## California Avocados Performance

% California Avocados are Better  
Ad Markets

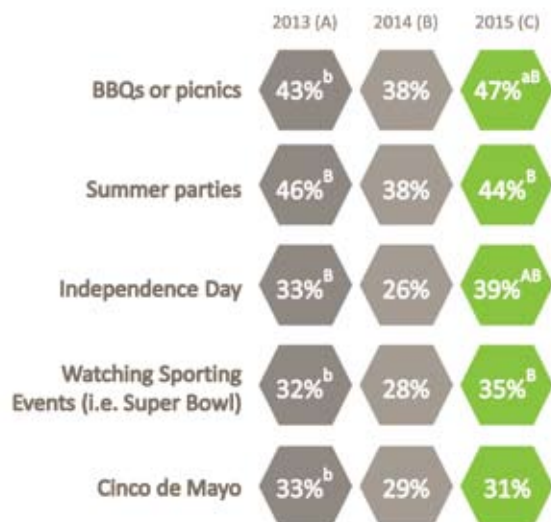
California is better at...



## California Still the Premium Choice

California avocados continue to be rated the highest on “premiumness” (59 percent, compared to the highest rated import at 32 percent). Consumers also give California avocados the highest marks for freshness, food safety, premium quality, reliability and taste.

### TOP 5 SERVING OCCASIONS



## 4th of July Fuels Increase in Summer Consumption

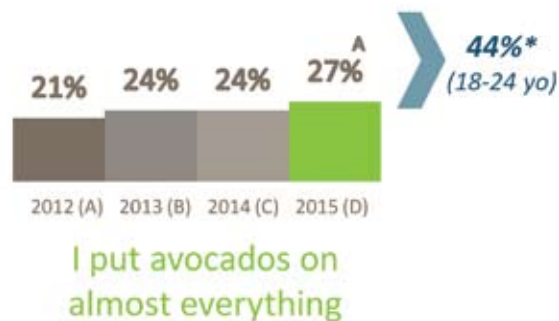
Overall, avocado summertime-serving occasions rebounded this year with a 4 percent jump to 64 percent. While BBQs/picnics and summer parties remain the top two serving occasions for avocados (47 percent and 44 percent respectively), the 4th of July holiday saw a 13 percent increase over last year, to 39 percent.

## Setting a Benchmark for a Future Target Market

For the first time, the Tracking Study included respondents between the ages of 18 – 24. The Commission requested the addition of this age group in order to proactively establish a benchmark for an age group that will be part of CAC’s targeted market.

It is worth noting a few key differences in this age group as compared to others.

- While 18-24 year olds are not as concerned about purchasing avocados grown in the U.S., their recall of California avocado labels in the store was significantly higher than other age groups (61 percent compared to 40 percent).



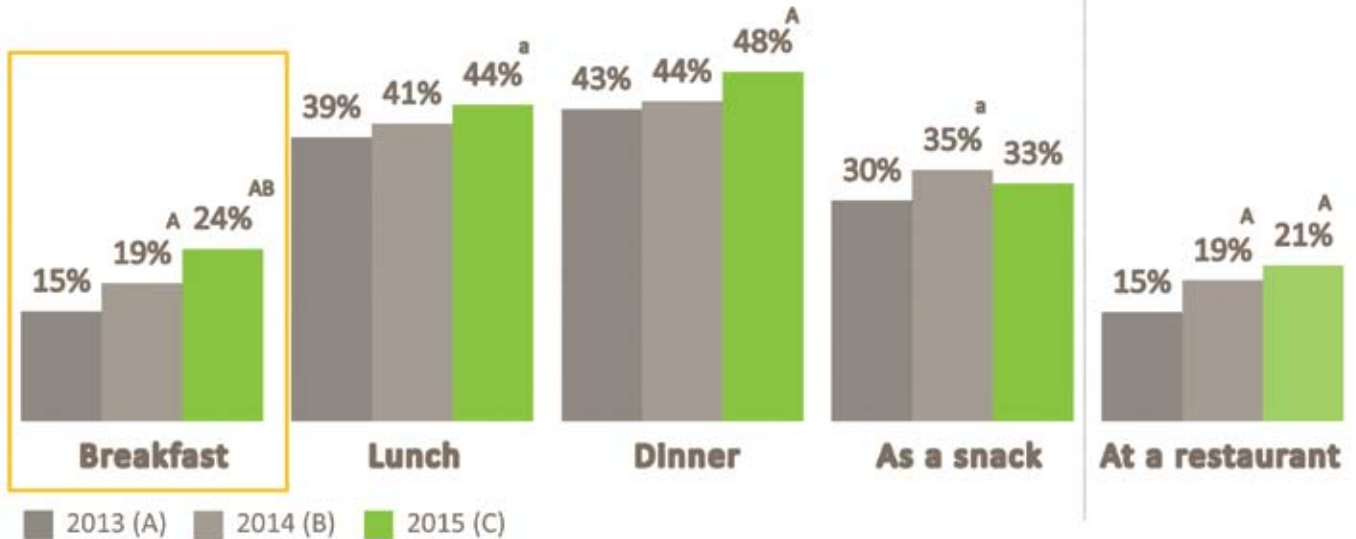
- This age group also had a better recall of the Distinctly Californian Campaign (43 percent) than other age groups (27 percent).
- Respondents in this age group are also more likely to “put avocados on almost everything” (44 percent as compared to 27 percent of other 25+ age groups) and they are more likely to consume avocados at breakfast, as a snack or at a restaurant.



## Avocado Consumption at each Meal

% Eating Avocados Weekly or More Often  
Ad Markets

18-24 year olds are eating avocados more frequently compared to those 25+  
32%\* At Breakfast | 42%\* As a snack | 31%\* At a restaurant



- The opportunity to serve avocados at BBQs/picnics and summer parties are both overwhelmingly popular with this age group as well (56 percent and 57 percent, respectively).

Results from the 2015 California Avocado Tracking Study validate the Commission's efforts to increase brand awareness at point of purchase, via on-fruit California avocado labels. As noted in the "California Grown' Label Resonates in the Marketplace" article (found on page 36), handlers feel the California avocado labels add value because they clearly identify the fruit to those consumers who seek California avocados and are willing to pay the premium price. While the Commission cannot match the marketing spend of its competitors, it can optimize the efficiency of the resources at hand with programs such as the California avocado label and tiered account marketing (see "Tiered Marketing" article on page 42). And by proactively tracking the preferences of a future target market, the Commission will gain insights that can be used to formulate marketing strategies in the coming years. 🥑

### Legend

Note: Significant differences are denoted by upper & lower case letters at the 95% & 90% levels, respectively.



For the 18-24 year old age group, asterisks (\*) are used to denote significance at the 90% level vs. the 25+ age group.

By Tim Spann  
Research Program Director

## Good Fertilization Practices: A Tool in the Fight Against Pests and Disease

Every grower knows that mineral nutrients are essential for the growth and development of trees in order to achieve maximum yield. And they understand the necessity for balanced fertilization as it relates to replacing the nutrients carried off by crop harvest. However, it's probably safe to say that most growers don't think about the myriad effects fertilizer nutrients have on tree health beyond growth and yield, or about the delicate balance between various nutrients within the tree. Here we discuss the essential plant nutrients, the balance between them and their general effects on plant health, as well as general fertilization program guidelines.

### Essential Plant Nutrients

In addition to carbon (C), hydrogen (H) and oxygen (O), which plants take up through the fixation of carbon dioxide (CO<sub>2</sub>) via photosynthesis and water (H<sub>2</sub>O) uptake via roots, there are 14 mineral nutrients that are recognized as essential for normal growth and development of all plants. An essential nutrient is defined as follows:

- A given plant must be unable to complete its life cycle in the absence of the nutrient (life cycle = vegetative state, flower, seed production)

- The function of the element must not be replaceable by another element
- The element must be directly involved in plant metabolism or must be a component of an essential plant constituent (e.g., nitrogen (N) is a constituent of proteins and chlorophyll)

Essential nutrients are usually broken into two categories — mac-

ro-nutrients and micro-nutrients — based on the relative quantity of each needed by the plant. These 14 nutrients, their general relative abundance in plants and some of their basic functions in plant biology are shown in Table 1.

Although some of these nutrients are needed in very minute quantities — and except in specific soil types or under certain conditions,

**Table 1**

The 14 essential mineral nutrients required by all plants for normal growth and development. The general abundance of each nutrient, relative to nitrogen, and key functions are shown.				
	Nutrient	Chemical symbol	Relative abundance (%)	Function in plant
Macro-nutrients*	Nitrogen	N	100	Component of proteins and amino acids
	Potassium	K	25	Catalyst, ion transport
	Calcium	Ca	12.5	Cell wall component
	Magnesium	Mg	8	Part of the chlorophyll molecule
	Phosphorus	P	6	Nucleic acids, ATP
	Sulfur	S	3	Amino acids
Micro-nutrients	Chlorine	Cl	0.3	Photosynthesis reactions
	Iron	Fe	0.2	Chlorophyll synthesis
	Boron	B	0.2	Cell wall component
	Manganese	Mn	0.1	Activates enzymes
	Copper	Cu	0.01	Component of enzymes
	Zinc	Zn	0.03	Activates enzymes
	Molybdenum	Mo	0.0001	Involved in N metabolism
	Nickel**	Ni	0.00005	Involved in N metabolism

\*Ca, Mg and S are sometimes broken out from the macro-nutrients and categorized as secondary nutrients.

\*\*Ni is the newest identified essential plant nutrient. The data establishing its essentiality were published in 1987; it was recognized as essential by the American Association of Plant Food Control in 2004.



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*Love at First Bite*



A leaky barrel illustrates Liebig's law of the minimum. Just as the capacity of a barrel with unequal length staves is limited by the shortest staff, so too are a plant's growth, yield and health limited by the nutrient in shortest supply.

they do not need to be applied as part of a regular fertilizer program — they are no less important than the other elements. For example, molybdenum (Mo) is the element needed in the second smallest quantity, but it is critically important to N metabolism, the element needed in the greatest quantity. In many instances of Mo deficiency the symptoms are expressed as N deficiency because N is not being properly metabolized.

### Nutrient Balance

The example of how Mo impacts N metabolism is a perfect example of nutrient balance. *No nutrient functions in isolation from others within a plant.* This principle was first developed in agricultural systems by German botanist Carl Sprengel in 1828 and later popularized by the German chemist Justus von Liebig, and is commonly known as Liebig's Law of the Minimum. In its simplest form, Liebig's Law tells us that the most abundant nutrient is only as functionally available as the most limiting nutrient.

The complex interactions of nutrients is the reason why complete tissue analyses are so important to proper tree management. Plants often suffer from "hidden hunger" — a nutrient being deficient without any outward symptoms of deficiency. Again, Mo is a good example of a nutrient whose deficiency can often be hidden. A tree may have symptoms of N deficiency and a grower will assume the normal course of action may be to apply more N. But if that deficiency is caused by too little Mo affecting N metabolism, the application of N will not correct the problem and may actually worsen it by creating a greater nutrient imbalance.

### Plant Nutrition and Tree Health

In order to complement disease and pest control methods, it is helpful to know how mineral nutrients affect disease resistance in plants. Altering how plants respond to pest or disease attacks can increase resistance. There are two primary resistance mechanisms that mineral nutrition can affect:

- The formation of mechanical barriers, primarily through the development of thicker cell walls.
- The synthesis of natural defense compounds, such as phytoalexins, antioxidants and flavonoids, which provide protection against pathogens.

As a rule, plants with an optimal, balanced nutritional status exhibit optimal growth and the highest tolerance to pests and diseases. Susceptibility increases as nutrient concentrations deviate from this optimum. The interaction between higher plants and disease organisms and pests is complex. However, the roles of mineral nutrients are well established in some areas of host-disease interaction. Our goal, as growers and horticulturists, is to recognize these interactions and maximize the potential for disease and pest control by proper grove management. What follows is a brief summation of how plant nutrition affects different types of plant diseases and insect pests based on a few specific nutrient examples.

**Fungal Diseases:** Thinner, weaker cell walls leak nutrients from within the cell to the apoplast (the space between plant cells). This can create a fertile environment for the germination of fungal spores on leaf and root surfaces. Mineral nutrient levels directly influence the amount of leakage as well as the composition of what is leaked. For instance, potassium (K) deficiency causes cell walls to become leaky, resulting in high sugar and amino acid concentrations in the leaf apoplast. Calcium (Ca) and boron (B) deficiencies also cause a buildup of sugars and amino acids in both leaf and stem tissues. Nitrogen (N) is a key component of amino acids; therefore, an excessive supply of N can bring about higher amounts of amino acids and other N-containing compounds in plant

tissues. These mineral imbalances lower resistance to fungal diseases by creating a more favorable environment for pathogens.

Most fungi invade the leaf surface by releasing enzymes that dissolve the middle lamella (the “glue” that bonds adjacent cells). The activity of these enzymes is strongly inhibited by Ca, which further explains the close correlation between the Ca content of tissues and their resistance to fungal diseases.

Plant tissues contain and produce a variety of defense compounds, which hinder fungal attacks. Boron plays a key role in the synthesis of these compounds. Borate-complexing compounds trigger the enhanced formation of a number of plant defense chemicals at the site of infection. The level of these substances and their fungistatic effect also decreases when the N supply is too high.

Mineral nutrition also affects the formation of mechanical barriers in plant tissues. For example, copper (Cu) is a plant nutrient widely used as a fungicide. However, the amount required as a fungicide is much higher than the nutritional requirement. The action of Cu as a fungicide relies on direct application to the plant surface and the infecting fungi. From a nutritional perspective, Cu deficiency leads to impaired defense compound production, accumulation of soluble carbohydrates, and reduced lignification (wood development), all of which contribute to lower disease resistance.

These effects are well illustrated by the severity data for the fungal disease greasy spot on citrus (Table 2). A greenhouse study was conducted in which trees were fertilized with a complete nutrient solution at full strength; at a one-tenth strength so all nutrients were deficient; or at full strength with different nutrients omitted from the solution. After just two weeks, almost all of the nutrient deficient plants had significantly

greater disease severity compared with the well-fertilized control trees.

**Bacterial Diseases:** Mineral nutrition affects susceptibility to bacterial infections in much the same way that it affects fungal infections. Potassium and Ca play key roles in forming an effective barrier to infections. When K, Ca, and, often, N levels are deficient, plants are more susceptible to bacterial attacks. A frequent symptom of B deficiency is the development of “corky” tissue along leaf veins and stems as a result of the irregular (misshapen) cell growth that occurs when B is deficient. These irregular cells are more loosely bound than normal cells, essentially producing wounds through which bacteria can enter.

Disease relationships to K content are quite consistent across plant species. A published review of 534 research articles found that K reduced bacterial and fungal diseases 70 percent of the time and insect and mite attacks 60 percent of the time. Unlike other nutrients, the generalization can be made for K that an

adequate supply usually results in an increased resistance to attack by all parasites and pests.

Calcium affects the incidence of bacterial disease in a variety of ways. First, Ca compounds play an essential role in the formation of healthy, stable cell walls. Adequate Ca also inhibits the formation of enzymes produced by fungi and bacteria that dissolve the middle lamella and allow penetration and infection. Ca deficiencies trigger the accumulation of sugars and amino acids in the apoplast, which lowers disease resistance. Fruit tissue that is low in Ca is also less resistant to bacterial diseases and physiological disorders that cause rotting during storage.

**Soilborne Fungal and Bacterial**

**Diseases:** Mineral nutrition affects soilborne diseases in many different ways. A micronutrient-deficient plant usually has depressed defense capabilities against soilborne diseases. However, in some cases, nutrients can have direct effects on soilborne pathogens. For example, soil-applied manganese (Mn) can inhibit

**TABLE 2**

	Symptom severity rating*	
	2 weeks	4 weeks
Full strength Hoagland’s solution	1.6c**	3.1c
One-tenth strength	4.5a	5.0a
Full strength –Mg	3.3ab	4.8a
Full strength –Ca	3.8ab	5.2a
Full strength –B	1.7c	3.5bc
Full strength –Mn	3.2b	4.4a
Full strength –Zn, Cu, Mo, Fe	3.3ab	4.2ab

\*Disease severity on the lower 20 leaves was rated on the scale of 1=No infection, 2=0-25% infection, 3=25-50% infection, 4=50-75% infection, 5=75-100% infection, 6= leaves abscised.

\*\*Letters indicate significantly different means.

the growth of certain fungi. Also, nitrites are toxic to some *Fusarium* and *Phytophthora* species. Nitrites are formed from ammonium nitrogen in the nitrogen cycle as it is converted to nitrates by beneficial soil bacteria.

In other cases, the use of ammonium-based fertilizers can increase the incidence of some diseases, whereas nitrate-based fertilizers can have the opposite effect. One expla-

nation for this effect is how these different N forms affect soil pH. Ammonium fertilizers generally decrease soil pH over time, particularly in soils with low buffering capacity, and nitrate fertilizers tend to either slightly increase soil pH or have no effect. However, some studies have found that the effects these two N fertilizer forms have on soilborne diseases are independent of soil pH, further in-

dicating the complex relationship of mineral nutrition and disease.

**Pests:** Pests are organisms such as insects, mites, and nematodes that are harmful to cultivated plants. In contrast to fungal and bacterial pathogens, visual factors such as leaf color are important factors in pest susceptibility. Nutritional deficiencies can discolor leaf surfaces and increase susceptibility to pests. For example, many insects are attracted to yellow reflecting surfaces (i.e., surfaces that appear yellow in color to the human eye), and many nutrient deficiencies result in yellow leaf coloration.

Three primary pest defenses of plants are:

- Physical surface properties such as color and hairs
- Mechanical barriers such as tough fibers, silicon crystals, wood formation
- Chemical/biochemical such as content of attractants, toxins, repellents


Mineral nutrition affects all three defense systems. Generally, young or rapidly growing plant parts are more likely to suffer attack by pests than older, slower-growing parts. Therefore, there is often a correlation between N applications (stimulation of growth) and pest attack. Boron deficiency reduces the resistance to pest attack in the same ways it reduces resistance to fungal infections. It is used in the synthesis of flavanoids and phenolic compounds, which are a part of the plant's biochemical defense system.

In the game of baseball, no home runs are scored without touching first base. In the strategies of integrated pest management, mineral nutrition is first base. Optimizing mineral nutrient levels — especially at critical stages when pest populations are threatening — is both cost effective and agronomically sensible. 🥑

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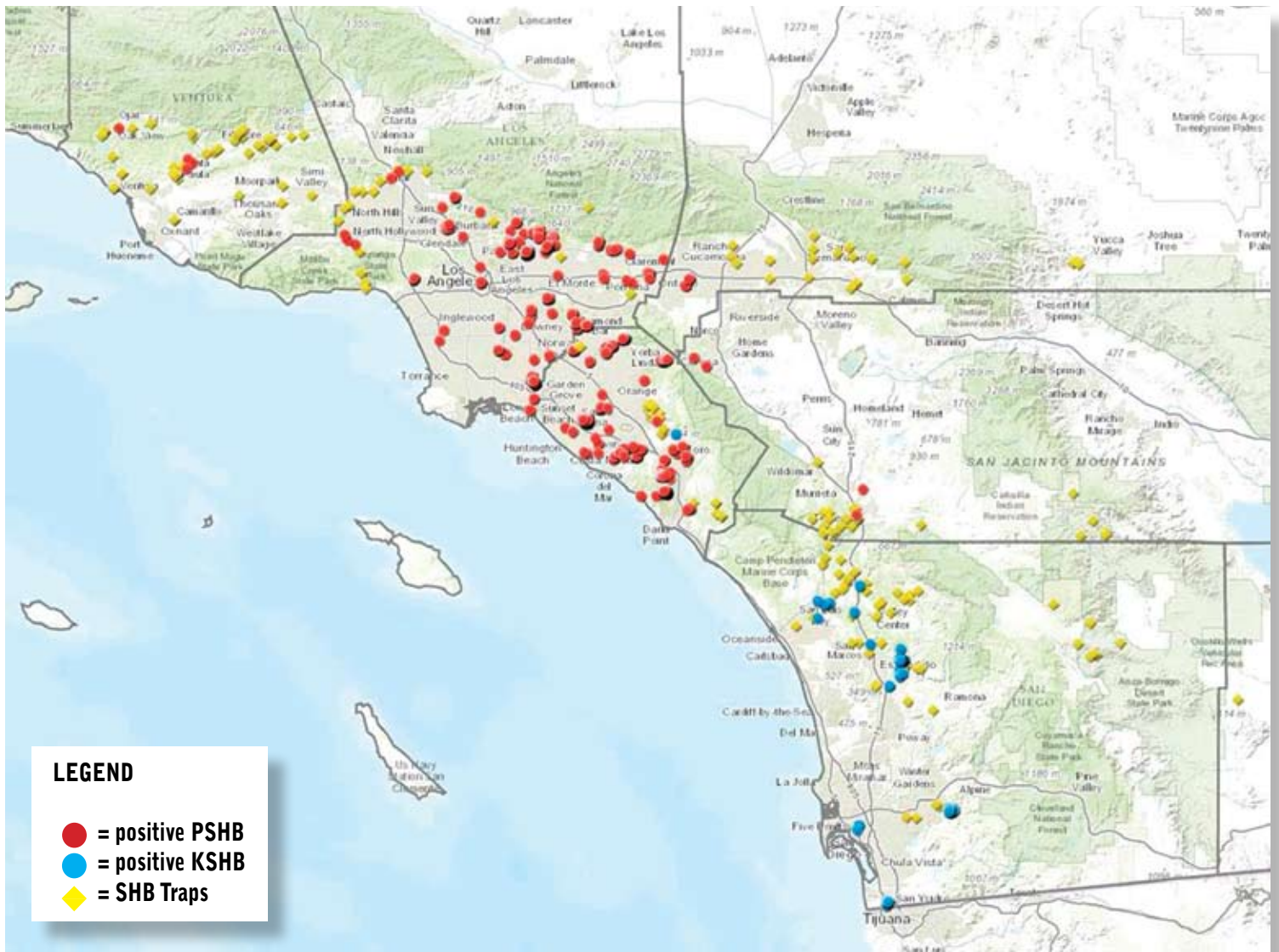
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# Shot Hole Borer Update

By Tim Spann  
*Research Program Director*

**A** lot has been happening with the shot hole borer since the last issue of *From the Grove* came out just a few short months ago. There has been very significant movement of the polyphagous shot hole borer (PSHB) both in the south and north, with it now being present in the Temecula area of Riverside County and the Santa Paula area of Ventura County. Not to be outdone, the Kuroshio shot hole borer (KSHB; San Diego beetle) moved significantly north into Orange County. Despite a tremendous amount of research, there are still more unanswered questions than answered ones.

## ***Temecula PSHB Finds***

In late October, the California Avocado Commission (CAC) learned that beetle specimens collected from traps located near two packinghouses in Temecula were identified as PSHB. These finds were the first near the avocado growing area of Riverside County, and were about 30 miles from the closest known location of PSHB. The Commission immediately deployed additional traps in the area to increase the trap density and try to determine the extent of the apparent infestation. Since then, only two additional beetles have been captured in the traps — one in a new trap and one from one of the previously positive traps.



*Drs. Joe Morse and Frank Byrne conduct shot hole borer injection trials at Pine Tree Ranch*

There is still no certainty about how the beetles moved to the Temecula area. Surveys of the area did not find any infested trees, avocado or other hosts. The working hypothesis is that they had infested trees lining Temecula Creek, which the Army Corp of Engineers is working on clearing to prepare for El Niño. This may have caused the beetles to disperse and subsequently become caught in the traps. This would in part explain why, after the initial captures, there have not been continuing trap finds.

### **Orange County KSHB Finds**

In early November, a PCA found a beetle suspect in a trap located in an Orange County commercial grove. DNA analysis by Dr. Richard Stouthamer's lab at University of California, Riverside (UCR) determined that the beetle was a KSHB specimen and not a PSHB specimen. This find marked the first time that KSHB had been positively identified outside of San Diego County and, like the PSHB find in Temecula, was nearly 30 miles from the previously known infested area.

Ground surveys of the area did not find any apparently infested avocado trees, and no additional specimens have been captured. Initially, the presence of a nearby firewood yard was of concern, but an inspection of that location found that no new wood had been brought onto the property in about a year. At this time, there's no theory concerning how the beetle may have moved into Orange County and there is no evidence that a population of KSHB has been established in the county.

Since the two beetle species appear to now be sharing the same territory, it is important to mention what could happen. The sibling mating habit of these beetles — brothers mate with sisters in the gallery — makes outcrossing between the two species virtually impossible under natural circumstances. Unfortunately, the same cannot be said of the fungi associated with these beetles. If a beetle of one species picks up the fungi from the other species — by re-using an old gallery or attacking the same tree — the possibility exists for the fungi to hybridize. Fungal hybridization could lead to adaptation to new hosts or an increase or decrease in virulence. Researchers will keep a close eye on this situation.

### **Ventura County PSHB Finds**

When the last issue of *From the Grove* was released, we knew that PSHB was knocking on the door of Ventura County. The Commission had been funding the maintenance and monitoring of a network of early detection traps in Ventura County since early 2015. In early November, two of those traps — one in Ojai and one near Santa Paula — were found to have PSHB specimens in them. Soon after those finds, infested avocado trees were found in two groves near the original trap find on the western edge of Santa Paula. The Commission immediately retooled our detection trapping grid in Ventura County in response to these finds.

On December 2, more trap samples from six additional avocado groves to the west of Santa Paula were confirmed as PSHB. One of these traps had 20 PSHB specimens in it and another had 10, indicating that a significant population has established in the area. No additional specimens have been found in the Ojai valley.

Growers in the area should routinely survey their groves for any symptoms of PSHB attack. The Commission, in cooperation with UCR, UC Cooperative Extension and OC Parks has developed a handout to help growers recognize the symptoms of PSHB attack. This handout can be found, in both English and Spanish, as a tear-away insert to this article. Growers may also wish to install lured traps in their groves to aid in early detection. Information on where to purchase traps and lures accompanies this article on page 25.

### **Researchers Working Hard**

Since the first identification of the shot hole borers as a potential threat to avocados in early 2012, the Commission has been working closely with the researchers at UCR, especially Drs. Akif Eskalen, Richard Stouthamer, Joe Morse and Frank Byrne. Together this team has been focused on understanding the biology of the beetles and their fungal symbionts, and searching for and testing control strategies. They recently presented updates on their work to the CAC Production Research Committee and their accomplish-



ments are impressive.

Early on, Richard Stouthamer was focused on the correct identification of the beetles. As we've shared in previous update articles, we now know that there are two different, but closely related, species of shot hole borers, both of which originate from Southeast Asia. He then shifted his efforts to beetle trapping and biocontrol studies.

Dr. Stouthamer's lab has found that the beetles are highly attracted to the compound quercivorol, which is a chemical component produced by their fungal symbionts. His lab has tested various formulations of lures containing quercivorol from different companies and found two that are very good (see details in call out box below). They also discovered that these ambrosia beetles, unlike others, are repelled by alcohol, which is commonly used in ambrosia beetle traps. They are continuing to work to determine the ideal concentration of quercivorol to maximize effectiveness.

Drs. Stouthamer and Eskalen have been working on identifying potential biological control agents for the shot hole borers and their fungal symbionts. Two trips to Southeast Asia have yielded several potential biocontrol agents for the beetles — a parasitic wasp, a nematode and a fly. Because of its greatest potential for specificity to our beetle species,

the parasitic wasp has been prioritized. Likewise, potential biocontrol agents for the fungal symbionts have also been found and are being pursued. Dr. Eskalen has identified species of *Bacillus* bacteria that are found naturally on avocado trees in California that show high antagonism toward the *Fusarium* fungi. He is working on developing methods for applying these bacteria in high enough concentrations to be effective in the field. Since these bacteria were cultured from avocado trees, the hope is that there will be fewer regulatory hurdles to clear in order to use them.

Lastly, Drs. Joe Morse and Frank Byrne have been spearheading our efforts to obtain efficacy data for pesticides against the shot hole borers. They developed efficacy data for Hero® that was used to submit a Section 18 Emergency Exemption Application to the California Department of Pesticide Registration (CDPR) on September 1. That application has cleared the CDPR review process and was forwarded to EPA the first week of December. We remain optimistic that we will receive that Section 18 in early 2016. In addition, trials continue with what we believe will be more effective systemic pesticides for future registrations. Unfortunately, those products require the full EPA registration process and are likely several years out. 🍌

## PSHB/KSHB Traps and Lures

Lindgren funnel traps are currently the trap of choice for PSHB/KSHB. These traps come in different configurations with varying numbers of funnels. The 12-funnel version with a wet collection cup is recommended. The wet cup should be filled with about one inch of soapy water. Antifreeze can be used, but is more hazardous and you must make sure the antifreeze does not contain alcohol, which will repel the beetles. The cups will need to be checked every three to four days (up to one week if using antifreeze).

Both beetles are attracted to a quercivorol lure. There are two companies currently producing this lure for sale in the United States and both work equally well, but there is a significant cost difference between the two. Lures last approximately 60 days and old lures should be removed when a new one is installed on the trap. Lures should be installed about mid-way along the length of the funnel trap.

### Lures and Traps

#### **Synergy Semiochemicals Corp (Canada)**

604-454-1122

synergy@semiochemical.com

Lure item # 3361 — \$12

Trap item # 4021 — \$60

#### **ChemTica Internacional (Costa Rica)**

506-22615396

cam@chemtica.com

Lure item # P548-Lure — \$6

Trap item # P218-Trap — no price info

### Traps Only

#### **BioQuip Products**

<https://www.bioquip.com/>

2321 Gladwick Street

Rancho Dominguez, CA 90220

(310) 667-8800

Trap item # 2854 — \$72

## CAC Board Approves 2015-16 Budget, Business Plan and Sets Assessment Rate

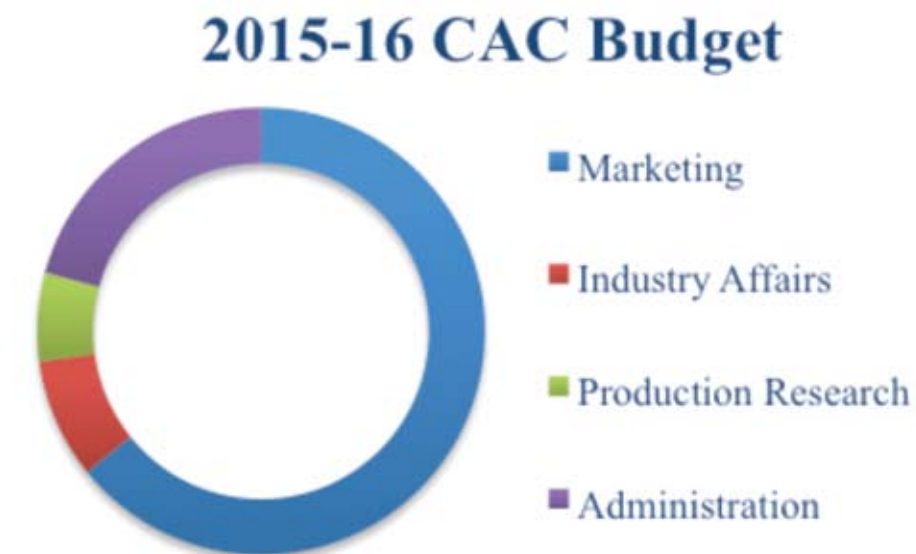
**A**t its October 15, 2015 meeting the California Avocado Commission (CAC) Board of Directors took up the annual task of approving the budget, business plan and annual assessment rate for the fiscal year commencing November 1, 2015.

The approved budget of \$15.3 million is based on a crop size of 360 million pounds (all varieties) and an assessment rate of 2.30 percent. Programs outlined in the business plan reflect a robust marketing spend of \$9.8 million, 64.2 percent of the total budget, with 6.4 percent dedicated to Production Research projects and 7.6 percent going towards Industry Affairs activities.

Following are business plan highlights for the 2015-16 fiscal year:

### Marketing

- Support retail and foodservice initiatives that use the California avocado label throughout the season and secure retail commitment to utilize California avocado display bins



- Refine and enhance the tiered-account marketing approach that includes customized programs for targeted retailers and foodservice operators willing to pay a premium for California avocados
- Continue integrated advertising and marketing support promoting California avocados as the perfect choice for the American summer

holidays

- Initiate 360-degree integrated consumer marketing campaign, with an emphasis on high-engagement
- Customize functionality and creative of CAC's website, CaliforniaAvocado.com, to support marketing campaigns; evaluate website to improve load performance; and

review and update recipe section to optimize fan-friendly recipe search

- Develop comprehensive social media, content and communication strategy based on new brand recommendations from Mullen Lowe
- Expand relationships with artisan chefs, registered dietitians and blogger ambassadors
- Conduct retail research

## Industry Affairs

- Develop and support technical initiatives to address the spread of the polyphagous shot hole borer (PSHB) and Kuroshio shot hole borer (KSHB) pest-disease complex, including Section 18 emergency exemptions and a field lab for bioassays
- Work with the Metropolitan Water District to improve water efficiency program and continue to develop programs with water agencies in the interest of lowering agricultural water costs
- Utilize Pine Tree Ranch Demonstration Grove for Educational Outreach Field Days
- Examine and review new and existing Free Trade Agreements with China and Japan
- Work with handlers to review current CDFA AIP inspection requirements
- Complete Redistricting and Referendum functions as required by the Food and Agricultural Code
- Explore potential registrations for 6-BA and ProGibb

## Production Research

- Develop prioritized list of effective new pesticides and fungicides for shot hole borer and document factors for insect transmission
- Examine effect of Southeast Asian biocontrol agents in quarantine studies at UCR
- Optimize trapping and develop method to use lures to attract and kill the shot hole borer

- Monitor and document PSHB and KSHB and Fusarium dieback incidence and spread
- Quantify impact of shot hole borer infestation on crop yield
- Evaluate pesticide resistance development in avocado thrips
- Examine trunk spray and injection methods of pesticides for use against a variety of pests

- Evaluate rootstocks with focus on resistance to Phytophthora cinnamomi and salinity
- Develop web-based decision support tool that examines effects of climate, fertility and irrigation on production and fruit quality
- Develop a model that prescribes leaf nutrient levels required for maximum yield 🥑

**Review the complete business plan and budget online at the following locations:**

**Business Plan:** <http://www.californiaavocadogrowers.com/commission/accountability-reports/business-plans>

**Budget:** <http://www.californiaavocadogrowers.com/commission/accountability-reports/finance>

## California Avocado Growers Referendum Vote

***The California Department of Food and Agriculture will soon conduct a referendum vote as mandated by state law to determine whether California Avocado Commission operations should be re-approved and continued for the next five years.***

- Ballots will be mailed to growers on January 29, 2016
- Completed ballots must be returned to the California Department of Food and Agriculture for tallying and be postmarked by February 29, 2016
- Contact the California Avocado Commission at **949.341.1955** if you are an eligible grower and do not receive a ballot



# Grower Profile



## Finding Your Niche in an Avocado Grove

By Tim Linden

Avocado grower Shawn Martin makes no bones about it: his parents' decision to buy retirement land in the middle of avocado growing country was the best thing that has ever happened in his work life.

Prior to that purchase of 12 acres of harsh scrub brush in La Conchita in 1998, Martin admits he had no idea what he wanted to do. Fast forward to 2015: he and his parents have been working that piece of land for 17 years. It now has the retirement home for his parents as well as about six acres of organic avocados that Shawn and his father, John, have planted one by one over the years. "We are at six acres now and I'd like to get to nine acres to make this work," he told *From The Grove* recently.

The story begins about 20 years ago in the mid-1990s when John and Joyce Martin started contemplating their retirement years. Joyce was a flight attendant while John was a Los Angeles County sheriff. They looked at various locations and even went into escrow on a piece of property in Hawaii.

The 20-something Shawn lived in Santa Barbara at the time and was going to Santa Barbara City College, headed toward a philosophy degree at UC Santa Barbara. A failed math class and the realization that a philosophy degree wasn't going to produce a job made Shawn rethink his educational objectives. He started taking horticultural classes at City College and discovered an aptitude for the work. "I was the top student in botany. I did really well in all the horticultural classes."

He said his mom wasn't surprised because as a young kid, Shawn loved to hang around the house plant section in the local store and always wanted to plant vegetable gar-

dens in the backyard. Soon the young Martin was working at a local greenhouse where he earned little, but learned a lot. He was also involved with the California Rare Fruit Growers discussing the local cultivation of crops such as bananas and cherimoyas.

A friend took Shawn up to Rincon Mountain and he fell in love with the area. He touted it as a retirement place for his parents and eventually his father did purchase the 12-acre parcel in 1998. During the next several years, every chance they got, father and son would clear the land of its coastal sage scrub. "It was hard work. I would come up here alone and wouldn't see another soul all day."

By 2000, they had completed all the paperwork with the various agencies and were ready to plant about three and half acres. "I wanted to grow tropical fruit, but Dad was more pragmatic. He said others in the area were growing avocados and he thought that was a safer bet."

For two years they worked clearing brush, ordering avocado trees and planting them one-by-one. From day one, they followed the path to organic production. "That was my idea," said Shawn. "I'm a surfer and I see what pollution does to the ocean. I like organic stuff and I just thought we should do that."

His parents were not necessarily like-minded but they went along with this plan. Though Martin said they were "neophyte" growers, he had taken a lot of horticultural classes by this time and had learned a lot at the nursery. "I had a good background in soil science and irrigation," he said.

But not such a complete background that it prevented mistakes. In the early plantings, the Martin Ranch, as it



is called, did lose some trees due to wet fields and other errors.

By 2004, they harvested their first crop of avocados. “We were all smiles when we harvested our first fruit. We only got about four bins but it was great.”

A decade later and the Martin Ranch is doing well. Now a little more than six acres have been planted and they have harvested as much as 100,000 pounds of fruit in a year. This year, Shawn says the crop on the trees appears to be the largest they have ever had. And it is getting close to harvest time.

“We are in a microclimate where it matures very early,” he said. “We will be picking some 40s and 48s in December.”

Martin is an advocate of picking the crop early to minimize the alternate-bearing tendencies of avocados. In fact, he is willing to give up a few cents per pound on the price by picking early, in order to produce a bigger crop the following year. “That works very well for us because our crop tends to be early anyway.”

Hass is the dominant variety grown by the Martins but they do have a number of pollinators and they have been experimenting with both Lamb Hass and Reeds the last couple of years. Shawn said his goal is to plant an additional half acre every year until he maximizes the acreage.

While Shawn is the “manager” of the ranch, he said it is truly a three-person operation. He and his father do all the heavy lifting, but he said it would be a huge mistake to minimize his mother’s contributions. “I basically manage the ranch but my parents are the financiers so I run all the

decisions by them. My dad likes to say he is the peon and I am the manager on Monday, Wednesday and Friday and we reverse roles on Tuesday, Thursday and Saturday.”

The family farmers have learned a lot over the years and have become quite skilled at organic farming. And in fact, Shawn has established an avocado consulting company under the Rincon Mountain Organics moniker.

While it is challenging to be self-supporting with only six-plus acres, Shawn said the organic component allows for better returns. Over the years he has received a low of about \$1.20 per pound at farm gate to as much as \$2.00 per pound. And he says his yields are better than average for organic or conventional growers. His best trees on his best soil have consistently yielded at what would be 20,000 to 30,000 pounds per acre. “If I could get all the trees to do that, it would be great,” he quipped.

But of course, some of the trees on his hilly land aren’t planted in optimum conditions. Martin is continually upgrading his ranch and the trees and carving out extra spots for an additional tree here and there. “You have to be creative,” he said, noting that economy of size comes into play even when dealing with a single digit acre ranch. “The larger we get the better it is.”

He is very bullish on the future of avocado farming in California, especially for organic avocados. He said demand continues to rise for all California avocados. “We grow organic avocados but we’re not elitist. I am a supporter of anyone who grows avocados. I’m a big supporter of the California Avocado Commission’s label program.” 🥑



*CAC and Chef Hugh Acheson with retailers from Save Mart and Lucky (Northern California)*

## CAC Showcases Premium California Avocados at PMA Fresh Summit 2015

**R**ecord-breaking east coast based attendance of 19,332 industry professionals, including 1,060 exhibiting companies from 63 countries and more than 3,380 buyers, made the Produce Marketing Association (PMA) Fresh Summit 2015 an outstanding venue for the California Avocado Commission (CAC) to network with retailers and industry leaders. At the event, which was held in Atlanta at the Georgia World Congress Center, CAC showcased the premium California avocado brand, the value of California avocados at retail and the Commission's leadership role in the industry.

Retail representatives from Ahold, BJ's, Costco, Fresh & Easy, Giant Eagle, Hannaford, Harris Teeter, H.E.B., Kroger, Military Commissaries, Mollie Stone's, Roche Bros., Safeway, Save-Mart, Stater Bros., Wakefern, Walmart, Wegman's, Whole Foods and more met with CAC staff to discuss California avocado performance in their stores, receive 2016 crop projections, review research and category sales data and learn about the season's upcoming marketing programs.

The event location led the Commission to partner with renowned Atlanta-based Chef Hugh Acheson, who fused southern cuisine with premium California avocados to cre-

ate irresistible dishes for booth visitors to sample. Acheson's aromatic California avocado recipes attracted large crowds to CAC's Fresh Summit booth. Representatives from CAC's key customers were treated to samples of Chef Acheson's New York Strip with Crisp Black Eyed Peas, Kale, California Avocado and Preserved Lemon Vinaigrette on Saturday, California Avocado, Poached Shrimp, Grapefruit, Orange, Endive and Chives on Sunday, and Charred Scallion and Apple Guacamole on both days. On Sunday CAC also hosted an invitation-only brunch in the booth featuring a variety of California avocado breakfast dishes. The brunch encouraged targeted retailers, California avocado stakeholders and industry VIPs to engage with CAC representatives.

Hugh Acheson is chef/partner of the Athens, GA restaurants 5 & 10 and The National, Empire State South restaurant in Atlanta and The Florence in Savannah. Acheson competed in Bravo TV's Top Chef Masters Season 3 and currently stars on the popular television show as a Top Chef judge. Acheson is a James Beard award winner for Best Chef Southeast, was named a Best New Chef by Food & Wine Magazine and is an award-winning cookbook author. In his

most recent book, *The BROAD FORK: Recipes for the Wide World of Vegetables and Fruits*, Acheson mentions California avocados.

At Fresh Summit CAC sponsored the Produce for Better Health Foundation Supermarket Registered Dietitian (SRD) tour. The SRD participants visited the Commission's booth and met with popular Atlanta-based registered dietitian and CAC spokesperson, Carolyn O'Neil. The SRDs learned more about California avocados and ways to promote them in retail stores, in their consumer communications and through the media. CAC hosted a social media contest for the SRDs at the event, resulting in 13 unique entries and numerous tweets about California avocados with the event hashtag: #freshsummit. In doing so, the SRDs helped elevate CAC's expo presence and positioned CAC as a go-to resource for SRDs and Twitter participants at the Fresh Summit.

CAC utilized a variety of social media platforms during the PMA Fresh Summit 2015 to engage with industry and media representatives as well as California avocado fans far beyond the event. These social media activities resulted in more than



*Renowned RD Carolyn O'Neil educates SRDs about California avocados*



*CAC Chairman Doug O'Hara, Tom Bellamore, Jan Delyser and Bryan Silbermann (PMA CEO) with Big Bird*

133,000 impressions and nearly 1,400 engagements such as marking a post as a “favorite,” retweeting a CAC tweet or adding comments to Facebook and Twitter posts.

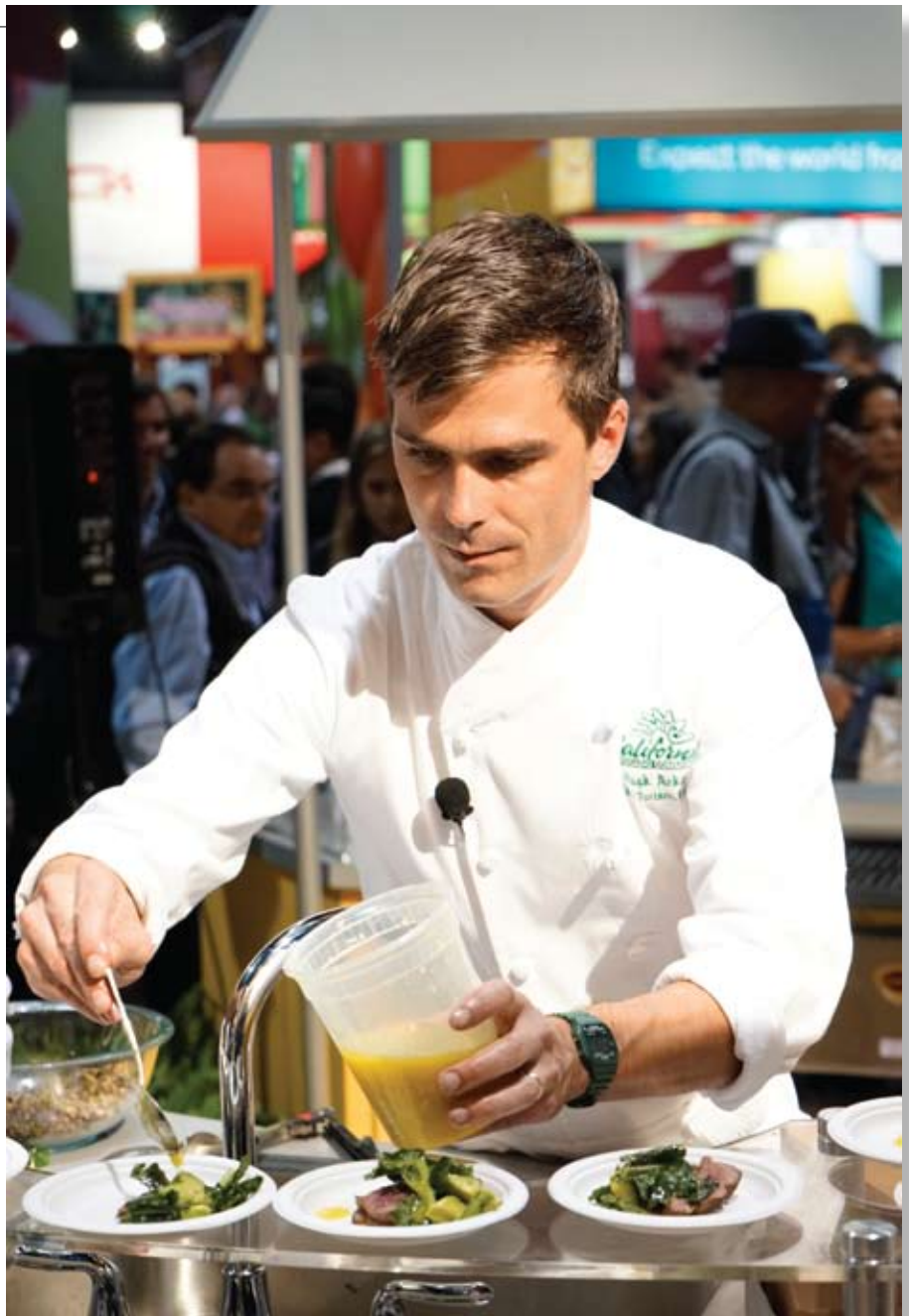
The expo marked the Commission’s first Periscope event — a live broadcast for Twitter users. CAC’s Periscope highlighted Chef Acheson preparing plates of the day’s featured California avocado recipe at the CAC booth. Acheson generated a lot of interest among social media users. CAC received more than 130 views of the Periscope and nearly three hours of total content was watched.

The Commission’s most popular tweet centered on its participation in the PMA Fresh Summit Sensory contest. CAC’s Georgia Peach, California Avocado and Chicken Flatbread Sandwich recipe was selected as one of 10 finalists in the contest, which was judged by a panel of retailers and local children. The recipe was featured at a reception following the contest.

CAC’s social media presence at the Fresh Summit not only generated substantial interest among industry insiders but also helped build recognition for the California avocado brand in the larger social media sphere. According to Fresh Plaza, a well-known industry trade publication, the event hashtag #freshsummit became a trending topic on Twitter during the expo. Trending topics are considered to be the most popular and talked-about topic based on real-time rankings measuring what people are talking about on Twitter across the globe.

PMA’s Fresh Summit also provided numerous opportunities for the Commission to engage with trade media representatives and generate interest in the upcoming California avocado season and future marketing initiatives. Jan DeLyser, vice president of marketing, was interviewed by AndNowUKnow and Produce Retailer at the PMA Fresh Summit. In addition, CAC President Tom Bellamore and DeLyser participated in a joint interview with Ag Net.

Other Fresh Summit highlights included the presentation of the Produce Business Marketing Excellence Award to CAC for its 2014 Wake up to Breakfast marketing campaign and meetings with growers, handlers and others. Bellamore and Ken Melban, CAC vice president of industry affairs, had the opportunity to meet with industry stakeholders and other avocado association leaders to discuss topics of con-



*Chef Hugh Acheson prepping a California avocado creative recipe for CAC’s key retailers*

cern to the industry.

In addition to being an excellent venue for meetings and networking, Fresh Summit has an educational component that includes workshops and general sessions with keynote speakers. One session highlight was a video from First Lady Michelle Obama thanking the industry for its efforts to inspire children to eat healthier. At this year’s State of the Industry Address, PMA CEO Bryan Silbermann and PMA President Cathy Burns reflected on initiatives to improve fresh produce marketing around the world, with a significant focus on creating new ways to help consumers eat more fruits and vegetables. 🥑



# Huge Successes Achieved at Avocado Brainstorming 2015 & VIII World Avocado Congress

## Brainstorming

Avocado Brainstorming is a small meeting held every four years and organized by Dr. Mary Lu Arpaia and The Hofshi Foundation. This year's Brainstorming was held the week prior to the World Avocado Congress in Ica, Peru. Sixty-one attendees from 12 different countries participated in the meeting. The meeting was organized into eight sessions covering topics such as the challenges of expanding international trade, health and nutrition of avocados, limitations to productivity and invasive pests and diseases. Each session was about two hours long and chaired by two or three topic experts who presented a summary of recent research in the relevant area. Each session was followed by a Q&A period.

Overall, Brainstorming was an excellent meeting and I was encouraged by the positive attitudes everyone had about the future of the world avocado industry. The scope of topics covered was very good and hit upon all the critical issues facing world avocado production. Despite the California industry no longer being the dominant player in the world avocado industry, it was clear from everyone's comments that our research program and researchers are still looked to as

the benchmark against which others are measured. And most of the other industries credit California for developing the world avocado market.

One of the things that made the Brainstorming meeting great was its small size. The limited number of participants allowed for a lot of interaction and communication. In addition, people felt free to share ideas and unpublished research findings because of the intimate nature of the meeting. That said, the size was also one of the meeting's limitations; there were a number of key researchers who were not present who would have been able to add quality ideas to the discussions. However, had the meeting been much larger I'm afraid people would have been more guarded and less willing to share ideas.

The Brainstorming event is by invitation only and I heard mixed feelings from researchers before, during and after the meeting concerning this. One researcher told me that because the meeting is closed he declines the invitation to attend. Others credit the invitation process for giving the meeting its intimate feel and openness of discussion. The organizing committee made a concerted effort to invite younger researchers to this Brainstorming and about half of the attendees were new or mid-career

scientists. My experience has been that younger researchers are open to sharing ideas and not as concerned about their ideas being stolen as compared with more senior researchers. I think this is partly due to the fact that the scientific questions being asked today require more and more cooperation and the younger generation is more comfortable with that environment. Thus, as the average age of Brainstorming attendees decreases there may be a trend toward less exclusivity.

A big challenge with a meeting like this is simply the time factor. There is a lot to cover in two and a half days. I think it's fair to say everyone would have liked more time, but with the World Avocado Congress scheduled for the following week, it was a challenge for many people to spend two full weeks away from their work. To address this it was decided to move future Brainstorming meetings off-cycle from the Congress. This may allow for more time in which to host small breakout sessions where researchers can start to develop frameworks for future collaborative research projects, or to host more in-depth discussions on specific topics at future Brainstorming meetings.

A couple of research highlights

related to propagation of avocados and improving our understanding of phytophthora stand out. Dr. Neena Mitter's lab from the University of Queensland, Australia, has been working very hard to develop tissue culture (TC) techniques for avocados. True TC involves taking any cell in a plant, multiplying it in a culture system, and getting those new cells to differentiate into various plant organs (stems, leaves, roots). This is in contrast to the advancements made by Duarte Nursery where they are simply doing shoot multiplication in culture. Dr. Mitter's lab has been able to achieve greater than 40 percent success in TC with several varieties. However, it will likely be a long time before the average grower will buy a tree produced by TC. Rather, they are now exploring this technology to preserve germplasm in a much more cost effective and secure manner. They are making considerable advances in cryopreservation of their TC material. They have been able to freeze 'Reed' TC material in liquid nitrogen for up to 12 months and maintain 60 percent viability. As our world-wide industry looks at looming pest and disease issues, such as shot hole borers and laurel wilt disease, these preservation techniques will be critically important.

Significant advances in understanding the pathogen-host interaction of phytophthora on avocado were also presented. Dr. Noelani van den Berg's group at the University of Pretoria, South Africa, has been working to understand, from a molecular and genetic approach, what causes phytophthora to be pathogenic. Similarly, Dr. Mitter's group has been working to understand the molecular and genetic response of the avocado tree to phytophthora. Although their respective research is intriguing, there are no simple answers on either side. This work will help to identify weaknesses within the pathogen that can be targeted by

new control strategies and identify breeding lines that have a group of traits related to resistance to improve traditional breeding efforts.

It is often difficult to find specific outcomes of meetings like this that will directly impact growers. However, in my opinion, these types of meetings are invaluable. These are the venues in which new ideas are generated, research collaborations are made and problem solving takes place. Although there is not one single outcome from this meeting that directly impacts growers today, it is likely many advancements that will come along over the next 10 years will trace their beginnings to this or other Brainstorming meetings.

### **World Avocado Congress**

The World Avocado Congress (WAC) is held every four years and this year's meeting took place in Lima, Peru, September 13-18, 2015. There were about 1,500 attendees representing every avocado growing region of the world. By far the largest contingents were from Central and South America. The meeting was organized into three concurrent sessions each day. Room 1 talks focused on genetics, nursery management, and pests and disease; room 2 talks centered on cultural management; and room 3 talks covered marketing, human health and nutrition, and postharvest/processing. In addition, there were two keynote speakers each day who presented to the entire audience.

This was my first WAC so I do not have a frame of reference to judge this congress compared to previous ones. Overall, the venue seemed a little small for the number of attendees and some of the meeting rooms were quite crowded; however, the content of the talks was top notch.

There was an optional field trip on Wednesday to see avocado groves, and each group had the opportunity to visit two different groves. The

groves that my group visited were standard groves with no exceptional production practices. I'm uncertain if this was the same for each group or just the luck of the draw, so to speak. It would have been nice to visit some more progressive groves such as high-density plantings or unique pruning systems.

The presentations were generally high quality and well presented. In the genetics and nursery management sessions a number of people presented on their experiences testing clonal rootstocks, including researchers from Spain, New Zealand, Australia and Chile. This struck me as a good example of how California has been a trendsetter in the world avocado industry. A number of people presented from South Africa to discuss various aspects of their breeding program. I think it is safe to say that there will be some new, highly phytophthora tolerant rootstocks coming out of the South African program within the next five years or so. It will be important for California to maintain close communication with South Africa and evaluate these new selections under our conditions as soon as possible. Additionally, a number of researchers presented on the topic of understanding the avocado tree response to phytophthora infection, building upon what was presented at the Brainstorming. Again, although great progress is being made in understanding the mechanism of host response, the hurdle will be translating that knowledge into practical advancements in rootstock breeding, which is still a ways off.

In the cultural management sessions there were numerous presentations on the use of uniconazole and paclobutrazol plant growth regulators (PGRs), particularly in high-density plantings. I was asked multiple times why we don't use these products in California. Not considering the registration issues (many millions of dollars and not supported by

the chemical manufacturers), PGRs are tools in a larger production system that is best described as intensive management, not just high-density. Even if registered in the United States, I don't think these chemicals would be very useful considering the way most growers currently grow avocados in California. This is a difficult situation analogous to the chicken and egg. Is the lack of PGRs the reason more growers in California are not growing high-density or is the lack of high-density plantings, and thus the need for PGRs, the reason they are not registered here? Perhaps if things change in the coming years, and avocado production in California becomes more intensive, it would be worth re-evaluating these products.

High-density plantings were covered by a number of speakers. What struck me most about this topic was the broad range of "management styles" for high-density plantings. There really is no one-size-fits-all solution and each country or region that has adopted high-density plantings has had to develop their own management system to suit their specific conditions. While there is a lot to be learned from these other regions, as high-density plantings are adopted in California we will likely need to develop our own management system, which may vary from region to region.

One presentation from a Chilean researcher was quite intriguing, presenting work on the use of electrostatic systems for the application of agrochemicals by helicopter. Electrostatic systems give the chemical particles a negative charge as they leave the spray nozzle. These particles are then attracted to the positively charged plant. Two big advantages of electrostatic systems are that they generally improve spray coverage and reduce chemical drift. This was the first time I'd seen this technology applied to helicopter applications. As

the ag-urban interface becomes more and more of a challenge in California, this may be a technology worth evaluating, whether for helicopter or ground sprayers.

Overall, the content of the WAC was good. I did notice quite a bit of overlap between the Brainstorming and the World Avocado Congress, al-

though there were more speakers on a given topic at the congress. I think it is a wise decision by the Brainstorming organizers to move the meeting off-cycle from future WACs. For me, personally, both meetings were very enlightening as this was my first opportunity to explore avocado production outside the United States. 🥑

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# 'California Grown' Label Resonates in the Marketplace

By Tim Linden

**A**vocados grown in California command a premium — so identifying their point of origin with a label on the fruit is an excellent strategy, according to the marketers of California avocados.

"We know the California brand has caché in the marketplace and adds value," said Rob Wedin, vice president of fresh sales and marketing for Calavo Growers Inc., Santa Paula, CA. "We sticker 50 percent of our California fruit with the California label." He noted that the California label is alternated with a Calavo logo sticker as the fruit goes through the packing line; hence the 50 percent stickered fruit number.

Wedin observed that California fruit is typically sold at a premium price and thus he believes the label works. Wedin notes there is no current empirical research data quantifying the value of stickered fruit with the California point of origin, but "it's more of a gut feeling. Instinctively [the label] seems to work and we are comfortable with that."

Several other marketers mirrored those remarks.

Dana Thomas, president of Index Fresh Inc., Bloomington, CA, said, "2015 was the second year that we have placed California labels on our fruit and we will continue to do so in 2016." He noted that the company also puts a second label on the fruit, which can slow the packing line, but it's worth the effort because "the label has been met with approval in the marketplace by our customers looking for the California fruit."

Thomas believes that as avocado consumption grows and California fruit represents a declining market share, it



makes even more sense to identify the point of origin. "We (California) used to be the major supplier but today we are a niche marketer. It (the label) adds value and we support it."

Phil Henry, president of Henry Avocado Corp., Escondido, CA, echoed those comments. Henry, through its label supplier, has created a label for the California fruit that includes the PLU code. He said measuring the value of the sticker and comparing it against the cost involved is very difficult to do, but the fruit gets a premium price and it makes sense to identify it for those customers that are looking for California grown product.

The marketers agreed that the California label is effective in both California markets and non-California markets. Henry noted the California origin resonates especially well with California retailers, which is where Henry markets most, if not all, of its California stickered fruit. Thomas of Index Fresh noted his company has customers throughout the country that prefer California fruit and those retailers also receive the California label on their orders. Wedin of Calavo confirmed that this is the same marketing strategy his firm uses. "The California brand does extend beyond the borders," he said. "Certain retailers recognize the value and quality of the fruit and want it at the time of the year when it is at its best."

Wedin does believe that the premium pricing and mar-



keting should be concentrated during the time of year when the fruit is at its best. It is one reason he is a fan of picking California fruit when it has acquired that top quality taste. "We will have some growers picking fruit in late December and January, but the fruit seems to be at its best beginning in March."

In the long run, Wedin feels that as California's market share drops in the U.S., marketing the premium fruit's point of origin will gain even greater significance. "There is definitely a premium for California fruit. It is often nuanced differently as each week of the season is different, but it does command a premium price over the course of the season. There is added value in the California brand, but how you execute on that is the key."

Mission Produce Inc., Oxnard, CA, has not yet begun to use a California label on its California fruit, but it plans to do so with 100 percent of its Golden State output in 2016. "We tried to do it last year but we had some issues switching from the old packing shed to the new shed. We just couldn't get it done until too late in the season, so we decided to wait until 2016," said Robb Bertels, the vice president of marketing for the firm.

Mission has designed a label with the California grown designation, the Mission name and a bar code and/or PLU number.

The company has analyzed the concept and Bertels said there are two reasons driving its participation. "The growers definitely appreciate it when we call out the origin of their fruit," he said. "But we also have had a fair number of conversations with retailers who believe it (the California point of origin) has a certain amount of caché in the marketplace. It depends on the strategy of the retailer — everyone is a little different — but some do market the California name."

Bertels said the advantage does appear to be more of a regional play mirroring the target markets of the California Avocado Commission. "Beyond California, there are retailers in the Pacific Northwest and we have a couple in Colorado and Utah that definitely prefer California fruit."

Whether the fruit is marketed outside of California also is dependent on the size of the crop. Bertels noted that the total volume of last year's crop was off and thus

most of the fruit wasn't marketed beyond the state. This year, Mission expects a much bigger crop so the marketing of it should stretch farther geographically.

Jan DeLyser, vice president of marketing for the California Avocado Commission notes that California brand identification has increased on avocado bag headers as well. Some packers are including the California avocado logo next to their brand logos, and several retailers are now requesting that their custom-designed avocado bags carry California branding in season. 🥑

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# Commission Representatives Travel to Peru



By Ken Melban  
*Vice President of Industry Affairs*

**I**n conjunction with the World Avocado Congress, Commission Chairman Doug O'Hara and I travelled to Peru to meet with Peruvian avocado leaders and visit production areas in early September 2015. The first two days of our trip were hosted by James Bosworth, chairman of ProHass, and Daniel Bustamante, ProHass vice chairman. (ProHass is the Peruvian avocado growers' association representing approximately 80 percent of the total industry.) Peru currently has 18,000 Hass bearing hectares (44,000 acres) and another 7,000 non-bearing hectares (17,300 acres). The average yield per hectare is 9,167 kilos (8,360 pounds per acre).

In Peru, we visited the Chiclayo area, about 450 miles north of Lima, to see the large-scale agricultural production of their two respective companies, Agrícola Hoja Redonda (AHR) and Agrícola Cerro Prieto (ACP). In addition to Hass avocado, other major crops included citrus, grapes and blueberries. The Chiclayo production of AHR encompasses 1,000 hectares, 120 of which are Hass avocado. AHR also has 830 hectares, including 310 hectares of Hass avocado, in the Chincha region south of Lima. ACP has a total of 4,000 hectares; 1,200 are Hass avocado.

We also spent another two days in the area of Trujillo, approximately 350 miles to the north of Lima. There we were hosted by representatives from Camposol and Mission Produce. Camposol grows Hass avocado on 2,500 hectares

and has 13,000 employees, not all directly involved with avocado. Mission just opened a new packing facility and has approximately 2,700 planted hectares, but not all are producing yet. The four companies we met with represent approximately 25 percent of the total Hass production in Peru.

In general, Hass avocado farming in Peru is done on a very large scale. During all four visits we went up to higher ground and saw what could best be described as a sea of avocados...literally as far as the eye could see.

The growing conditions of Peru's production areas are vastly different from those in California. The two production areas we visited are located almost entirely on sand dunes. It was amazing to see avocado groves growing in sand. The water supply is delivered from the Andes through a federal water project consisting of large canals. All the groves we visited had two or three drip lines, with emitters spaced out about every 18 inches. Growers plant corn in between the avocado trees and once the stalks are fully grown they are cut and left in place to create mulch. Due to the environmental conditions trees grow very rapidly and can produce within two years.

The average pay for employees, including harvesters, is \$300 - \$390 per month, and employees typically work 47.5 hours per week. This amounts to a pay range of \$1.46 - \$1.89 per hour. Most of the companies we visited have



*Jimmy Bosworth, Doug O'Hara, Daniel Bustamante*

their own nurseries, with 20,000 – 30,000 trees in stock at a cost of \$2 per tree.

We had some candid talks with our hosts and found them to be very open. One of the common discussion items was the glut of Peruvian avocado supplied to the U.S. market in 2014. When we noted our desire to avoid those market conditions again, everyone agreed that lessons had been learned and similar mistakes would not occur. Although this was encouraging, it's worth noting that in 2014 Peru's production totals were much higher. For 2014 Peru's total volume to the United States was 144 million pounds. For 2015 total Peruvian volume was 365 million pounds with 105 million pounds shipped to the United States. This represents a 26 percent reduction from 2014 in U.S. shipments. Obviously we are hopeful the 2014 issues won't be

repeated, but concerns remain that when supplies increase the large influx may occur again.

For the 2015 season, Peru increased its exports to Europe. The Peruvian industry members we spoke with noted that interest in the European market remains strong, and in some instances 2015 fruit that was expected to ship to the U.S. market was actually directed to Europe. The two primary factors that influenced the shift were market conditions, at times stronger returns in Europe, along with more difficult phytosanitary shipping requirements into the United States. Peru's exports to Chile also grew, and they remain bullish on increasing that market. They also export to Japan.

The domestic consumption of Hass avocado in Peru is very small, with exports at about 95 percent. Apparently, Peruvians prefer the green skin varieties. Considering Peru



*Nursery*



*Corn stalks planted between young avocado trees*

has a population of roughly 30 million people, with 10 million living in Lima, it seems there would be a stronger effort to increase domestic Hass consumption. When we asked about that during our visits, the general response was, "Peruvians don't like Hass." To which we would inevitably respond, "Do you think the U.S. Hass market just happened? It was developed through education and marketing." Nonetheless, for now it doesn't appear Peru is interested in increasing its domestic Hass market. Lastly, Peru was recently granted access to China and is pursuing access to India, then South Korea and Colombia.

For 2016, Peru is forecasting a total production of 380 - 400 million pounds, barring any major impacts from El Niño. Of that total, an estimated 130 million pounds will be shipped to the United States. 🥑

# Commission Working to Expand Trade Opportunities

By Ken Melban

*Vice President of Industry Affairs*

**A**s support for the California avocado brand continues to gain momentum in the United States, the California Avocado Commission also is working to expand our consumer base internationally. Although the export of California avocados over the last few years is small — below 5 percent of the total crop volume — there is reason for pursuing new markets. The total U.S. avocado consumption now exceeds two billion pounds, and while there are no guarantees, all projections are for demand to increase an average of 10 percent over the next few years. While demand may be uncertain, what is almost certain are the increases in supply.

Of course there is room for California's premium fruit even as our percentage of total U.S. sales volume is shrinking. In fact, with our core market primarily in the western states, some would argue that as U.S. consumption increases, the majority of California fruit could be sold right here in California. In reality, though, not all U.S. avocado consumers are willing to pay the premium price necessary to sustain California growers. With the cost for offshore avocado production considerably less than in California, it is



*Ken Melban and Ed McFadden meet with USDA Deputy Undersecretary Elvis Cordova*



imperative the Commission explore all market options. The expression, "Don't put all your eggs in one basket," seems prudent. All options should be explored to ensure California growers are in the best position to receive premium returns, and some of those returns may be realized in offshore markets.

In order to strengthen the international market position for California avocados, I applied to serve on the United States Department of Agriculture's (USDA) Agricultural Technical Advisors Committee (ATAC) for Trade in Fruits and Vegetables. In June 2015, USDA Secretary Tom Vilsack and United States Trade Representative Michael Froman appointed me to the Committee. ATAC works to "ensure a private-sector voice in establishing U.S. agricultural trade policy objectives to reflect U.S. commercial and economic interests" and operates under the USDA's Foreign Agricultural Service. The position provides the Commission with an important seat at the trade discussion table and key contacts as we work through the bureaucracy necessary to navigate access into new international markets.

Recently, the Trans Pacific Partnership (TPP), a trade agreement among 12 Pacific Rim countries including the United States, was reached. Currently there is a 3 percent tariff on California avocados exported to Japan. During the last couple of years, the Commission has worked to ensure that a provision to eliminate the avocado tariff was included in the TPP. If signed and ratified by participating countries, the TPP will remove the tariff on California avocado.

Since 2005, the Commission has been working to gain access to China. Typically this involves identifying sanitary and phytosanitary concerns and, if present, ensuring measures are taken to mitigate any legitimate concerns. The politics of China have led to significant delays. In the last couple of years the Commission has ramped up its efforts with the USDA's Animal and Plant Health Inspection Service (APHIS) to ensure they are doing everything possible to press China on the California avocado application. Commission representatives have held multiple meetings with APHIS and hosted a grove tour with the director general for China's Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), China's counterpart to APHIS.

In November, a bilateral trade meeting was held in China between APHIS and AQSIQ. The Commission developed a Chinese-language brochure for the AQSIQ delegation in order to provide examples of how avocado could be used by Chinese consumers and to demonstrate the nutritional

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牛油果中的纤维能超过大量的维生素、矿物质和其他营养物质。虽然量相对较少，五分之一的六英寸牛油果(去皮)含30卡路里，将近20种维生素和矿物质。确实是许多营养物质的最佳选择。
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- 天然不含胆固醇**  
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- 独特的水果**  
牛油果作为“超级食物”，可以帮助增加消化系统的健康。加州牛油果，富含维生素E，维生素K，维生素A和维生素B。
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benefits.

According to APHIS, the brochure was a tremendous success and helped to maintain avocado as a priority. The next step is a technical visit to California avocado production areas and packing facilities for AQSIQ representatives. The Commission is working to secure a visit for spring 2016.

New Zealand also has expressed interest in California avocados and the Commission is working concurrently on a New Zealand application. While this wouldn't represent tremendous volume potential, it may provide a worthwhile alternative market.

Rest assured the Commission's focus and efforts on maintaining and improving the California avocado place in the U.S. market will continue. Hopefully, we can build on that success and take advantage of the California brand strength in the international marketplace. 🥑

# Tiered Marketing

At the start of the century fifteen years ago, California avocado market share was dominant in the United States. Since then there has been a significant change due to an increase in supply of imported avocados. As a result of the slipping market share, the California Avocado Commission's (CAC's) marketing team has developed and continues to implement strategic approaches to positioning California avocados as premium through differentiation.

## A Prioritized Focus on Outreach

The Commission's tiered account marketing program identifies loyal customers with a preference for California avocados and aligns CAC's marketing resources to support California avocado sales in an efficient manner.

To identify optimum retail and foodservice targets, the Commission conducted a situational analysis to better define and understand the factors that affect promotional opportunities. Based on this analysis it was determined that CAC would:

- Identify retailers who have a preference for and are loyal to California avocados when available
- Target markets where the California avocado brand is "local" and brand development is stronger
- Coordinate target account outreach with handlers to synchronize distribution with marketing support

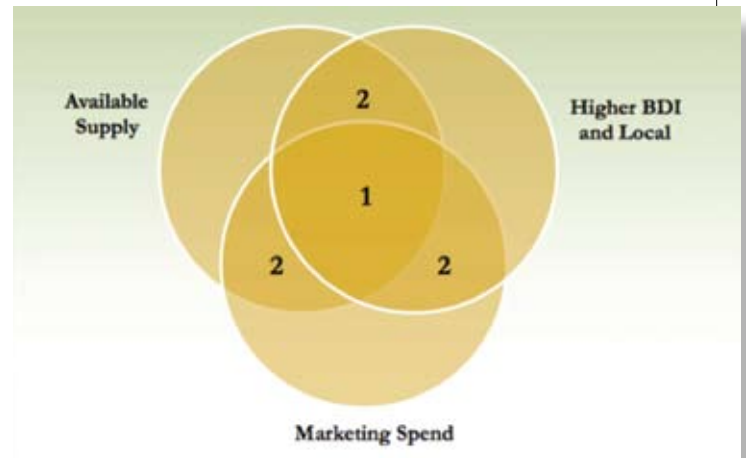
"We are telling our premium brand story to those who are loyal to the California avocado brand and are willing to pay a premium price," notes Jan DeLyser, CAC vice president of marketing. "We demonstrate the advantages of differentiation by merchandising California avocados."

It's a combination of market share, consistent quality and preference that led us to this approach and the opportunity to differentiate California avocados from all others. We are gaining significant traction with our target accounts and looking forward to building on the success we achieved with last year's launch of the tiered account approach."

## Customized Marketing Support

To maximize spending efficiency and increase sales, CAC's tiered approach allots marketing resources and support to retailers and foodservice operators based upon their classification. The Commission provided Tier One partners with customized full California avocado season promotional planning, execution and performance tracking. For Tier Two retailers the focus was placed on the American Summer Holidays and the outer market target retailers received support for specific retailer-hosted in-store events.

Support for foodservice operators is similar. CAC's food-



service team met with the organizations to discuss promotional opportunities and then compiled a list of ideas specific to the chain. CAC also hosted menu ideation sessions with the chains' decision makers as part of the planning process.

"All three targets are important to the California avocado industry," states DeLyser. "We utilize general consumer outreach to build demand, and are able to provide very specific marketing support to retailer and foodservice operators who carry California avocados with this targeted approach. There are hundreds of different things we can do for them, and our success has been in our ability to dig in to identify the right resources and tools for each specific customer."

Another positive outcome of the tiered approach has been improved connectivity between the marketing team, retailers, foodservice operators and handlers. Handlers provided input on the targeted retailers' strategies and CAC's consumer marketing activities were tightly synchronized with handler supply and retail promotional calendars. This ensured that California avocados were available in stores when promotions were being run and that they were identified as such at point of purchase.

The Commission monitored its Tier One and Tier Two accounts throughout the season and adjusted the promotions as needed based on the data on hand. Concludes DeLyser, "This past year had its fair share of challenges including the ongoing drought and increasing global competition, but our market was amazingly stable. We were able to maintain a premium price for our product from start to finish. Our tiered marketing approach has allowed us to channel our resources where they can have the most impact — with retailers who understand our premium brand and have a vested interest in promoting it. These retailers aren't willing to sacrifice quality for price, they are choosing California avocados." 🥑

# 2015 CAC General Election Results

By April Aymami

Industry Affairs Manager

The California Department of Food and Agriculture released the results of the 2015 CAC General Election on October 31, 2015. The individuals listed below have been elected for the two-year term beginning November 1, 2015 through October 31, 2017.

## District 1

Member: Carol Steed  
Alternate: Vacant Seat

## District 2

Member: Kellen Newhouse  
Alternate: Ohannes Karaoghlian

## District 3

Member: Ed McFadden  
Alternate: Bryce Bannatyne, Jr.

## District 4

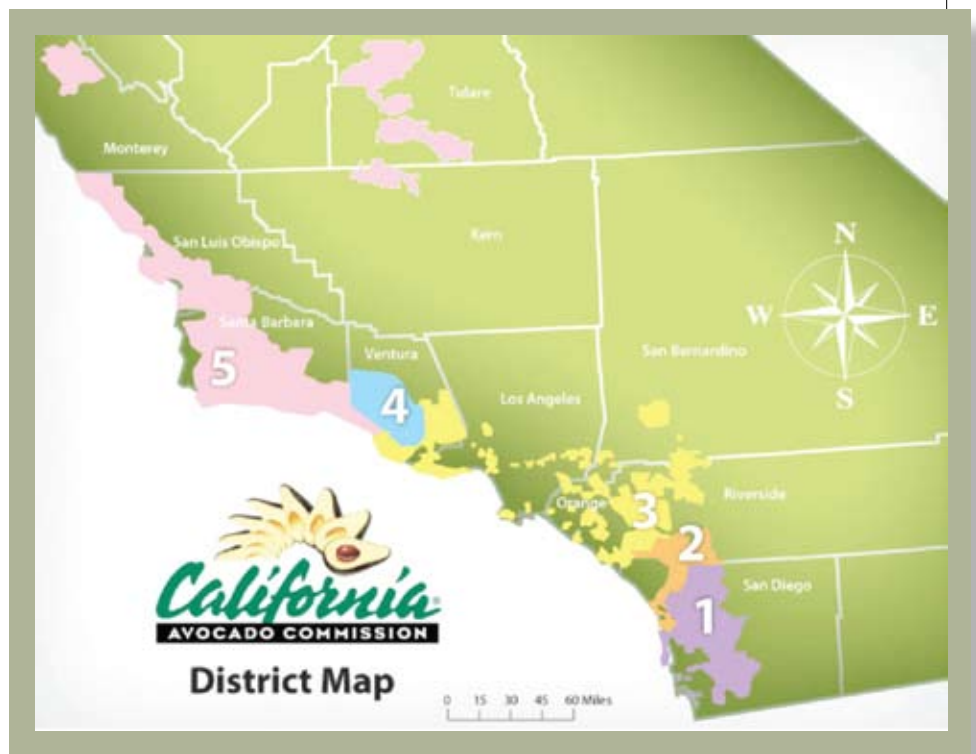
Member: John Lamb  
Alternate: Robert Grether

## District 5

Member: Jim Swoboda  
Alternate: Vacant Seat

## Handlers

Member: Steve Taft,  
*Eco Farms Corporation*  
Alternate: Donny Lucy,  
*Del Rey Avocado Co., Inc.*  
Member: Gary Caloroso,  
*The Giumarra Companies*  
Alternate: Vacant Seat



The newly elected commissioners were seated at the regular meeting of the CAC Board on November 19, 2015 where the following individuals were then elected to serve on the Commission's Executive Committee for the term ending October 31, 2016:

**Chairman:** Doug O'Hara  
**Vice Chair:** Jerome Stehly  
**Treasurer:** Art Bliss  
**Secretary:** Jim Swoboda

A complete list of CAC Commissioners and Alternates can be found on page 6, or by visiting the Your Representatives ([www.californiaavocadogrowers.com/commission/your-representatives](http://www.californiaavocadogrowers.com/commission/your-representatives)) page of the grower website. 🥑

## Production Research: An Investment in the Future

About five years ago, the California Avocado Commission (CAC) began the process of revamping its approach to investing in production research. The size of the Production Research Committee (PRC) was reduced and they were tasked with reviewing projects based on strategic needs and for increased returns to growers. To this end, the CAC Board defined a set of imperatives in 2011 — a grower-driven research management system, effective grower education, increased average per-acre production, achieving and sustaining critical industry mass, and maintaining a premium quality product.

One of the challenges with production research is that there is often no immediate return on investment in the form of increased grower profitability. Rather, production research is an investment in the future that results in maintained or increased profitability down the road. Ideally, the production research program will lead to improvements in productivity — reduced cost of production, increased yield — and provide the technical support for marketing messages.

In recent years, one of the biggest tasks of production research has been overcoming crises, specifically shot hole borers and Fusarium dieback. The PRC has been diligent

in seeking information about this pest-disease complex — seeking consultations with researchers from Israel, sending researchers to South-east Asia — and allocating resources in challenging economic times. Although the investment in shot hole borer research has been large, more than \$2 million since 2012, the cost of not attacking this problem head on would be far greater.

The challenge in dealing with a crisis is how to maintain and even expand existing research to address other challenges faced by the industry — Phytophthora and salinity for example — while addressing the crisis. This has been the dilemma faced by the PRC and CAC Board over the past couple of years. CAC has been diligent in pursuing grant opportunities, wherever they exist, to help offset the costs of shot hole borer research as well as maintain other research priorities. We have been successful in garnering Federal farm bill support for two years for shot hole borer survey and monitoring work. In addition, we have recently forged an unprecedented partnership with the Asociación de Productores y Empacadores de Aguacate de México (APEAM AC) to help address the shot hole borer crisis.

Effective grower education was one of the imperatives put forth by the Board in 2011. Since then many

efforts have been made to improve grower outreach and education. One of the biggest efforts has been the development of the Pine Tree Ranch demonstration grove in Ventura County. We have hosted six field days there since spring 2014 and the feedback from growers has been very positive. We recently submitted a grant proposal for a new demonstration project at the site to educate growers about the use of soil moisture and irrigation sensors to deal with the drought by improving irrigation management. The site has also proved invaluable for shot hole borer pesticide research. The testing of unregistered pesticides to develop the needed efficacy data to apply for registration requires crop destruction. Traditionally, we would have sought grower cooperators for this work who would need to be compensated for the destroyed fruit, increasing the cost of the research. By doing these trials at Pine Tree Ranch, we have been able to avoid these additional costs. The decision to take on the demonstration grove was not an easy one, but it has proved to be a worthwhile one.

Another imperative put forth was to increase average per-acre production. One of the ways in which this imperative has been addressed is by revamping the plant breeding program. Inarguably, the two greatest



limitations to productivity in California avocado production are salinity and Phytophthora. To address these issues, CAC made the difficult decision to suspend funding for an active variety breeding program and refocus our efforts on rootstock breeding. This change came about in part as a result of a change of research leadership at University of California, Riverside (UCR). In January 2015, Dr. Patricia Manosalva came on board at UCR as the lead researcher on the rootstock breeding program. CAC has worked closely with Dr. Manosalva to develop the goals and objectives for the revamped program and has committed to providing her with the necessary resources to develop a modern, productive program. Although no longer funding active variety breeding, CAC recognizes the value of the germplasm material that has been built up over many years by Dr. Mary Lu Arpaia and her prede-

cessors. We are continuing to fund the maintenance of that material and are supporting Dr. Arpaia's efforts to secure other funding sources for the variety breeding program.

One of the biggest changes made to the production research program was the decision to provide multi-year contracts to the researchers so they could have some assurance of continued funding for a long term project. There is no better example of this change than Dr. David Crowley's Decision Support Tools project. This project was a seven-year project totaling close to \$1 million. Dr. Crowley provided a preliminary report on this project in the Fall 2015 issue of *From the Grove*. In that article he provided revised leaf nutrient concentration recommendations for avocados and guidelines for irrigation water salinity levels. The next step for this project, as it nears completion in December 2016, will

be to develop the final Decision Support Tools website. CAC has recently submitted a grant proposal seeking funding to help us achieve this goal and bring this project to its full potential.

Production research is not always the easiest line item to run a cost benefit analysis on. Many of the projects take several years to complete and completion is just the first step. No real value may be realized until the results of that research are communicated to growers and changes in practices start to happen. Recognizing the steps of this process and putting the necessary pieces in place is the first step to realizing the full value of production research. CAC has put those pieces in place with the current production research program, grower outreach and education plans. 🥑

By Tim Linden

## 2016 Crop Looks Big But Opinions Vary Widely

**B**arring any weather catastrophes over the next several months, the 2016 California avocado crop will be significantly larger than the one that was marketed in 2015. However, opinions vary greatly as to how much larger, ranging from 25 to nearly 50 percent.

The 2015 crop came in at just over 275 million pounds, which was lower than the preseason estimate. For budget purposes, the California Avocado Commission (CAC) has used a 2016 crop volume of 360 million pounds. Following a series of crop estimating surveys in September and December, CAC recently released the official 2016 pre-season estimate of 392.5 million pounds for all varieties, with Hass representing 378 million pounds. Several handlers who were interviewed are expecting the crop to top 400 millions while others see around 350 million pounds being more likely.

Rob Wedin, vice president of fresh sales and marketing for Calavo Growers Inc., understands the wide disparity for this upcoming season. "It depends where you are located," he said. "We have some groves that are up 40 percent and others that only look to be about 10 percent larger."

When looking at the entire state, Wedin and Calavo are taking a conservative approach. "We are in the camp that thinks the pre-season estimates are a little high," he told *From the Grove* in mid-November. "We think it will be closer to 350 million pounds."

Like everyone interviewed, Wedin said the amount of rain that falls in the avocado groves will greatly

impact the volume. An El Niño situation, which would drop considerable rain in Southern California if it materializes as expected, would help size the crop and increase the volume. Though an extraordinary amount of rain could hamper harvesting from time to time, Wedin echoed everyone's comments when he said rain ending California's four-year drought would be a welcome sight whenever it comes.

Robb Bertels, vice president of marketing for Mission Produce, carved out territory at the other end of the volume spectrum when he predicted the crop will top 420 million pounds. "We think the pre-season estimate is on the conservative side," he said. "We think the crop is going to come in at around 400-425 million pounds."

Speaking in mid-November, he said there was potential for a very large crop as long as it continues to size.

Phil Henry, president of Henry Avocado Corporation, has no quarrel with CAC's estimates. He does not expect final volume to reach the 400 million pound mark. He said California has had huge crops in the 500 million pound arena and he said this crop cannot be characterized as a huge crop.

Dana Thomas, president of Index Fresh, also believes the 360 million pound estimate is on the conservative side as he said it is prudent for CAC to err on the low side for budgeting purposes. "I think it is going to be 400-410 million pounds," he said, but added that if you asked 10 growers, you would get 10 different

answers.

One of those growers could be Shawn Martin, the grower profiled in this edition of *From the Grove*. Martin has been growing avocados for about a decade in the Rincon Mountain area in South Santa Barbara County. In early November, he told *From the Grove* that this year his crop was shaping up to be the largest he has ever had. He has harvested as high as 15,000 pounds per acre and he believes he is going to exceed that this year, if Mother Nature cooperates. And what has Martin even more excited is that the fruit appears to be sizing exceptionally well and early. In November, he anticipated doing some size picking in December and harvesting size 40 fruit.

Not speaking specifically of Martin's grove or crop, Wedin said the tendency this year might be to harvest early because of the larger crop. He hopes growers fight that tendency because he said California fruit is at its best and most advantageous from a quality standpoint after mid-March.

However, others did agree that some fruit will be harvested early both to take advantage of an early market and for cultural reasons. Martin, for example, who doesn't have that many acres, does everything he can to prevent the alternate-bearing avocado grove characteristic from appearing. One very well-known strategy is to unburden the tree of this year's crop as early as you can. Many growers are expected to employ this strategy in 2016, especially if their trees are loaded with fruit. 🥑

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