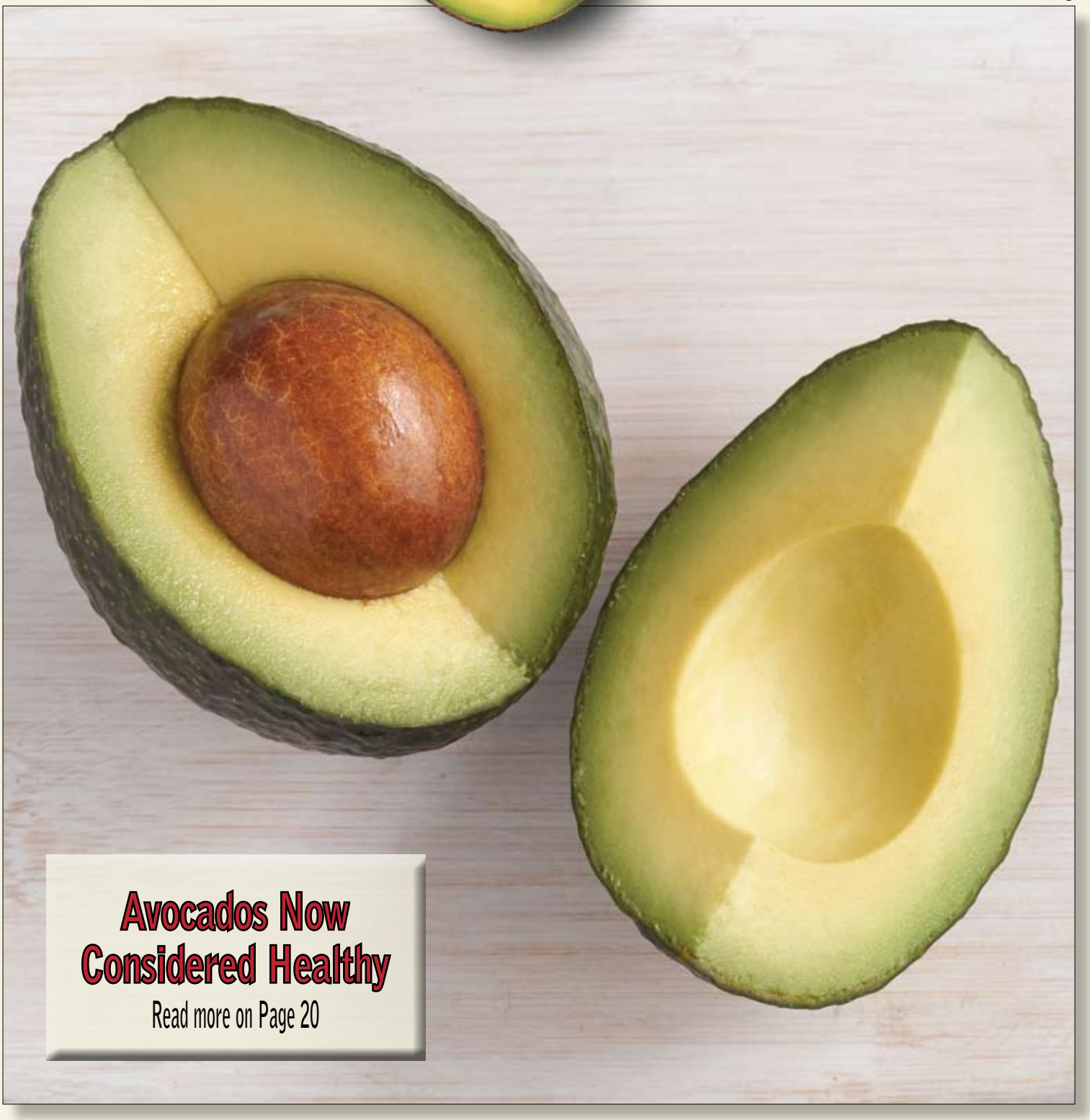
Winter 2016

From the Grove

The Latest News from the California Avocado Industry



Avocados Now Considered Healthy

Read more on Page 20

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.

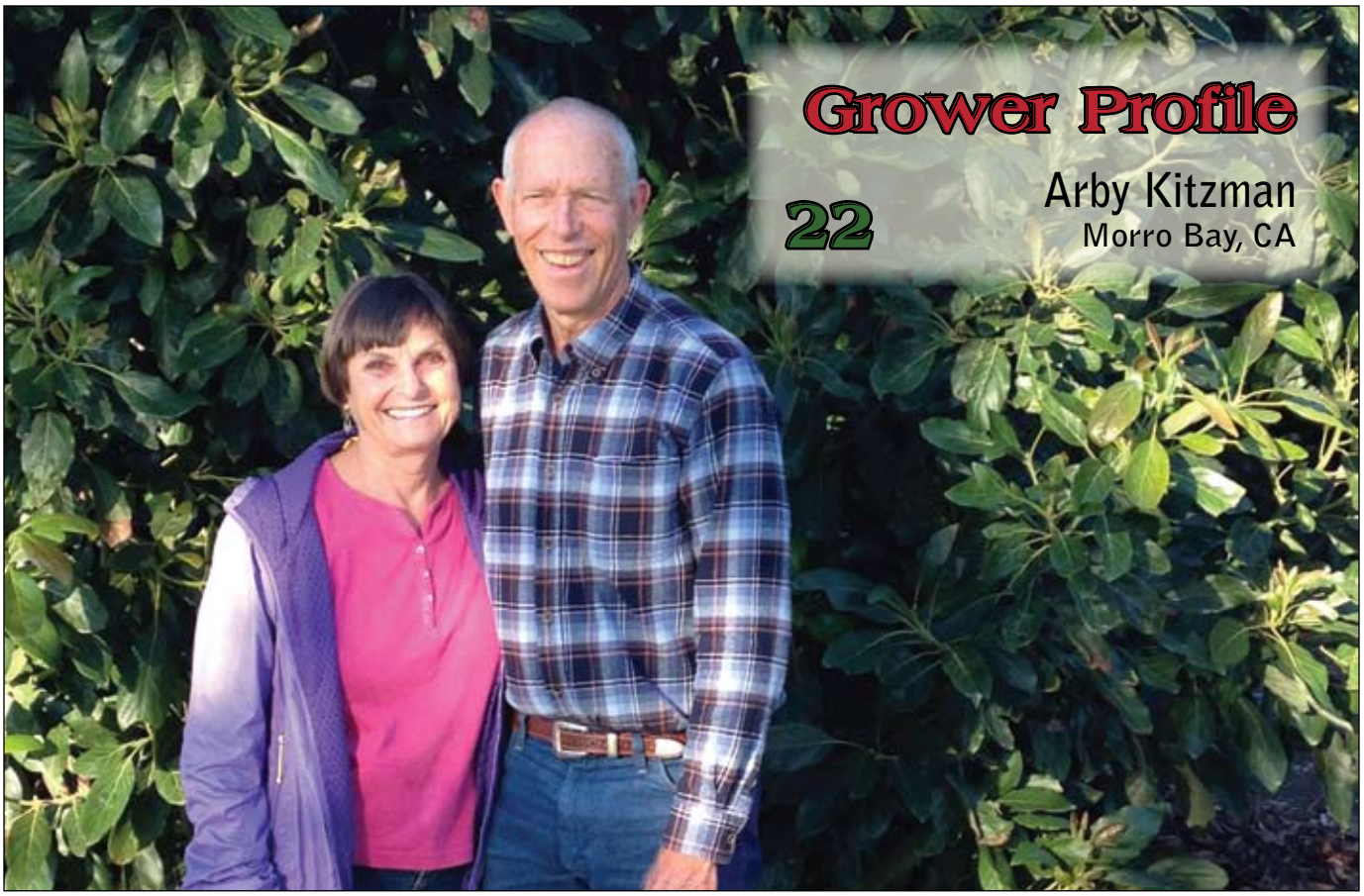
From the ranch to the market, we provide growers with timely cultural advice and guidance on timing harvest. As a global packer, we monitor the pulse of daily supply and demand, while servicing a worldwide customer base.

Let Mission's expertise in the global marketplace help you maximize your return.

Mission®

world's finest avocados

SOUTH: 951.695.4636 | NORTH: 805.488.3575 | worldsfinestavocados.com



From the Grove

Volume 6
Number 4

President
Tom Bellamore
CA Avocado Commission

Editor
Tim Linden
Champ Publishing
925.258.0892
tim.linden@ymail.com

Ad Sales
Tom Fielding
626.437.4619
tomfielding1@mac.com

Design/Layout
Heather Gray
User Friendly, Ink.
userfriendlyink@gmail.com

April Aymami
Industry Affairs Manager
949.754.0738
aaymami@avocado.org

www.californiaavocadogrowers.com

In This Issue

Winter 2016

8 California Avocado Commission Explores Opportunities in Asia

12 CAC Participates in U.S./China Ag Meeting

16 2016 CAC Election Results and a Look at the 2016-17 CAC Board of Directors

20 FDA Update: Avocados Now Considered "Healthy"

22 Stellar Year for Arby Kitzman
Grower Profile

24 Growth of Store-Made Fresh Guacamole Provides Incremental Fresh Avocado Sales

32 CAC's 45th Exhibition at PMA Fresh Summit a Success

34 Shot Hole Borer and Fusarium Dieback Update

36 Progress Reported on Redbay Ambrosia Beetle & Laurel Wilt Issues

42 How to Make a California Avocado Rose

Departments

4 Message from the President
6 Chairman's Report
14 From Your Commission
26 California AvoTech
30 Issues Watch
41 Handlers Report

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.

Volume 6, Number 4 Winter 2016

FROM THE GROVE is published quarterly by California Avocado Commission; 12 Mauchly, Suite L; Irvine, CA 92618. POSTMASTER: Send address changes to California Avocado Commission; 12 Mauchly, Suite L; Irvine, CA 92618.

Message from the President

All Eyes East

Tom Bellamore

As Donald Trump assumes the Presidency of the United States, there is but a single certainty: change is imminent. The nature and degree of change stretch out in front of us as a vast, open plain devoid of any features until we are upon it. We can guess at how the landscape might lie, the time horizons ahead of us, and how rough or smooth the trail will be, but we will not know for certain what the journey holds in store until we are underway. And so it is that we turn our eyes east, and we watch and wait.

Leading up to the election, there was ample rhetoric — from all parties — on topics of acute interest to avocado growers. Sentiments on trade and immigration policy differed widely between candidates, as did stated views on environmental issues and infrastructure investment – all of importance to California agriculture. Rhetoric is not action, however. Rather, it is directional, and despite the alignment which now exists between the Legislative and Executive branches of government, action still takes the collective will of the majority. As the yokes are placed on the oxen, we will see which have the determination to pull.

Like millions of Americans before us, we hold an idealized vision of what we would like our future to be. Many California avocado growers picture a world where competition, at least in part, is held in check. Others see government intervention in the drought in the West, through infrastructure improvement and relief from high-priced water. Some picture a guest worker program that provides cheap labor when it is needed without ties to permanent residency. This is America, after all, and anything is possible.

Then there is the stark reality that nothing is ever easy or as simple as it should be. Sure, with the stroke of a pen (or rather, the withholding of a signature) President Trump could single-handedly cause the Trans-Pacific Partnership to fail. But that is less likely to be the case with the North American Free Trade Agreement (NAFTA), which has been in place since 1994. Mexico's early willingness to renegotiate the agreement and Mr. Trump's unhappiness with NAFTA's performance certainly suggest that change is likely, but the breadth of the current agreement makes it all but impossible to predict the specifics of such change. Although rolling back certain provisions of NAFTA could lead to the reinstatement of tariffs, the imposition of other protective measures, such as seasonal import quotas, would be frowned upon by the World Trade Organization, to which the United States remains a party.

It is worth noting, too, that as you scroll through the 600 plus pages of legal text that constitute NAFTA, the word "avocado" is all but absent. NAFTA, contrary to common belief, had no direct effect on Mexico's ability to ship avocados to the United States. The decision, before and after NAFTA, rested in the hands of the U.S. Department of Agriculture (USDA) because the prohibition on entry was entirely based on legitimate phytosanitary concerns. Of course, the spirit of NAFTA created a tidal wave of change that quickly overtook USDA, forcing the agency to identify a solution that would satisfy both governments. Even then, complete access for Mexico was 23 more years in the making. The dismantling of NAFTA, therefore, by itself, does not guarantee a cessation of imports from Mexico.

Undoubtedly, the same holds true for immigration reform — it is not apt to be swift nor easy. Mr. Trump has clearly articulated many of his priorities but a specific plan for agricultural guest workers remains forthcoming. The President's disdain for regulation provides hope that, at a minimum, a streamlined guest worker program can be put in place, and many in agriculture will be working with the new administration to see this accomplished. On this issue, our new President must collaborate with Congress, and though all of one party, individual Congressional members may not necessarily be all of one mind.

Infrastructure investment and environmental policy changes may be closer at hand. The former is mostly a matter of appropriation and the latter a function of regulatory change, which is largely deemed the exclusive realm of the Executive Branch. Most observers expect the promulgation of new regulations to grind to a near halt, as the President scrutinizes what is working and what isn't. And, as we all know, there are plenty

Board of Directors

District 1

Member/John Burr
Member/Jessica Hunter
Alternate/Ryan Rochefort

District 2

Member/Kellen Newhouse-**Vice Chair**
Member/ Leo McGuire
Alternate/Ohannes Karaoghlanian

District 3

Member/Art Bliss-**Treasurer**
Member/ John Lamb
Alternate/Robert Grether

District 4

Member/Jason Cole-**Secretary**
Member/Ed McFadden
Alternate/Bryce Bannatyne

District 5

Member/ Jim Swoboda
Member/ Rick Shade-**Chairman**
Alternate/Tyler Cobb

Handlers

Member/Steve Taft
Member/Gary Caloroso
Alternate/Gary Clevenger

Member/Egidio "Gene" Carbone
Member/Robb Bertels
Alternate/Donny Lucy

Public Member
Nina Ames

To contact a CAC representative, please visit: CaliforniaAvocadoGrowers.com/Commission/your-representatives

of federal regulations that pertain to agriculture in California.

As the new administration gains momentum, the Commission will be paying close attention, looking for opportunities to further the interests of California avocado growers. To be fair to all, take heart in the fact that we would be doing the same even if Secretary Clinton had been successful in her bid for the Presidency. The difference is, I suppose, that the mandate for change is palpable and expectations are running high. Nonetheless, in the early days of what promises to be a very different approach to government, we must wait and let the details of the new landscape come into focus.

At Long Last, the Avocado Emoji is Here!

Emojis – those icons on your phone like the smiley face – are used to express emotion, to convey the things words cannot or communicate them in less space, to express our feelings and even let friends know what we're having for lunch. But ever since emojis have been around a very important one had been missing: the avocado. Until now!

Earlier this year, the California Avocado Commission (CAC) developed a social media campaign encouraging fans to push The Unicode Consortium (the non-profit corporation that governs the issuance of new emojis) for an avocado emoji. CAC started a campaign on iPetition and by the end of May achieved the goal of 1,000+ signatures by avocado fans asking for an avocado emoji. More than a third left encouraging comments, and beyond the petition itself the campaign was noted on social media and by traditional media such as Newsweek.

In June, CAC celebrated with fans on social media after The Unicode Consortium announced that an avocado emoji would be coming out soon. At last. in December the long-awaited avocado emoji became available on iPhones with iOS 10.2.

CAC prepared communication in anticipation of the announcement and immediately launched an online conversation celebrating the release. A dedicated email to CAC's nearly 250,000 subscribers was sent out, which included a "Click-to-Tweet" link that recipients could click to share the news. More than 70 people shared the tweet that showed the emoji and included CAC's Twitter handle @CA_Avocados.

Additionally, California-branded social media posts were developed that encouraged fans to share the news and engage with the avocado emoji with their friends, reaching more than 600,000 people in 48 hours.

And share they did...more than 400 times across Instagram, Facebook and Twitter. Even the popular culinary magazine *Bon Appetit* posted an article saying, "Don't panic, the avocado emoji is finally here!"

CAC expects excitement to continue as avocado lovers around the world realize that all of their emoji dreams are now a reality. Avocados have always been in our hearts, and now they're in our phones.

Chairman's Report

Rick Shade

New Year Brings New Chairman

Hello to my fellow avocado people across the state. As I write this, at the end of the Thanksgiving weekend, I am happy to see a nice rain falling outside of my office windows. I have quit hoping for that drought-busting El Niño, and would be really happy with an average rainfall year. By the time the magazine is printed and mailed we will be in the New Year. I will take this opportunity to wish you a happy and prosperous New Year. I hope that you are able to enjoy the news and information in this issue with the sound of a steady rain falling in the background.

Shortly after being voted in as chair of the California Avocado Commission this year, I was asked what kind of imprint I would like to leave on the Commission when I am done with the chairmanship. I had to take some time for my thoughts to come together and jell, but I settled on two main areas upon which I want to focus my energy.

The first area is to usher in a youth movement on the board. I am too long in the tooth and gray in the hair to lead such an effort, but I want to do my best to foster the change. With no disrespect to my fellow gray-haired board members, the world is changing. The next group of leaders is comfortable with and works in a very different world than we are used to. Communications technology and social media are leading the charge. I have a personal experience I will use to illustrate the point: I learned just a couple of months ago that our business has had an Instagram presence for more than a year, an account my youngest son and business partner started up. I looked at the site and thought it was cool and showcased what we do in a nice way. What truly stunned me were the numbers. My son showed me the number of followers we have, and more importantly, the amount of business we have picked up solely through that account. This, my friends, is where marketing is going. The people making the decisions on the future of our business must understand and be part of the new wave of business!

My second area of concern is to get our grower board members as engaged as possible with you — the growers and farmers they represent. I am going to push each of them to hold district meetings and talk about what is happening at the Commission and get your thoughts as well. I also want your representatives to listen to you and bring your concerns back for discussion. We can't work on what we don't know about. Do not hesitate! Contact your representative if you have a question, a concern, or an idea. That is what we are here for. Find out about the trends in the industry, learn where our marketing is focused so you can be in that sweet spot where California avocados are the force in the marketplace. Go to the meetings and learn about new and updated production methods that will help you remain competitive in a changing world.

In closing, let's do what we can to make the most of every day — smile, laugh and be thankful that we are California avocado growers.

SHOREBREAK ENERGY SOLAR

HARVEST THE SUN'S ENERGY

Reduce operating expenses

Helping Growers SAVE MONEY

Cash flow positive year 1

100% FINANCING AVAILABLE

ASK ABOUT OUR $0 COST SYSTEMS

Call Us today for a free no-obligation energy analysis

877.449.1944

Corporate Headquarters
1 Peters Canyon Rd., Suite 110, Irvine, CA 92606
CLSB# C10-972616
SHOREBREAKENERGY.COM

Jan DeLyser and Ken Melban met with Tomoko Shibata (c), Costco's buyer for Japan at Asia Fruit Logistica.

California Avocado Commission Explores Opportunities in Asia

California Avocado Commission (CAC) Vice Presidents Jan DeLyser and Ken Melban recently visited Tokyo and participated in Asia Fruit Logistica in Hong Kong to explore opportunities for California avocados.

Tokyo Retail Visits

While in Tokyo, they visited a number of stores – including Kinokuniya International, Life, Yorkmart, Aeon, Tokyo Food Show Store, Seven & I Holdings, Kyusyuya and Ito Yokado – to observe avocado merchandising practices. Like much of the world, Japanese consumption of avocados is on the rise and displays of fruit from multiple origins were common, as were labels identifying the source of the fruit. The retailers are diligent in merchandising different origins separately. In addition to Hass avocados from Mexico and Peru, there was one display of Reeds from California.

"We saw a wide array of avocado usage ideas in departments outside of produce, like the 'Green Gourmet', a deli-like case with multiple salads as well as sushi," said DeLyser.

CAC staff met with Sam's Club China Vice President Neil Maffey and Paul She, director produce/bakery, to discuss access status and potential opportunities.

"We also saw foodservice menus featuring 'hamburg' and other proteins with avocados." When retailers were asked how Japanese consumers like to eat avocados, a common response was "with soy sauce."

In addition to store visits, the CAC team met with two distributors, Farmind and Wismettac, who source California avocados from California handlers and supply retailers and foodservice operations in Japan. The discussions centered on identifying opportunities for California avocados, target accounts and timing. There is a wide range of retailers in Japan, some focus on premium products and others focus on price. This retail structure is well suited to CAC's domestic tiered account approach, which determines distribution and promotion strategies based on the best fit for premium California avocados. As a result of the meetings, CAC identified opportunities for point-of-sale materials and recipe brochures to support California avocado availability in Japan. Additionally, there was some ideation around a usage for avocados that would be promoted in accordance with specific Japanese events and cuisine – similar to CAC's successful Super Bowl, Cinco de Mayo and 4th of July marketing programs.

Asia Fruit Congress

The Asia Fruit Congress, held on September 6 as part of Asia Fruit Logistica, featured presentations on a number of topics. Youchi Kuo from the Boston Consulting Group spoke about China's slowing economy and the "new normal" of 5.5 percent growth yields in consumption — the same rate as Germany. She referenced a two-speed economy with rising affluents and a new generation leading a rise in e-commerce. In addition, she discussed the upper middle class consumer demand profiles — premium offerings, health and lifestyle, affordable treats, sophistication, brand awareness, brand advocacy and global awareness.

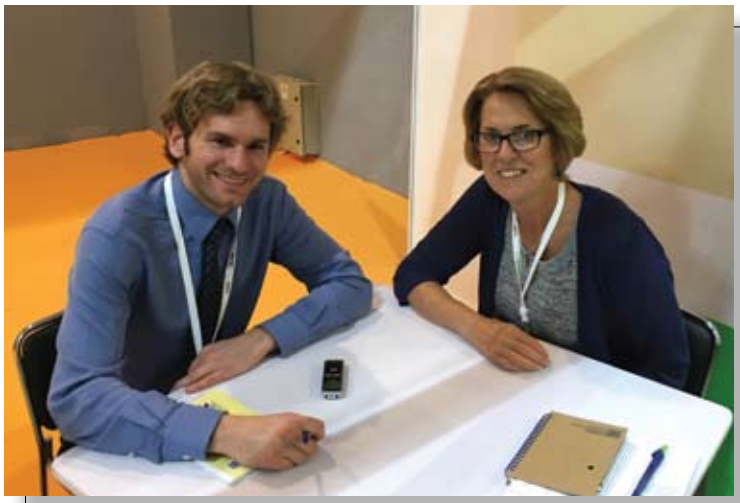
Loren Zhao, co-founder of Fruitday China, discussed online opportunities for produce purchases during his presentation. He noted that fruit is one of the highest purchased products and the favorite online fresh product. Zhao indicated the majority of online fresh customers tend to be married women with high income and an education. According to Zhao, the Fruitday customer tends to be in the mid 30s, is married, has children and is open to new things. In addition, the customer understands globalization, has brand awareness and demands service and experience. He also shared case studies, including one about the benefits of educating consumers about fitness and avocado nutrition.

Asia Fruit Logistica

Asia Fruit Logistica, which was held at Asia World-Expo September 7 – 9 in Hong Kong, hosted more than 11,000 buyers and trade registrants from 74 different countries. The event provided CAC staff with the opportunity to meet with retailers, government officials, California avocado industry stakeholders, global avocado stakeholders and produce representatives from around the world. California avocado industry stakeholders included representatives from Mission Produce, Index Fresh, West Pak Produce, Del Rey Avocado and Piru Fillmore Citrus.

Ken Melban, CAC, met with representatives from the Agricultural Trade Offices of USDA in China.

During the event, Melban and DeLyser met with Tomoko Shibata, who is the merchandise buyer fresh foods for Costco Wholesale Japan Ltd. She indicated their avocado category sales had grown significantly year over year and that their members have a preference for California avocados when available. Shibata said that demos have proven to positively impact sales of avocados at Costco Japan and



Matthew Ogg, reporter for Fresh Fruit Portal, visited CAC's booth during the show and did a story about CAC's participation.

mentioned that it's as simple as serving a cube of avocado with soy sauce. She also indicated that they merchandise a six-count bag at the 25 Costcos located in Japan.

CAC staff also met with Sam's Club China Vice President Neil Maffey and Paul She, director produce/bakery, to discuss access status and opportunities. Maffey served on a panel during the Congress held as part of Asia Fruit Logistica and shared Sam's Club's philosophy of targeting the upper middle class in China. He noted there is increased interest in avocados in China, and since they are not produced domestically, it is a tremendous import opportunity. There are currently 13 Sam's Clubs in China, with two more expected to open this year; the chain plans to open 20 more locations during the next 10 years. Maffey noted that demos are a proven way to increase sales at Sam's China. He also said that they market a four-pack with a divider in a box to enhance quality, and indicated that the firmer fruit is preferred since most Chinese do not eat raw vegetables or salads. The Sam's representatives recommended establishing relationships with distributors in China to ensure best quality at point of purchase.

In speaking with representatives from China and Thailand, CAC staff discovered there is a tremendous amount of interest in having California avocados gain access to these markets. Chinese and Thai importers and retailers, as well as California growers and packers, were all very positive concerning Chinese consumers' perceptions of California produce. There was consensus that California avocados could realize success in China, but before that can happen the U.S. and Chinese governments must complete the work necessary to finalize an agreement. The best-case scenario would be the finalization of a work plan sometime in 2017, thus culminating a lengthy process initiated by CAC in 2005.

Earlier this year, the Commission began the process of gaining access to Thailand, thus it was rewarding to hear representatives from Thailand express interest in having California avocados available to round out their supply of avocados following the New Zealand avocado season.

In support of that government-to-government process, CAC held meetings with two key U.S. Consulate General officials: Zhen 'Freddie' Xu, agricultural marketing specialist from the Shanghai office, and May Liu from the Guangzhou office. Both indicated there remains strong support from the USDA's Agricultural Trade Offices in China and they are working with the Chinese government to finalize an agreement.

Part of the challenge for marketing fresh avocados in China is that consumers aren't accustomed to eating raw produce due to food safety concerns. In fact, much of the preparation of fresh, domestically-grown produce in China

Matt Freeman (l) and Dave Fausett (r), Piru Fillmore Citrus visited CAC's booth, pictured here with Ken Melban, CAC at Asia Fruit Logistica in Hong Kong.

involves cooking to mitigate any potential contamination. That said, one strong positive point that kept coming up in discussions with attendees is that Chinese consumers perceive California produce as very safe. There was also some discussion about finding that one popular Chinese "dish" that could incorporate avocados and drive consumption. California and other avocado producing countries with access to China (Mexico, Peru, Chile) will need to educate target consumers concerning the various ways avocado can be prepared and consumed.

Once the Commission is granted access to China that market could provide California avocado growers with a valuable opportunity, especially in years with large California volume. With a shipping time of two weeks, it's expected California avocados would travel well and provide a premium option in comparison with Mexican fruit (three weeks travel) or Chilean and Peruvian fruit (four weeks travel).

NON-GMO

BIOSTIMULANT FERTILIZERS, PEST CONTROL & BIO FUNGICIDE

INCREASE FLOWERING AND FRUIT PRODUCTION WHEN USING PURE PROTEIN DRY

99% OF NITROGEN DERIVED FROM AMINO ACIDS
INCREASED WEIGHT OF FRUITS & VEGETABLES

PURE PROTEIN DRY

15-1-1 • 11-13-8
5-12-14 • 7.5-1-25

PRIMO AMINOS

18 TYPES OF AMINO ACIDS
80%+ AMINO ACIDS
100% WATER SOLUBLE

CONTAINS IRON & ZINC
PLUS BENEFICIAL MICRO ORGANISMS

BACILLUS SUBTILIS
FIGHTS POWDERY MILDEW
BACILLUS THURINGIENSIS
HELPS TO CONTROL BORER LARVAE




Weed-a-Way

CONTACT
OR
PRE EMERGENT
HERBICIDE

EX-ICUTE™ & RID-BUGS

25(b) OILS MINIMUM RISK ORGANIC INSECTICIDE:

AND BIO-FUNGICIDE CONTROLS:

WSDA LISTED

cdfa

OMRI LISTED
For Organic Use

Organic AG Products

www.OrganicAGProducts.com

Guaranteed by AZ ENTERPRISES INC DBA ORGANIC AG PRODUCTS
2367 Brant St., • Arroyo Grande CA. 93420

SALES CONTACT INFO:

JOE HASLETT
(805) 748-4033
joehaslett.oap@gmail.com

ED ZYBURA
(805) 550-7776
edzybura@charter.net

APHIS and AQSIQ delegations

CAC Participates in U.S./China Ag Meeting

By Ken Melban
Vice President of Industry Affairs

A bilateral meeting on agriculture was held October 21-22, 2016 between the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) and China's General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ). The meetings were held in Chicago and the California Avocado Commission was in attendance.

Industry members were not allowed to join the actual bilateral discussions since it was an official government-to-government meeting. However, the Commission did participate in a pre-bilateral meeting with APHIS on October 20 to discuss the next steps in securing a trade agreement for avocados with China. In addition, on October 22 the Commission co-hosted and participated in a dinner for the AQSIQ and APHIS delegates.

In the pre-bilateral meeting, APHIS reported that China was very close to finalizing the Pest Risk Assessment (PRA). The purpose of the PRA is to identify pests (insects and diseases) that are known to exist within California avocado production but that are not present in China. Finalizing a PRA is a critical step in developing a trade agreement, and it must be completed and agreed upon by both governments. Once a PRA is finalized, measures to mitigate the introduction of pests are identified in a workplan, also known as an agreement.

During the bilateral dinner both AQSIQ's Director General Li and APHIS's Deputy Administrator Osama El-Lissy spoke about their shared goal of modeling a collaborative working relationship for their government colleagues. They laid out an ambitious plan for concurrently signing six agreements in 2017 — three for the United States and three for China. California avocados were included in the U.S. products.

This was a very positive sign that the California avocado agreement could be finalized within the next year. However, this report must be tempered with the realization that these negotiations seldom unfold as planned. In addition, now that the U.S. presidential election has concluded, there will be a change in administration that may cause some delays.

The Commission first petitioned APHIS for China trade access in 2005. APHIS then initiated the process by work-

ing with AQSIQ, but by 2011 nothing had been received from AQSIQ on the California avocado PRA. During the last five years, the Commission has worked with senior APHIS staff to ensure that California avocados were a high priority for both APHIS and AQSIQ. Although the development of a trade agreement is supposed to be limited to phytosanitary issues, the politics between the two negotiating countries can play a significant role. In this instance, China is attempting to negotiate access for specific commodities to the United States, and APHIS is facing tremendous pressure from domestic producers of those commodities. The same is occurring in China. Fortunately, there is little (if any) commercial avocado production in China so those internal industry pressures don't exist specific to the California avocado request. However, in some instances trade negotiations may result in a "quid pro quo" situation, and California avocados have been caught in the middle of efforts on both sides involving other commodities.

In 2014 the Commission pressed APHIS to once again provide AQSIQ with an updated pest list in the hope of jumpstarting the stalled process. In January 2015, the Commission secured a visit to a California avocado grove for AQSIQ's Director General Li and APHIS's Deputy Administrator El-Lissy. The visit seemed promising as both were very positive about moving the California avocado process forward. In August 2015, the pest list was again provided by APHIS to AQSIQ.

Finally, in May 2016, the Commission hosted a technical visit for three AQSIQ officials to California. AQSIQ had developed its draft PRA and wanted to visit California avocado groves and packing facilities to finalize its PRA. The technical visit lasted a full week with a total of eight groves and four facilities visited. The report back from AQSIQ to APHIS was positive, with follow-up information requested on some specific pests.

The above detailed timeline illustrates how delays can, and do, occur. However, the initial reports concerning the bilateral meeting are favorable and there is hope that the PRA will be completed soon. Both countries must agree on four remaining pests. Once the PRA is finalized, a workplan will be negotiated to identify the steps necessary to mitigate all identified pest risks in the growing, packing and shipping processes.

After the PRA and workplan are completed, all California avocado packing facilities interested in shipping to China must be certified. Once the workplan is finalized APHIS will provide training for packing facility personnel on the specific requirements. The Commission will keep you updated as developments occur.


COMMITMENT TO
INNOVATION

West Pak employs the world's most advanced, fully automated avocado grading and sorting technology.

The innovative **Inspectra** system is our safe, non-invasive, near-infrared (NIR) technology used for testing the internal properties of produce. It sorts fruit by dry matter, firmness and internal quality. Combined with our **Compac 9000IR** infrared sorter, offers the most automated packing line in the avocado industry with unparalleled labor savings. The Inspectra and Invision systems, working in unison, bring world class consistency and accuracy of sorted product.

We continue our commitment to California and our investments in technology and material handling. If you are interested in our latest technology and efficiency, please call us at **1-800-266-4414** or visit us at **westpakavocado.com**.

WEST PAK™
AVOCADO, INC.

FIELD REPRESENTATIVES

SOUTH
Galen Newhouse
Andrew Gabryszak
Robert Salaski
David Chol

NORTH
Ralph Gonzalez
Mike Harberson

By April Aymami
Industry Affairs Manager

Board Commits to a Strong Marketing Effort Despite Lower 2017 Budget

Each October the California Avocado Commission (CAC) Board of Directors takes up the annual task of approving the budget, business plan and annual assessment rate for the upcoming fiscal year. While no two years are ever the same, the past few years have found the Commission in a position where anticipated crop size and value continued to generate revenue levels that funded strong marketing, industry affairs and research programs without much consideration given to raising the assessment rate. However, this past October, faced with estimates of a 200 million-pound crop for 2017, the CAC Board had only two options for generating adequate revenues to continue carrying out the Commission's mission – increase the assessment rate or drastically reduce spending.

To thoroughly weigh their options, the CAC Board first reviewed the anticipated ending financial position for 2015-16, which provided a better understanding of projected reserve balances. Through prudent management of funds throughout the year, more than $1.5 million dollars were returned to reserves at the end of the 2015-16 fiscal year. In addition, it is estimated that an excess of nearly $2 million in assessment revenues were generated due to favorable market conditions and additional crop volume in the second half of the year. The result – a strong reserve balance heading into the lower volume 2017 crop year.

Those combined factors allowed management to develop a 2016-17 business plan and budget that continues to provide growers with a robust marketing effort of $7.7 million, 61 percent of the total budget, with another $1.6 million dedicated to industry affairs, issues management, research and grower education programs, despite projected revenues totaling only $9 million dollars. Committed to providing growers a stable assessment rate, and not further burdening them in an already-short crop year, the CAC Board approved management's recommendation to maintain the assessment rate of 2.30 percent and adopted a budget of just over $12.7 million, reflecting a reduction of $2.7 million versus the 2015-16 budget of $15.4 million.

Included here are just a few of the business plan highlights for the 2016-17 fiscal year. Review the complete business plan and budget online at the following locations:

Business Plan:

www.californiaavocadogrowers.com/commission/accountability-reports/business-plans

Budget:

www.californiaavocadogrowers.com/commission/accountability-reports/finance

Marketing

- Continue tiered-marketing approach by targeting retailer and foodservice operators willing to pay a premium for California Avocados and providing these "Tier 1" customers with customized marketing support, including geo-targeted advertising, merchandising, recipes and more
- Extend the Made of California campaign and ensure the supporting media plan is targeted, efficient, technologically advanced and relevant to CAC's targeted audience
- Emphasize the unique competitive advantage of Fresh California Avocados as the only locally grown avocado

- Promote California Avocados as the perfect choice for the American Summer Holidays
- Enhance function and design of the website, blog and email programs to better communicate the superiority and unique competitive advantages of Fresh California Avocados
- Leverage third-party advocates to share key California avocado brand messages, including Artisan Chefs, Blogger Ambassadors, Registered Dietitian Nutritionists, retailers, foodservice operators and California avocado fans

Industry Affairs

- Conduct field meetings, seminars and workshops to educate and update growers and industry stakeholders on pertinent industry and cultural management issues
- Pursue external funding opportunities for industry initiatives
- Develop technical initiatives to support productivity and profitability, including shot hole borer detection, phytosanitary security and Section 18 emergency exemptions
- Monitor water issues, explore possible federal actions that would impact agricultural water supplies and represent industry stakeholder interests related to water conservation
- Identify water use efficiency technologies
- Advocate and develop position papers on behalf of stakeholders concerning topics such as food safety regulation, immigration reform, invasive species funding, conservation/water efficiency, free trade agreements, foreign market development and emerging markets programs

Production Research

- Obtain biocontrol agents against polyphagous shot hole borer (PSHB) from Southeast Asia and test at UCR for possible deployment in California
- Develop web-based decision support tool for avocado production and fruit quality
- Develop rootstock varieties resistant to Phytophthora cinnamomi and salinity
- Continue risk assessment of PSHB and monitor spread of insects, transmission factors, risk areas and crop yields in both infested and non-infested groves
- Maintain important germplasm collections
- Maintain and utilize high-density demonstration grove for grower education classes

2016 CAC General Election Results and a Look at the 2016-17 CAC Board of Directors

By April Aymami
Industry Affairs Manager

You may have noticed that the 2016 CAC General Election materials looked a bit different than previous years. Due to redistricting and changes made to the CAC law to reduce the number of alternates, some districts saw fewer seats on the ballots, while other districts saw more than they normally would. Despite the variance among district ballots, when the full CAC Board assembled in November for its first meeting of the year, each of the five districts was represented by three producers (two members and one alternate), for a total of 15 producers. In addition to the 15 producer seats, the industry is currently represented by six handlers (four members and two alternates), along with one public member, resulting in a CAC Board composition of 22 members and alternates.

The newly elected commissioners were seated at the regular meeting of the CAC Board on November 17, 2016 where the following individuals were then elected to serve on the Commission's Executive Committee for the term ending October 31, 2017:

Chairman: Rick Shade
Vice Chair: Kellen Newhouse
Treasurer: Art Bliss
Secretary: Jason Cole

On the next page is a summary of the results of the 2016 CAC General Election. In addition, we have also provided a complete photo roster of the 22-member 2016-17 CAC Board of Directors on the pages that follow. Please take note of who the current Commissioners are that represent your district. If you are unsure of which district your grove resides in, please contact the Commission or locate your city/zip code on the following chart: www.californiaavocadogrowers.com/commission/district-map

2016 CAC General Election Results

District 1
Member (2-Year Term): Jessica Hunter

District 2
Member (2-Year Term): Leo McGuire

District 3
Member (2-Year Term): John Lamb
Member (1-Year Term): Art Bliss
Alternate (1-Year Term): Robert Grether

District 4
Member (2-Year Term): Ed McFadden
Member (1-Year Term): Jason Cole
Alternate (1-Year Term): Bryce Bannatyne

District 5
Member (2-Year Term): Rick Shade

Handlers
Member (2-Year Term): Egidio "Gene" Carbone, Calavo
Member (2-Year Term): Robb Bertels, Mission Produce

District 1

John Burr
Member
Grove Location: Escondido
Term Ends: 2017

Jessica Hunter
Member
Grove Location: Valley Center
Term Ends: 2018

Ryan Rochefort
Alternate
Grove Location: Valley Center
Term Ends: 2017

District 2

Kellen Newhouse (**Vice Chair**)
Member
Grove Location: Fallbrook
Term Ends: 2017

Leo McGuire
Member
Grove Location: Temecula
Term Ends: 2018

Ohannes Karaoghlanian
Alternate
Grove Location: Temecula
Term Ends: 2017

District 3

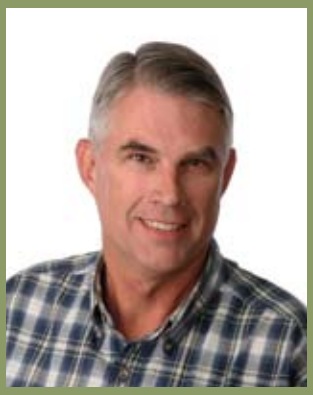
Art Bliss **(Treasurer)**
Member
Grove Location: Somis
Term Ends: 2017

John Lamb
Member
Grove Location: Somis
Term Ends: 2018

Robert Grether
Alternate
Grove Location: Somis
Term Ends: 2017

District 4

Jason Cole **(Secretary)**
Member
Grove Location: Santa Paula
Term Ends: 2017



Ed McFadden
Member
Grove Location: Fillmore
Term Ends: 2018

Bryce Bannatyne
Alternate
Grove Location: Fillmore
Term Ends: 2017

District 5

Jim Swoboda
Member
Grove Location: Goleta
Term Ends: 2017

Rick Shade **(Chairman)**
Member
Grove Location: Carpinteria
Term Ends: 2018

Tyler Cobb
Alternate
Grove Location: Goleta
Term Ends: 2017

Handlers

Steve Taft
Member
Company: Eco Farms Corporation
Term Ends: 2017

Gary Caloroso
Member
Company: Giumarra Companies
Term Ends: 2017

Gary Clevenger
Alternate
Company: Harvest Time/Freska
Term Ends: 2017

Egidio "Gene" Carbone
Member
Company: Calavo Growers, Inc.
Term Ends: 2018

Robb Bertels
Member
Company: Mission Produce, Inc.
Term Ends: 2018

Donny Lucy
Alternate
Company: Del Rey Avocado Company, Inc.
Term Ends: 2018

Public Member

Nina Ames
Term Ends: 2018

FDA Update:

Avocados Now Considered "Healthy"

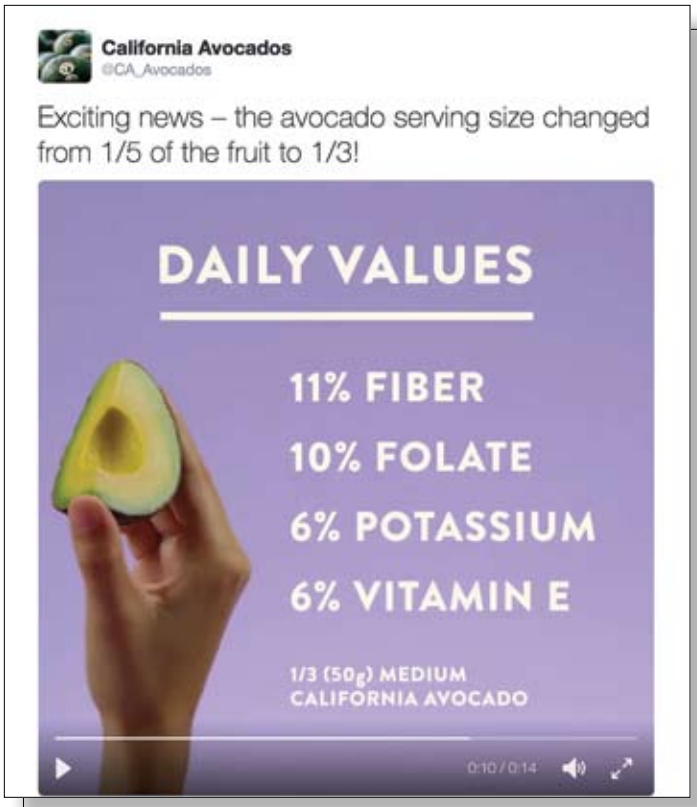
Avocado nutrition and guideline changes from the Food and Drug Administration (FDA) in 2016 will allow the California Avocado Commission (CAC) and avocado marketers to make nutrition claims that have been a long time coming – like "good source of" for certain nutrients and "healthy" to support communication of avocados as part of a healthy lifestyle.

Avocado Serving Size Change

In July 2016, the FDA released new serving sizes of certain foods, including avocados, and recommended daily intakes (daily values, or DV) of certain vitamins and minerals. The new serving size is very positive for avocados as it was increased from 1/5 of a medium avocado to 1/3 of a medium avocado. The updated serving size now allows the following claims to be made:

- Avocados are a good source of fiber (11% DV)
- Avocados are a good source of folate (10% DV)
- Avocados are a good source of pantothenic acid (14% DV), vitamin K (10% DV) and copper (10% DV)
- Avocados contain 6% daily value potassium per serving (up from 4%)
- Avocados contain 6% of daily value vitamin E (up from 4%)

Consumer communication via CAC's online marketing platforms (social media, blog and email) shared educational yet playful messages with CAC's targeted consumers and influencers. California avocado fans learned about the new serving size and how to cut a California avocado into one-third slices. A CAC video including key nutrition infor-



mation for the new serving size was viewed nearly 50,000 times.

Avocados Now Considered Healthy by FDA

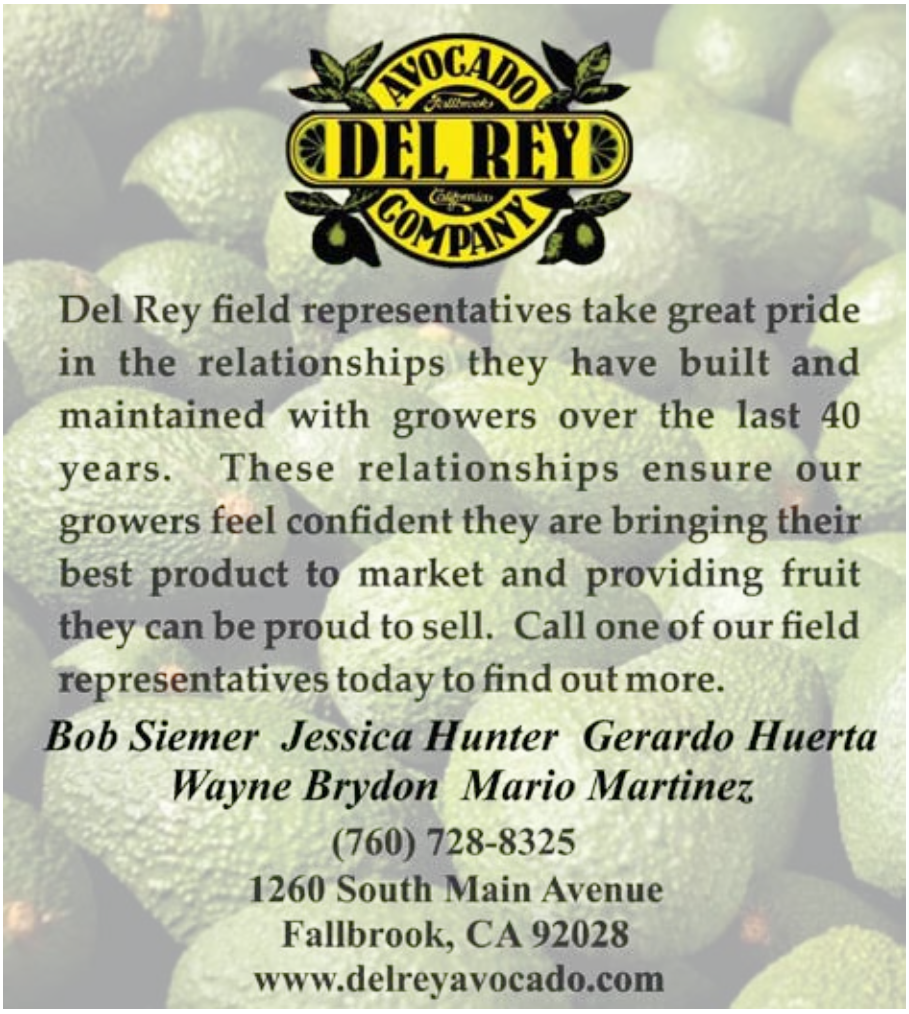
In September 2016, the FDA issued new guidance for the use of the implied nutrition content claim "healthy," which now includes avocados.

When the FDA published the prior rule defining "healthy" in 1993, avocados did not meet the FDA's definition because the total fat per serving exceeded the limitations they set at that time. Since then the science related to public health recommendations for intake of dietary fats has evolved. The focus of the most recent dietary fat recommendations has shifted away from limiting total fat intake to encouraging intakes of mono and polyunsaturated fats (the kind of good fat found in avocados).

Until the 2016 change, CAC was not allowed to communicate that avocados were healthy, meaning that all marketing done by the Commission with a nutrition angle had to be written to communicate healthfulness and wellness without mentioning the word "healthy." In 2015, CAC received approval and began utilizing messaging about avocados being a superfood, but due to oversight by the United States Department of Agriculture remained silent when it came to calling avocados "healthy." Using the word "healthy" in communications will aid in marketing messaging that strategically emphasizes the healthy attributes of the California avocado.

CAC's messaging concerning the news was celebratory and encouraged targeted consumers to share the exciting news with others online. Consumers responded positively with comments such as, "This is a joyous day!" Others noted that they already knew avocados were healthy, with comments such as, "I don't need the FDA to tell me this." CAC's blog post and social media assets were sent to CAC Registered Dietitian Nutritionist Ambassadors, who shared the content on their social media channels, extending the reach of California avocado messaging.

Both the increased serving size and the "healthy" claim, as part of the ruling from the FDA, open the door to many communication possibilities involving nutrition, and will be woven into upcoming California avocado promotions and messaging across all CAC marketing channels.



Grower Profile

Stellar Year For Arby Kitzman

By Tim Linden

It is not an exaggeration for 76-year-old Arby Kitzman to call 2016 his "best year ever." The Morro Bay avocado grower recently told *From the Grove*, "I don't think I'll ever have another year like this – 2016 was a great year."

In October, he capped his year with a first place finish for his age group in the USA Triathlon Aquathlon National Championships in Santa Cruz. A month earlier, in Cozumel, Mexico, he won his age group for both the Aquathlon World Championships and the World Triathlon Grand Final. In August, he came in second in the 75-79 male age classification for the Sprint Triathlon Nationals in Omaha, Nebraska.

And to top it all off, his 8.5-acre avocado grove produced 100,000 pounds of fruit for the first time ever, which he sold at record prices. "I didn't hit the $2 (per pound) market, but we did very well," he said, talking about the excellent in-grove prices that were available when his crop was being harvested in the late summer/early fall period.

And one more bit of good news for 2016: while other growers are looking at a down crop volume-wise for 2017, Kitzman says, "My trees are loaded. I'm not great at judging the crop on the trees, but it looks like I have as much fruit as last year. I've had a lot of drop but there is still plenty of fruit on the trees."

Kitzman, who was given the nickname Arby after his first two initials, R & B, when he was a toddler, was born in Hawaii in 1940. His civilian father ran the laundry service at the Pearl Harbor base from the 1930s through the end of World War II. After the war, his father ran a small laundry service in Twain Harte in the Sierra Foothills for several years, before moving the family to Paso Robles to do the same thing. It was there that Arby graduated from high school and pondered career choices. He got involved in agriculture as a summer job harvesting grain crops, and enjoyed roping and riding. "But I didn't have any particular direction, though I did want to be a cowboy."

In the meantime, his father had traded in the laundry business to serve as a Culligan water dealer. When he bought the Culligan franchise in Morro Bay, he asked Arby to join him and help run it. Thus began a career in the water business.

"We moved to Cayucos in 1959 and that became my career," Arby said. "My dad died when I was only 22 and my mom and I ran the business after that. Eventually we bought out our partners and that was my career until I retired. I didn't have an exact retirement date but it was somewhere around 2010. Now my son runs that business."

In 1974, he and his wife, Jeannie, bought a 10 acre site just outside of Morro Bay, built a home, added a few "country lifestyle" amenities, such as a pasture and farm animals, and raised their three kids. In 1980 he struck up a conversation with a fellow Morro Bay Rotarian, who was propagating avocado trees. "I traded him a water softener and a

reverse osmosis system for 250 avocado trees, which were planted on a little more than an acre."

Kitzman continued his career, paying some attention to his avocado grove but he was working full-time and his Culligan business was the top priority. "It was either 1995 or 1996 when I harvested 36,000 pounds and we had very good prices. I realized that if all my acreage would have been planted with avocados, I could have retired," he quipped.

Hence, he started planting the rest of the 10 acres. By 2000, he had 1,000 trees on 8.5 acres. "I experimented quite a bit with spacing and different densities. I have a few rows at 25 feet apart, which I could have done without. Most of my rows are 20 feet but I also have some at 10 and 12 feet. Everything now is in full production but it has been a struggle."

The bad freeze of 2007 killed close to 75 trees and knocked him out of business for about three years. Since his trees were not going to produce a crop in those years, Kitzman transitioned all the acreage to organic production, which he said did not work out. "From my perspective, it was very disappointing. I never got a good crop. In 2014, I switched back to conventional."

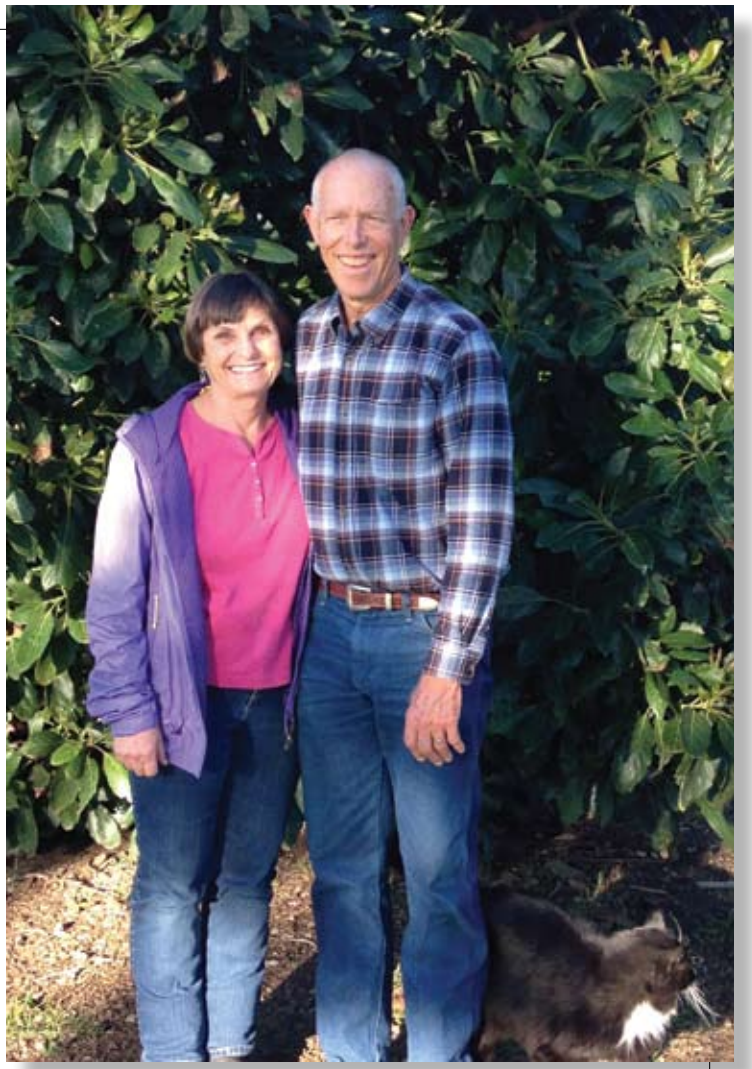
As he surveys the great year of 2016 and what appears to be another good crop on the trees right now, the longtime water softener salesman credits his Culligan background.

Culligan came into the water business selling water softeners and then championed reverse osmosis (RO) systems for water purification. Kitzman was very well acquainted with those systems. He has three small wells on his property that produce poor quality brackish water. "Being in the water business all my life, in 2013 I decided to install a commercial RO system. Since then my trees have taken off. I'm sure it is because of the quality of water. The trees look great."

He explained that he has installed nine, 5,000-gallon water storage containers on his property. Each day, he pumps the brackish water into three of those containers through the RO system. The resulting pure water is blended with the well water in the other six storage tanks. He has divided his grove into seven parcels. Each night, beginning at 6 pm and lasting until midnight, he puts about 15,000 gallons of water on one section of the grove. He repeats this every night in a seven day rotation.

However, on this particular late October day Kitzman got great news as he checked his water gauge that morning. "We got an inch and a half of rain last night."

He will continue to monitor the situation but was planning to turn off his completely-automated irrigation system for about a week. And with any luck, he said, continued rain will allow him to keep the system off through the end of the year and into January or February. "I'll play it by ear," he said.



Jeannie and Arby Kitzman

Water, he added, is the part of the agricultural business he knows best. "I need help with what I call the scientific stuff – how much fertilizer to apply and when."

With the rain falling and autumn in full force, this is the downtime of the year for Kitzman. The Santa Cruz Aquathlon earlier in the month was the last race of the season. The competitions are typically held from the spring to the fall. In the offseason, his training regimen also takes a bit of a rest as he tries to do only one activity each day: running, swimming or biking. Kitzman acknowledges that his athletic pursuit is more of a young man's game. He said some of the age groups – with participants in their 40s and 50s – attract more than 100 competitors. Now that he has "aged-up" to the 75-79 class, there are fewer competitors. "In the last race there were 13 of us. In most races the oldest group is usually 80-84, but I have been in some races with competitors in their 90s. I don't think I'll be doing that."

But one would be hard pressed to bet against him…especially considering his best year ever was his 76th.

Signs such as this, which featured the California Avocados logo, showcase the quality — and convenience — of store-made guacamole made daily with California avocados.

Growth of Store-Made Fresh Guacamole Provides Incremental Fresh Avocado Sales

Store-made fresh guacamole has evolved from a niche presentation by a few retailers using overripe or excess inventory to a profitable product offering for retailers, including some who specifically source fresh avocados for their guacamole programs.

Store-made fresh guacamole programs have grown in popularity with retailers in locales ranging from the West to the Midwest and Northeastern regions of the United States, with retailers reporting that sales of the product have been incremental to their fresh avocado sales.

Because store-made guacamole sales have not cannibalized bulk avocado sales, retailers have creatively expanded their guacamole offerings. Some retailers have developed signature guacamole recipes for their stores, which have led to the guacamole sections becoming "destination" stops for shoppers. In addition, some retailers now offer multiple SKUs of guacamole, providing customers with spicy and mild versions, tropical avocado salsas or guacamole featuring seasonal ingredients such as Hatch chiles.

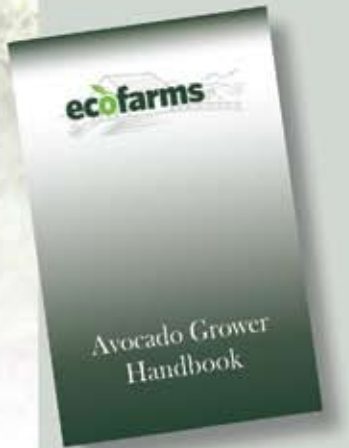
The California Avocado Commission (CAC) has helped targeted retailers capitalize on the popularity of store-made fresh guacamole by partnering with them on custom promotions for guacamole made daily with California avocados. This past season, the Commission partnered with several retailers in the West by sponsoring sales and display contests promoting store-made fresh guacamole with signage indicating that the avocados used were from California.

In the past, retailers primarily used overripe avocados or excess inventory when preparing store-made guacamole. Today, some retailers still use the ripe and ready to eat avocados – and thus restock their displays with fresher avocados. Other retailers are sourcing specific avocados (such as small size or #2 fruit) for their guacamole programs, which helps move those inventories as well. Regardless of which avocados retailers use to prepare their store-made fresh guacamole, they are able to obtain a premium price for the store-prepared guacamole and that has helped to reinforce the value for fresh avocados as well. One summertime ad in the Northeast, for example, featured a 12-ounce package of store-made guacamole for $8.

Handling California Avocados

Organic and Conventional Since 1974

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.



Call or Email for a copy of the new Eco Farms Avocado Grower Handbook, enola@ecofarmsusa.com

ecofarms

Tel: 800-350-4326
www.ecofarmsusa.com

By Tim Spann
Research Program Director

Final Report Issued Giving Tools for Fertilization and Salinity Management

During the past five years, a team of researchers led by Dr. David Crowley, professor of plant soil relations, emeritus, have gathered data from hundreds of avocado trees across a transect of major avocado production areas in Southern California in order to model the relationships between leaf nutrient concentrations and the yields of avocado trees.

The project, funded by the California Avocado Commission, was initiated to develop Decision Support Tools (DST) that can be used by California avocado growers to improve fertilization and nutrient management and minimize the effects of soil salinity in a cost-effective manner. A variety of scientists, graduate students, undergraduate student volunteers, postdoctoral research associates, CAC staff and visiting foreign researchers from Chile, Mexico and Pakistan contributed to the project and the final report issued by Dr. Crowley and Salvatore Campisi, postdoctoral research associate.

Following is a synopsis of the final report, the research groups' major findings and nutrient interaction models, as well as a look at a possible prototype for an online version of the DST.

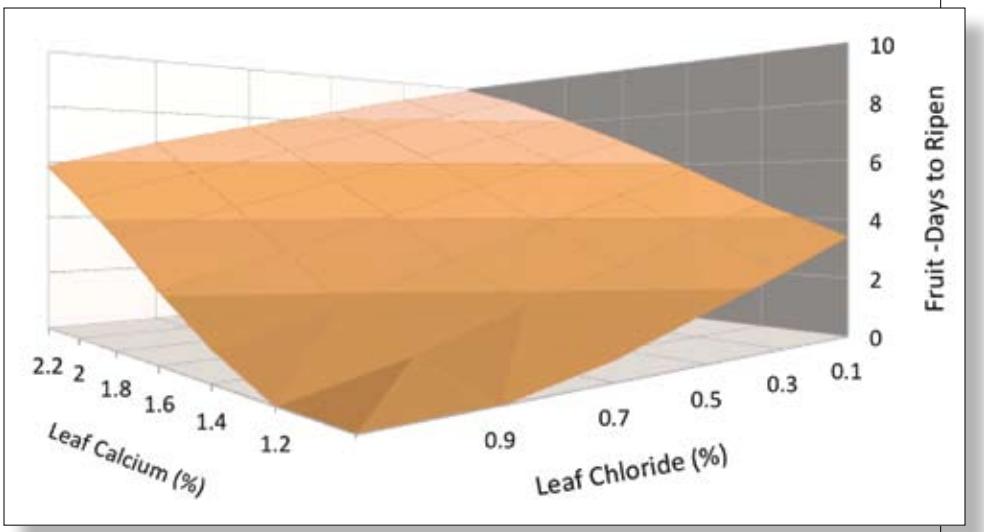


Figure 1. When fruit is removed from cold storage to ripen, high leaf chloride levels greatly reduce ripening time, thereby reducing time for transport and sale.

Final Phase

In the final phase of the DST project, researchers focused on translating all of the results into concise models that could be used in the development of an online DST for California avocado growers. During the earlier phases of the research, the team reported findings for nutrient-yield response relationships for each of the 11 individual elements monitored by leaf analysis and identified target ranges for each leaf nutrient element.

To develop the models that predict the nutrient-yield relationships of all possible combinations for the 11 elements, the researchers had to develop filters and mathematical models that could extract the relationships between yields and factors, such as chloride toxicity and alternate bearing. For example, modeling errors caused by alternate bearing trees are generated when heavy-yielding trees exhibit large nutrient removal in an on-cycle year, but accumulate nutrients during an off-cycle year. Similarly, low-yielding trees may be affected by other variables such as drought, summer heat fruit drop or poor pollination. The team thus developed filters to model trees with high yields that were not in an alternate bearing mode and whose nutrient profile should be duplicated across the orchard.

The team also refined Liebig's Law of the Minimum. This law states that "for any specific combination of elements, the *single element* that is most limiting must be corrected before any progress can be achieved by managing another element that is less limiting." For example, under Liebig's Law, chloride toxicity (the most limiting factor) would have to be alleviated before adjusting potassium, otherwise adjusting the potassium would have no affect on the yield. Because Liebig's Law does not take into account the effects of nutrient

excesses or chloride toxicity, the Law was refined to measure not only how nutrient limitations affected potential yields, but also how nutrient excesses and interactions between nutrients affect fruit production.

The team then developed yield-response relationships for each individual nutrient and each nutrient pair, noting when nutrient interactions and imbalances would increase or decrease production and the resulting potential effect on yield. Having completed 482 hierarchical modeling analyses, the team developed a series of lookup tables for each element that help to identify the greatest constraint and illustrate how nutrient interactions affect avocado yield potential.

A summary of the earlier stages of the DST project can be found in the Fall 2015 issue of *From the Grove*.

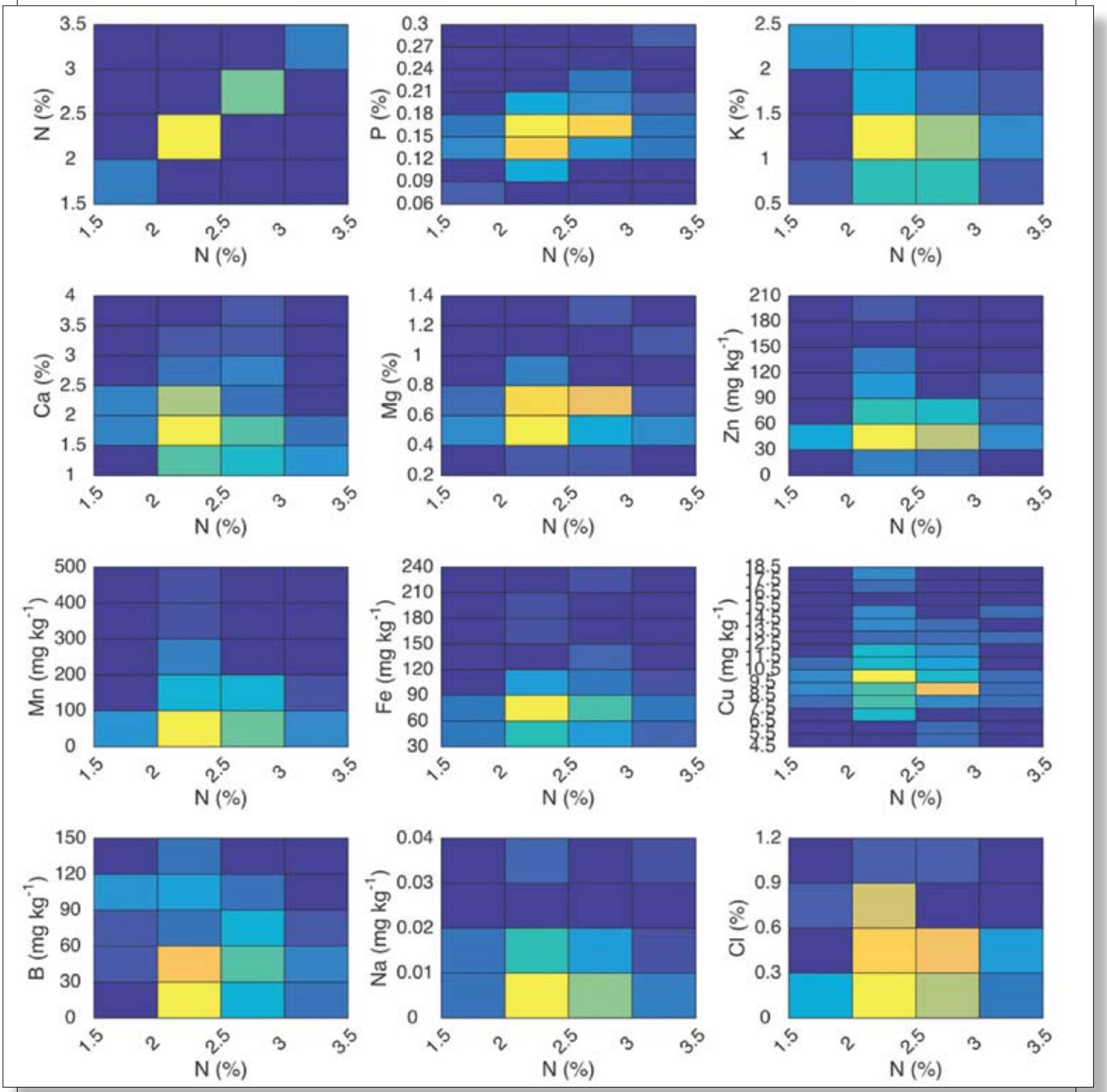
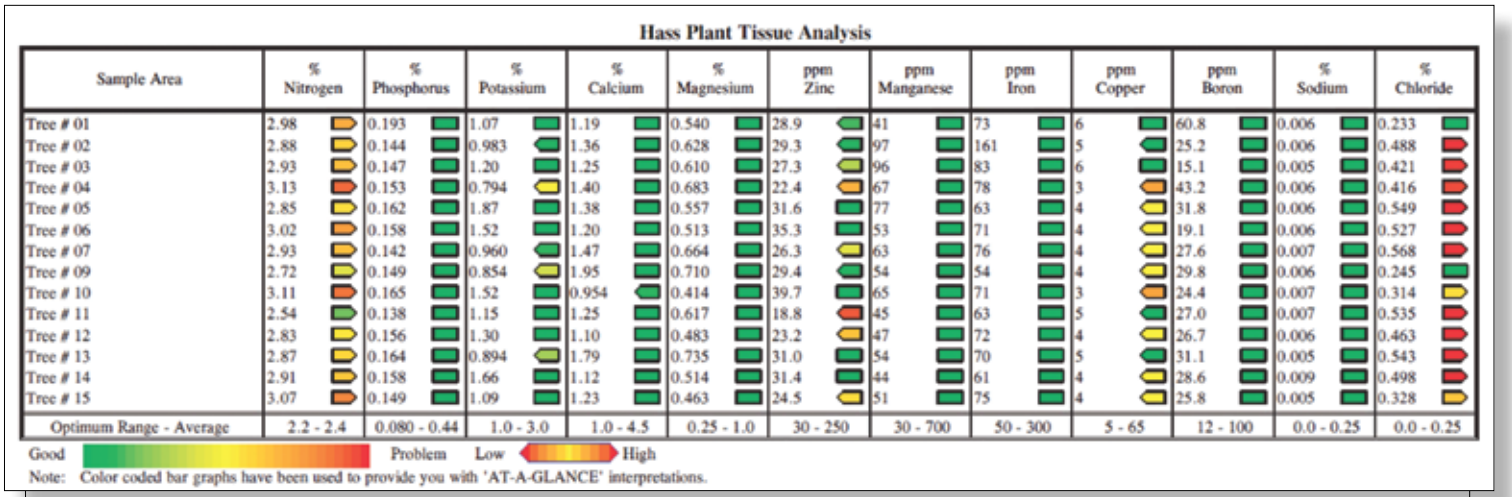


Figure 2. Production functional relationships for nitrogen and the other essential elements monitored by leaf analysis. Yellow indicates the ideal nutrient range for fruit production and dark blue indicates complete suppression of productivity.



Hass Plant Tissue Analysis

Sample Area	% Nitrogen	% Phosphorus	% Potassium	% Calcium	% Magnesium	ppm Zinc	ppm Manganese	ppm Iron	ppm Copper	ppm Boron	% Sodium	% Chloride
Tree # 01	2.98	0.193	1.07	1.19	0.540	28.9	41	73	6	60.8	0.006	0.233
Tree # 02	2.88	0.144	0.983	1.36	0.628	29.3	97	161	5	25.2	0.006	0.488
Tree # 03	2.93	0.147	1.20	1.25	0.610	27.3	96	83	6	15.1	0.005	0.421
Tree # 04	3.13	0.153	0.794	1.40	0.683	22.4	67	78	3	43.2	0.006	0.416
Tree # 05	2.85	0.162	1.87	1.38	0.557	31.6	77	63	4	31.8	0.006	0.549
Tree # 06	3.02	0.158	1.52	1.20	0.513	35.3	53	71	4	19.1	0.006	0.527
Tree # 07	2.93	0.142	0.960	1.47	0.664	26.3	63	76	4	27.6	0.007	0.568
Tree # 09	2.72	0.149	0.854	1.95	0.710	29.4	54	54	4	29.8	0.006	0.245
Tree # 10	3.11	0.165	1.52	0.954	0.414	39.7	65	71	3	24.4	0.007	0.314
Tree # 11	2.54	0.138	1.15	1.25	0.617	18.8	45	63	5	27.0	0.007	0.535
Tree # 12	2.83	0.156	1.30	1.10	0.483	23.2	47	72	4	26.7	0.006	0.463
Tree # 13	2.87	0.164	0.894	1.79	0.735	31.0	54	70	5	31.1	0.005	0.543
Tree # 14	2.91	0.158	1.66	1.12	0.514	31.4	44	61	4	28.6	0.009	0.498
Tree # 15	3.07	0.149	1.09	1.23	0.463	24.5	51	75	4	25.8	0.005	0.328
Optimum Range - Average	2.2 - 2.4	0.080 - 0.44	1.0 - 3.0	1.0 - 4.5	0.25 - 1.0	30 - 250	30 - 700	50 - 300	5 - 65	12 - 100	0.0 - 0.25	0.0 - 0.25

Good Problem Low High

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Figure 3. Sample of typical results for avocado leaf analysis, with existent optimal nutrient ranges listed in the bottom row.

Major Findings

Based on the data collected, it is evident that many of the California avocado growers are applying too much nitrogen and potassium and not applying enough sulfur and calcium (gypsum). This is critical because the researchers' models indicate that excesses of Nitrogen (N), Potassium (K) or over-fertilization of any element, can lead to "huge losses" in production.

In addition, data indicates that an avocado tree's nutritional status is linked to the alternate bearing cycle and may be a leading driver of placing the tree into such a cycle. Large nutrient imbalances between nitrogen and potassium were highly associated with alternate bearing trees.

During the study, researchers also examined the relationship between leaf nutrient values and avocado ripening time. Results indicate that chloride toxicity leads to greatly reduced shelf life, while increasing calcium can offset the shortened shelf life. The research team reports that more research is necessary to better understand this relationship.

Interactions of Pairwise Nutrient Combinations

The lookup tables that indicate how nutrient interactions affect the yield potential of avocado reveal a variety of interesting findings. Below are highlights from the final report. To review functional relationships for all 11 elements, California avocado growers can download a copy of the *Decision Support Tools for Management of Avocado Nutrition and Chloride Toxicity: Final Report* from the California avocado grower website.

Figure 2 (on page 27) is based on the lookup table for nutrient interactions with nitrogen. By examining these charts, we can make note of the following relationships between nitrogen and other nutrients:

- Nitrogen is optimal between 2 – 2.5 percent (indicated by the yellow box in the upper left hand chart on page 27)
- When nitrogen levels are high, growers must increase phosphorous (P) and K to maintain optimal productivity
- Calcium must be maintained between 1.5 – 2 percent in order to garner maximum yields
- If nitrogen is higher than 2.5 percent, excess calcium can seriously suppress yield
- If nitrogen is outside the ideal range, high amounts of iron have severe effects on production; the ideal range for iron is 60-90 parts per million (ppm)
- Optimal nitrogen levels are best paired with low levels of boron
- Excessive nitrogen and high chloride eliminate fruit production

The final report summarizes a number of nutrient interactions that will be of interest to growers. Some of the findings include:

- Yield losses associated with high leaf chloride levels caused by soil salinity can be partially alleviated with 30 ppm boron levels, 1.5 – 2 percent calcium levels and 1 – 1.5 percent potassium levels
- High leaf potassium is associated with greatly reduced yields
- A balance between iron and potassium is critical; low iron paired with high potassium or low potassium paired with high iron can significantly decrease yields
- Yield losses associated with high levels of boron can be alleviated by maintaining zinc concentrations between 30 – 60 ppm

Current avocado nutrient recommendations are based on those that were generated for citrus trees and adapted to avocado. Figure 3 is a sample of typical leaf analysis results for an avocado tree, with current optimal nutrient ranges listed in the final row. The research conducted by the DST team indicates that all of the optimal ranges listed in the bot-

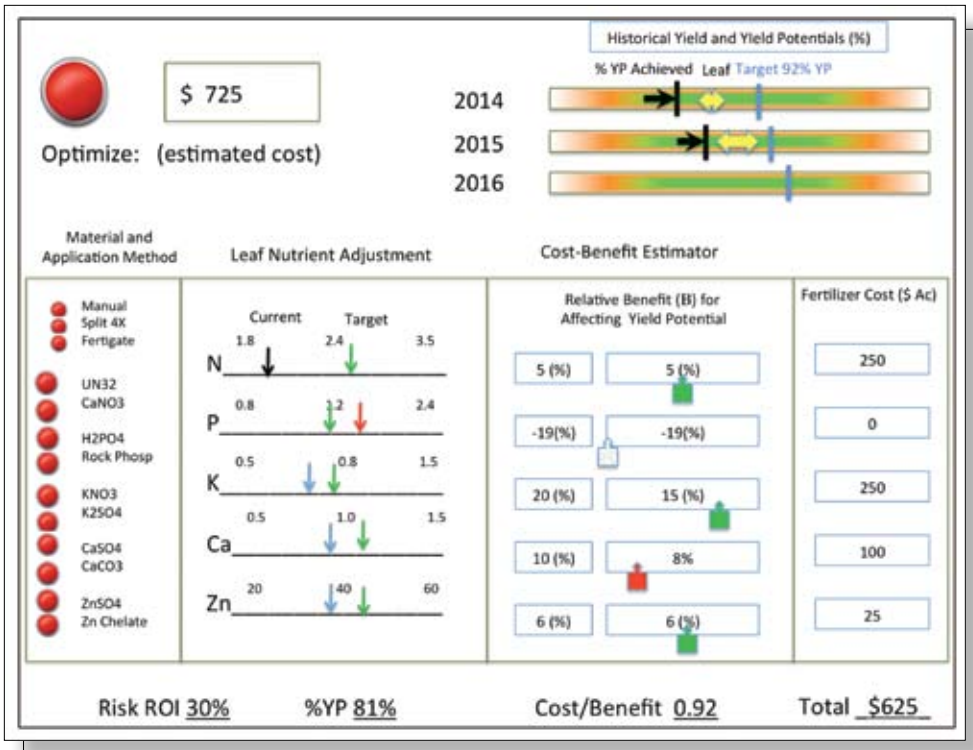


Figure 4. Draft concept for an online decision support tool that will help growers adjust nutrients and calculate the cost and cost-benefit ratio of adjusting fertilization methods.

tom row, except for nitrogen, will need "considerable revision" based on their findings.

The data sequence approach developed by the researchers involved in the DST project is a novel method for plant nutrition and as such the UC Office of Research has filed a patent application for this new intellectual property.

Online Decision Support Tool

Having completed the research and data analysis, the research team will now work to develop an online DST program that can be used by California avocado growers to optimize nutrient and salinity management in a cost-effective manner. Negotiations are underway with a software company to license the hierarchical data analysis and resulting predictive models for use by California avocado growers.

Figure 4 represents a draft concept of a DST webpage. Ideally, growers would enter leaf nutrient analysis data and the program would generate nutrient ratio calculations and specific recommendations concerning salinity and nutrient management. The recommendations would identify the most limiting constraint (the factor that would need to be addressed first, per Leibig's Law) and subsequent actions. The tool also would calculate cost and the cost-benefit ratio, as well as fertilizer schedules and grower reports.

While the research phase of the DST project has been completed, the researchers have identified new nutrient interaction factors worthy of further discussion (such as the calcium/chloride interaction relative to shelf-life) that could impact the avocado industry. The California Avocado Commission will keep growers abreast of the latest developments concerning the development of an online DST program, and will continue to partner with the research team as it completes the patent application and software development phases.

Issues Watch

By Ken Melban
Vice President of Industry Affairs

Board Approves CAC's Newest Food Safety Manual

In 2011, the California Avocado Commission developed a Good Agricultural Practices (GAP) manual and launched a food safety program for growers. During the last five-plus years, Commission staff has worked to help growers remain competitive with their fruit by becoming food safety certified. This initiative included workshops and GAP manuals to assist growers in becoming GAP certified. During this time, handlers have provided crucial assistance by partnering with the Commission and working directly with growers in the GAP certification process.

The first GAP manual, developed in 2011, primarily supported a grower's conformance to the United States Department of Agriculture's (USDA) GAP audit. In 2014, due to changing buyer requirements, the Commission modified the GAP manual to prepare growers for certification through a Primus Ranch audit scheme. Growers made the necessary adjustments and significant numbers of acres continued to receive GAP certification. As a result, great progress has been made in the last five years with much of California's acreage becoming GAP certified via the Commission's food safety program.

During the last year, as the Food Safety Modernization Act (FSMA) was finalized, retailer and food service customers have applied more pressure for GAP-certified fruit. Although there has never been one perfectly acceptable GAP audit standard among the major buyers, the Global Food Safety Initiative (GFSI) scheme has become the standard recognized and accepted by almost all customers. The Commission staff has been in contact with buyers and handlers during the past few months to assess their preferred food safety requirements and determine CAC's next steps. There was some discussion of moving to a Global GAP program, which includes a social responsibility component, but the industry consensus was that this is not necessary.

Based on input from buyers and industry members, the decision was made to modify the Commission's food safety program to support the GFSI standard. The newly-modified Food Safety Manual, Version 3.0, is aligned with the PrimusGFS scheme. As it currently stands, most of the PrimusGFS scheme demonstrates compliance with FSMA. The one area that will need to be modified is the water testing requirements. Primus is in the process of changing its scheme to fully comply with FSMA, and those changes are expected sometime in early 2017. The Commission staff considered waiting until the changes to the PrimusGFS are made before changing the Commission manual, but with key buyer deadlines for GFSI compliance set for no later than January 1, 2018, it was decided to move forward now to allow industry members time to adjust to the GFS scheme and become certified.

Once the PrimusGFS scheme is modified, it is anticipated that the Commission's Food Safety Manual will be adjusted accordingly. The key changes will involve increased record keeping. The Commission has scheduled another series of food safety grower workshops (to include Spanish translation) to provide training on the new Food Safety Manual as follows:

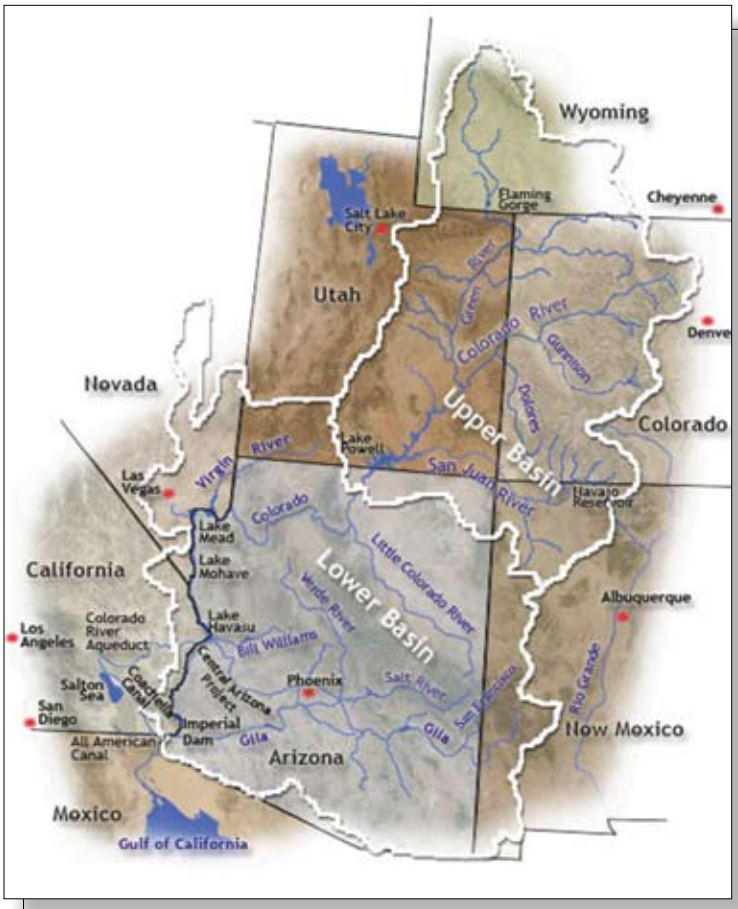
Monday, January 30, 2017
1:00 - 3:00 p.m.
San Luis Obispo Farm Bureau
4875 Morabito Place, SLO

Tuesday, January 31, 2017
9:00 - 11:00 a.m.
Santa Paula Ag Museum
926 Railroad Ave., Santa Paula

Wednesday, February 1, 2017
9:00 - 11:00 a.m.
Grand Tradition Estate & Gardens
220 Grand Tradition Way, Fallbrook

Colorado River Supply Facing Unprecedented Low Levels

As the sixth year of drought continues, the water level in the country's largest man-made reservoir, Lake Mead, has been dropping steadily and is currently at only 38 percent capacity. Both Lake Mead and Lake Powell feed the Colorado River, one of two major supply sources for the Metropolitan Water District (Metropolitan). This critical source of water, at present serving 40 million people, is facing increasing demand from population growth and agricultural use. In recent years, water from



the Colorado River accounts for roughly 55 percent of Metropolitan's overall supply, which serves avocado groves on district water from Ventura to San Diego.

In 1922, an agreement known as the Colorado River Compact was reached among the seven U.S. states in the basin of the Colorado River, which allocated water rights to the river's water. As populations continue to grow, the upper basin states – Colorado, Wyoming, Utah and New Mexico – are exploring using more Colorado River water, of which they are legally entitled.

Among the lower basin states, California has senior water rights and therefore wouldn't be required to cut back on water draws like Arizona and Nevada. However, if the situation continues to worsen the federal government could step in and reallocate the water.

The lower basin states, which in the past decades have been embroiled in lawsuits over the water allocations, are now working together to voluntarily cut their water use. This is an extraordinary joint effort, but illustrates the truly dire supply situation. Hopefully these unprecedented supply challenges will provide the impetus for a new era in how the Colorado River is best used to ensure this critical supply is sustained for generations. For success to be achieved all seven states must make sacrifices to correct the current supply and demand imbalance. Stay tuned.

Oceanside City Council Directs Staff to Research Possible Lower Ag Water Rate

The South Morro Hills Association (SMHA), including President Larry Balma and a group of area farmers, successfully advocated before the Oceanside City Council at its November 16 water rate public hearing. The SMHA's appeal was for the "City to direct staff to work with Oceanside growers to research and propose a lower water rate for agricultural use," which the City Council unanimously approved. Although the proposed 3 percent increase on agricultural water rates for 2017 was approved as presented, the Council's direction shows a willingness and interest in pursuing all possible options to ensure agricultural water rate charges are as affordable as possible. The Commission worked with SMHA to offer strategic consultation on possible avenues for success and will continue to provide similar support. Kudos to the SMHA for their grassroots effort!

CAC's 45th Exhibition at PMA Fresh Summit a Success

The California Avocado Commission (CAC) played a prominent role in the 2016 Produce Marketing Association (PMA) Fresh Summit, which was held at the Orange County Convention Center in Orlando, Florida, from October 14 – 16. The nation's largest produce and floral convention had record attendance for an East Coast Fresh Summit, with nearly 21,000 retailers, suppliers and growers from 65 countries visiting 1,200 booths and exhibits. CAC showcased the California by Nature campaign and new corporate logo on a unique two-story booth.

This was the 45th anniversary of CAC being an exhibitor at Fresh Summit. CAC has a long history of supporting PMA. California avocado innovator and Commission founding president and CEO Ralph Pinkerton served as PMA chair in 1973, and CAC Vice President Marketing Jan DeLyser had that honor in 2012-13. Many CAC staff members have volunteered on PMA committees throughout the years.

At Fresh Summit, the Commission team met with representatives from Albertsons, Costco, Harmon's, Kroger, Mollie Stone's, New Season's, Raley's, Sam's, Sprouts, Stater Bros., Tops, Wakefern and others. Retailers, Supermarket Registered Dietitians (SRDs), suppliers, growers, industry stakeholders, trade press and vendors visited the CAC booth to learn more about plans and crop information for 2017, including seasonal availability. Avocado supply was a popular topic of conversation due to the Mexican avocado grower strike and the disrupted supply of the fruit that was occurring at the time. Retailers noted their concern about not being able to fill their displays and carry out planned promotions.

CAC showcased creative California avocado recipes with tasty samples for invited booth visitors, including personalized *California Avocado Guacamole, California Avocado Spring Rolls, California Avocado and Veggie Breakfast Casserole* and a California yogurt parfait. Visitors were very engaged with CAC's booth graphics, which featured the "California by Nature" campaign and artwork by Michael Schwab.

Bruce Taylor left, who won the award last year, presented Jan DeLyser with the 2016 Robert L. Carey Leadership Award. Also shown are Cathy Burns and Bryan Silbermann of PMA.

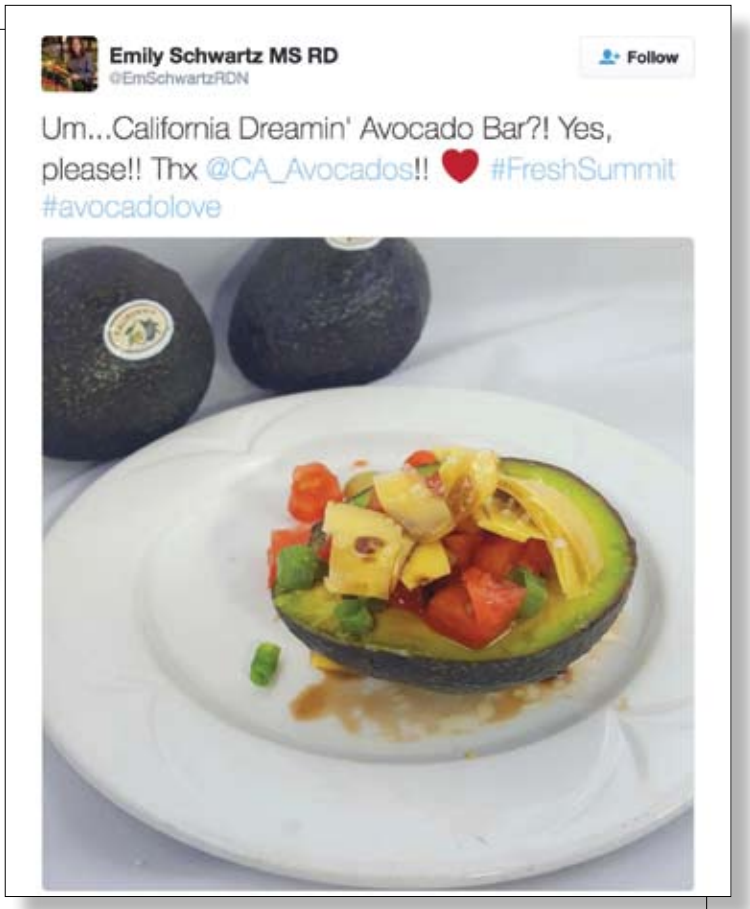
A highlight of PMA Fresh Summit occurred when Jan DeLyser was presented with PMA's Robert L. Carey Leadership Award. The award was established in 2012 to honor former PMA president Robert L. Carey, who led PMA from 1958 to 1996. The PMA annual award recognizes individuals who have demonstrated outstanding leadership skills and an exceptional commitment to PMA and the produce industry. Honorees are selected by a five-person panel of judges. DeLyser was honored for her 30 years of work on behalf of the industry, including having served as PMA chair, chair of the Produce for Better Health Foundation Board of Trustees, chair of the Fresh Produce and Floral Council and for leadership with the Center for Growing Talent by PMA. Bruce Taylor, founder and CEO of Taylor Farms and last year's award winner, presented the award to

Representatives from Save Mart/Lucky/Food Maxx met with CAC staff in the second-floor conference room of the CAC booth.

DeLyser and recognized her "collaborative spirit with the ability to listen and drive consensus." A video of the award presentation is available at http://www.pma.com/content/press-releases/2016/2016-robert-l-carey-leadership-award and includes a tribute from her family.

Another high point of CAC's PMA Fresh Summit experience was its sponsorship of the Produce for Better Health Supermarket Registered Dietitians program. SRDs continue to serve as powerful influencers of consumer behavior, developing retail health and nutrition programs, communicating via social media, as well as providing shoppers with recipes and nutritional information. During the Fresh Summit program, the Commission showcased new and interesting California avocado usage ideas for SRDs to share with their customers.

Some of the CAC booth team in front of the new booth graphics. From left, Zac Benedict, April Aymami, Angela Fraser, David Cruz, Connie Stukenberg and Carolyn Becker.



Festival Foods SRD tweet at Fresh Summit included California avocados.

On Friday evening, the Commission created an interactive experience for SRDs at the reception-style dinner. SRDs participated in CAC's California Dreamin' Avocado Bar social media contest by selecting from a variety of toppings and creating personalized California avocado halves. They then posted photos of their creations on their social media accounts and tagged California avocados for a chance to win a gift card.

SRDs and one blogger from Big Y Foods, Coborn's, Dierbergs Markets, Giant Foods/Martin's Food Markets, HAC Retail, Harmons Grocery, Jewel Osco, Kroger, Loblaw, Meijer, Niemann Foods, Redner's Markets, ShopRite and Skogen's Festival Foods — which combined represent nearly 7,000 retail stores — participated in the SRD program. On Saturday, CAC hosted small groups of these SRDs for 20-minute sessions in the Commission booth with Los Angeles-based Registered Dietitian Matt Ruscigno — educator, media spokesperson and athlete. Matt prepared his *Spicy California Avocado Hummus* for SRDs, gave a live demo concerning how to select and prepare a California avocado and spoke about the benefits of a plant-based diet, and the nutrition and culinary benefits of California avocados. CAC representatives provided the SRDs with information about the California avocado industry and retail support available during the season.

Shot Hole Borer and Fusarium Dieback Update

By Tim Spann
Research Program Director

Unlike the previous two years, polyphagous and Kuroshio shot hole borer (P/KSHB) activity has been relatively quiet this fall. In 2014 and 2015 it was common for P/KSHB trap captures in September and October to rise to 40-50 beetles per trap per week, but we have not seen the same rise in trap captures around avocado groves this year. This is good news, but it does not mean we can completely let our guard down.

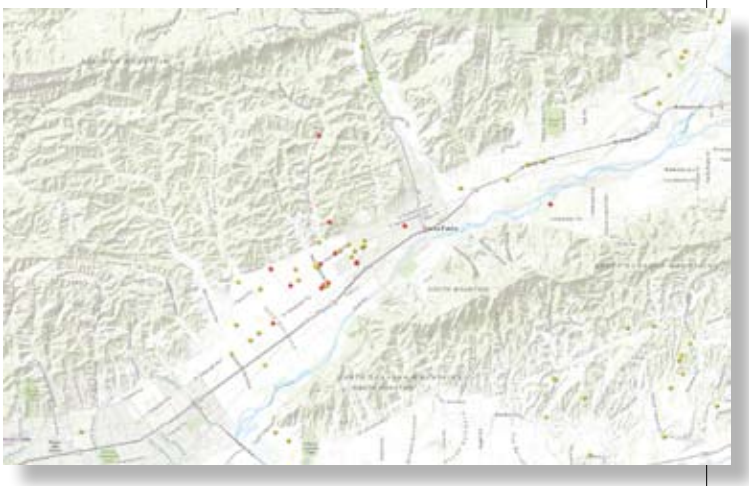
In Ventura County, where initial beetle detections first occurred just over a year ago, the spread has been much slower than we experienced in San Diego County. The center of the infested area remains focused near the western edge of Santa Paula; to date only a couple of specimens have been trapped north and east of the city. Although one beetle was captured near Ojai in late 2015, no additional specimens have been found in that part of the county.

Although movement has been slower than expected this year, the KSHB has managed to make some large leaps. One KSHB has been trapped in both Santa Barbara and San Luis Obispo Counties in 2016. Even though there is no evidence, as of this writing, that there is an established population of the beetles in those counties, their capture is alarming since KSHB is only known to be in San Diego and southern Orange Counties. Thus, the appearance of KSHB in Santa Barbara and San Luis Obispo Counties is likely from human movement (e.g., firewood or green waste).

Although these beetles are not causing the damage to avocados that we once thought they would, it is important to still take measures to control their spread as they are having devastating effects on the urban and natural forests.

We informed growers in the Fall 2016 issue of *From the Grove* that the monitoring program for SHBs was being suspended in San Diego and southern Riverside Counties. The California Avocado Commission (CAC) has a limited number of traps from that program that are available for growers in San Diego and Riverside Counties who may be interested in continuing monitoring in their own groves. The traps are available at no cost, but growers will need to service the traps and purchase lures themselves. If interested, please contact Tim Spann, CAC Research Program Director, for more details.

Shot Hole Borer distribution



Shot Hole Borer Santa Paula detail

Harvest Time PRODUCE

A Division of FRESKA

Meet our Field Representatives: Ernie Arana, Cell: 760.271.1708 ~ and ~ Jorge Quiroz, Cell: 760.421.1027

Industry Dedication & Grower Sustainability

Since 1985, Harvest Time Produce has been on a mission dedicated to the California Avocado Industry and focused on our Growers' sustainability. Our knowledgeable field representatives are here to earn your trust and help build your avocado business. From walking your groves, to assessing your crop, we aim to maximize your value every season.

At Harvest Time our aim is clear - happy growers and happy customers...creating an ongoing winning partnership for the future.

Love at First Bite

Harvest Time Produce • 760.722.6969 • 303 Via Del Monte • Oceanside, California 92058

Figure 1. A laurel wilt detector dog sits next to an avocado tree indicating to the handler that the tree is positive for laurel wilt. Innovative Detection Concepts (www.idetectionconcepts.com), the company that has trained the dogs, runs two dogs independently in each grove. Both dogs must hit on the same tree for it to be considered positive.

Progress Reported on Redbay Ambrosia Beetle & Laurel Wilt Issues

By Tim Spann
Research Program Director

On November 3 - 4, 2016, the University of Florida (UF), Tropical Research and Education Center hosted a two-day Avocado Laurel Wilt Summit in Homestead, Florida. The meeting consisted of a full day of research presentations by UF and United States Department of Agriculture (USDA) researchers followed by a day-long field tour.

The meeting was attended by about 150 people, mostly Florida avocado growers, but there was a sizeable delegation from Mexico, and California was well represented by

Figure 2. A screen capture of an aerial view of an avocado grove captured by a drone (inset). The yellow circle highlights a wilted limb in the upper part of the canopy of a laurel wilt affected tree.

Mary Lu Arpaia, Ben Faber (Ventura County), Mary Bianchi (San Luis Obispo County), Sonia Rios (Riverside and San Diego Counties), Akif Eskalen, Paul Rugman-Jones (from Richard Stouthamer's lab) and myself. I believe it is safe to say that we all came away with a sense of relief at the major progress that the Florida researchers have made in learning to manage this devastating pest and disease in avocados.

The Redbay Ambrosia Beetle (RAB; *Xyleborus glabratus*) is an invasive ambrosia beetle from Southeast Asia that was first found in Georgia in 2002, and was likely introduced through infested wood packing material. RAB's symbiotic fungal pathogen that causes laurel wilt, *Raffaelea lauricola*, is of unknown origin, but is believed to have arrived in the United States with the beetle. Since the first detection in Georgia, RAB and laurel wilt have moved quickly up and down the East Coast and across the Gulf Coast to eastern Texas. Unlike fusarium dieback and the shot hole borers we are currently dealing with in California, laurel wilt is a lethal, highly systemic pathogen, capable of killing a mature avocado tree within a couple of weeks after infection. Furthermore, RAB and laurel wilt are restricted to the Lauraceae, the laurel family that includes avocados.

Early Detection is Key

It was reported that about 25,000 commercial avocado trees (3 percent of the industry) have been lost to date in Florida, with an estimated value of $8.3 million (the industry includes about 8,300 acres). For commercial groves, a large effort has been placed on early detection of infected trees and grove sanitation practices. Early on, growers were trying to scout their groves from helicopters and by walking, but both methods proved impractical because of their cost and inability to detect very early symptoms, which is critical with this disease because of the speed with which it kills trees. In cooperation with forensic scientists from Florida International University, dogs have been trained to detect the laurel wilt pathogen and they can detect infected trees before any visual symptoms appear. At least one company is offering canine scouting services for about $150 per five acres.

Another scouting method being tested is the use of drones. Various entities are testing drones outfitted with cameras that can look at the visual, infrared and other spectra to try to detect the earliest symptoms. Drones are proving particularly helpful in old groves with large trees where it is difficult to see early wilt symptoms in the upper canopy from the ground. They also can be used in combination with the dogs to identify "hot spots" in groves and then have the dogs determine the extent of the infection around those hot spots.

Sanitation – immediate removal and destruction (burn or chip) of infected trees and prophylactic treatment of sur-

Figure 3. Drs. Daniel Carillo (UF TREC) and Paul Rugman-Jones (UC Riverside) have a discussion in front of a laurel wilt affected tree (left). The tree was just beginning to show wilt symptoms when the meeting organizers selected it about 10 days before the field tour; it was in full wilt by the time of our tour demonstrating the rapid decline caused by the disease. A branch on the tree showing the telltale sawdust "toothpicks" of beetle boring activity (upper right). A cut away of the branch showing a beetle entry hole (arrow) and dark staining from the laurel wilt fungus (center right). A cross section of the limb with beetle entry holes (arrow) and dark staining from the laurel wilt fungus under the bark (lower right).

rounding trees with fungicide — is proving to be the key to managing the spread of laurel wilt within commercial avocado groves. Anecdotal evidence suggests that the pathogen can readily move from tree to tree within a grove through root grafts, especially in old groves. When an infected tree is found and it is not immediately removed, including the roots, it is common to see the neighboring trees decline and the disease spread down the tree row. For this reason, the most aggressive growers are removing the infected tree and the neighboring trees on either side to ensure they get ahead of the spread, followed by treating a two-tree perimeter with fungicide.

Redbay Ambrosia Beetle and Other Ambrosia Beetles

A lot of research has focused on understanding the biology of RAB and potential control strategies. As California growers know from our own battle with shot hole borers (SHB), ambrosia beetles are notoriously difficult to control with pesticides since they spend so much of their life inside their host tree. Thus, pesticide treatments for laurel wilt are only recommended on neighboring trees following sanitation. Currently, Florida has a section 18 emergency exemption for the use of Hero® against RAB, and they are preparing another section 18 application for Cobalt® from Dow AgroSciences.

The unfortunate news in Florida is that RAB is not the only beetle spreading laurel wilt. Sixteen other ambrosia beetles — some native, some invasive — have picked up the pathogen and can spread it. It is not believed that these beetles have developed a symbiosis with *Raffaelea lauricola*, but they are simply becoming contaminated with the fungus when they bore into an infected tree. To date, there has not been a single documented case of laurel wilt spreading in avocados by RAB, it is all occurring from these other 16 species. In particular, *Xyleborus bispinatus* and *X. volvulus* are the biggest culprits; every specimen of these two species tested in South Florida has been contaminated with *Raffaelea lauricola*.

On the biological control front, there have been very few candidates found that have any real potential. Entomopathogenic fungi are proving to be the best potential option in Florida. However, because these fungi are relatively slow acting, RAB and other beetles can still infect and kill trees before dying. At this point, the available entomopathogens are viewed more as a strategy for broad population control and not a specific treatment for within groves.

Perhaps most exciting was work presented from Dr. Paul Kendra's lab, USDA Miami, on the chemical ecology of RAB. An interesting premise they started with is that since these beetles essentially have a "one and done" strategy — that is, they leave their host tree and fly once to find a new host — they must use some very reliable cues to find those hosts. However, they do not have pheromones and they are not attracted to volatiles from their symbiotic fungi over long distances, so how do they do it?

What Dr. Kendra's lab has discovered is that the beetles use a suite of cues to find their hosts. First are visual cues. These beetles see tree trunks and can home in on that silhouette. Second is a chemical called α-copaene. Copaenes are a class of chemicals known as terpenes that are produced by a number of different plant groups. α-copaene is attractive to RAB over relatively long distances and is likely a chemical cue the beetles use to find a host tree in the right family. Third is the use of quercivorol, the same lure we use in California for SHB. Quercivorol — a chemical component of the aggregation pheromone of the ambrosia beetle *Platypus quercivorus* — is believed to be a short-range attractant for RAB, allowing it to home in on a specific tree once it's in the general vicinity from using visual and α-copaene cues. When α-copaene and quercivorol were tested in combination on traps, the effect was synergistic, capturing more beetles than just the combination of either component alone.

Florida is home to another species of *Euwallacea* ambrosia beetle, the same cryptic group of beetles that includes the polyphagous and Kuroshio shot hole bores as well as the tea shot hole borer. In tests in Florida, the α-copaene was found to be attractive to their species of *Euwallacea* as well as to RAB. Thus, there may be potential for α-copaene to be used in California in conjunction with quercivorol for SHB monitoring or in an early detection program for RAB and laurel wilt.

Considerable progress also has been made in looking for repellants to prevent the beetles from finding avocado trees. Several researchers have found that fungal volatiles, not wood volatiles, drive beetle boring. This explains why it's been observed that initial beetle attacks are unsuccessful (the beetles do not create a gallery and lay eggs). However, these initial attacks serve to introduce the fungal symbiont to the host tree, which then attracts more beetles. By carefully analyzing the chemicals created during the period after initial fungal introduction the researchers found that the trees initially generate methyl salicylate (MS). MS is a near universal plant response to attack and is part of the systemic acquired resistance pathway in plants. The researchers found that MS production peaked three days after inoculation with the fungus and the trees repelled the beetles, but 10 days after inoculation MS production ceased and the trees became attractive to the beetles. It appears that MS is a general repellant to *Xyleborus* beetles and it is being tested against other genera. ISCA Technologies of Riverside is working to develop a commercial formulation of MS in combination with verbenone, another general beetle repellant, for use in Florida avocado groves, which may eventually be of use in California.

Raffaelea lauricola and the Development of Laurel Wilt

Plant pathologists characterize laurel wilt as a classic vascular wilt disease. That is, the tree responds to the presence of the pathogen by developing tyloses — outgrowths from the walls of xylem vessels used to wall-off injury or disease — which plug the xylem vessels and prevent the transport of water. In the case of laurel wilt, this process is very rapid and within three days of inoculation large portions of the xylem become non-functional.

Laurel wilt is unique in that it is the only systemic, lethal ambrosia beetle symbiont known. It is similar to Dutch elm disease and oak wilt and there are management lessons that can be learned from these diseases.

Figure 4. Three methods for treating trees with fungicide. Dr. Jonathan Crane demonstrates the passive root infusion (IV bag) method developed by UF TREC researchers (left), and two pressurized injection systems developed by growers (upper and lower right).

- Sanitation is critical — inoculum must be removed from the environment to help mitigate spread
- Fungicides are good only for high value trees — the labor and product costs involved make the wide use of fungicides impractical
- Trenching around trees to sever root grafts can reduce pathogen spread through this pathway
- Insecticides are seldom recommended due to poor efficacy, safety and cost
- There are no good conclusive data to support biocontrol strategies for these types of pests and diseases

Combined, Dutch elm disease and oak wilt provide us with 140 years of experience and one definitive conclusion can be drawn: **the most effective control strategy is a multipronged approach**.

Plant Physiology Affects Laurel Wilt

Perhaps some of the most interesting information presented during the meeting was about the tree itself. In general, ambrosia beetles are nature's cleanup crew, helping to break down dead and dying trees. The thing that makes RAB and the polyphagous and Kuroshio shot hole borers different is that they appear to attack "apparently healthy" trees. This has received some much-needed attention by the laurel wilt research team as "apparently healthy" may depend on your frame of reference.

There are many Lauraceous species that are valuable nursery tree crops in the southeastern United States and this has allowed for the study of tree attack under relatively controlled conditions. Researchers have found that even though nursery trees are "well-watered" there can be enough fluctuations in their water status to create transient periods of stress. By looking at physiological factors such as stomatal conductance — how much CO_2 and water vapor are moving in and out of a leaf's stomates — the researchers can document these periods of stress even though there are no visual signs of stress. It is during these periods of stress that the trees are attractive to the beetles and become susceptible. Thus, the researchers are working to develop recommendations — that may someday be applied to avocado groves — for minimizing tree stress and hopefully reduce laurel wilt incidence. This is a good lesson for us here in California as we enter our sixth year of drought. Although our trees may look "apparently healthy," there are likely stresses on the trees that cannot be seen with the naked eye.

Another group has focused on the apparent lower susceptibility of avocado to laurel wilt compared with native Lauraceous trees in South Florida (e.g., swamp bay), and the differences in susceptibility between avocado races. Initial investigations indicate that the West Indian race of avocados is more susceptible than Mexican and Guatemalan races. Early results indicate that this may be due to the rate of sap flow in the tree, with higher sap flow equating to more susceptibility. The reason for this is not yet known, but the researchers have documented variation in xylem vessel diameter among avocado races, and the West Indian race trees have the largest vessel diameters, which may allow the pathogen to spread more quickly.

Overall, I believe the tone was much more optimistic than it was when I last visited Florida two years ago. A lot of progress has been made in understanding how this pathogen works and about the biology of RAB and other ambrosia beetle carriers. But most importantly, significant progress has been made on early detection and management of the disease in commercial groves. It no longer appears that laurel wilt is an unmanageable disease, but the question remains whether it can be economically managed.

By Tim Linden

No Quarrel with Pre-Season Estimate

With the days getting shorter and colder and the fruit on the trees in a very slow growth mode, there appears to be no reason for handlers to quarrel with the pre-season estimate for the 2017 California avocado crop.

It became evident in the summer that the 2017 crop would be significantly smaller than 2016, in which more than 400 million pounds were harvested. For budgeting purposes, the California Avocado Commission (CAC) has pegged the crop at 200 million pounds. While that annual estimate is typically conservative to guard against a budget shortfall, everyone interviewed expects it to be fairly close to the ultimate outcome.

Rob Wedin, vice president of fresh sales and marketing for Calavo Growers Inc., Santa Paula, CA, said in early December that there was no apparent reason to alter the pre-season estimate at this time. He noted that cold winter weather had put the fruit in a little-to -no-growth mode so that if the crop ends up sizing very well – altering total volume – it's much too early to know that.

Dana Thomas, president of Index Fresh, Bloomington, CA, had virtually the same report from his perch further south. He said a good amount of rain and warm weather could end up increasing the individual size of the fruit adding tonnage to the volume, but at this point, in early December, 200 million pounds appeared to be an accurate assessment.

Because the crop is going to be much smaller than at any time in the recent years, Wedin said it is incumbent on the handlers to maximize per pound revenues in 2017. He expects the California crop to begin to be marketed later than it was in 2016, with the lessons of 2016 clearly evident.

"This year (2016) the market was definitely stronger in May, June, July and August than it was earlier in the year," said the Calavo executive. "I expect most growers – and it is the grower's decision to make – will take a look at last year and try to hit that same window."

Thomas agreed with regard to the bulk of the crop, but said, for one reason or another, some growers will pick early and Index will be ready to market that fruit. He said the small size of the crop will allow for selective and niche marketing and he does expect California fruit to return a premium throughout the season.

Robb Bertels, vice president of marketing for Mission Produce, Oxnard, CA, said CAC has long stressed its "tiered approach" to marketing the state's production. For the 2017 season, more than ever, he said this concept will come into play, as handlers will reserve the California fruit for those retailers most interested in promoting it. He expects some fruit will be marketed to several accounts in time for Super Bowl promotions.

While it's too early to know what the avocado market will be during the spring, there are some factors that could lead one to speculate that oversupply might again be an issue. Mexican growers were very concerned about the marketing situation in 2016 as it fluctuated wildly with periods of very low prices and other items when demand far exceeded supply. In October, there was a disruption in the marketplace with some Mexican growers cutting off supplies to the United States. What has resulted is less Mexican fruit being marketed in the October to December time frame than in 2015. Even in early December volume was still only at the 30 million pounds per week level, which was about 20 percent less than shipped during the same weeks in 2015.

Wedin was confident volume would continue to ramp up for the holiday pull at the end of December, and throughout January for the many retail promotions that typically occur as the Super Bowl date approaches.

In 2016, there were more supplies in February than consumed and the market price dropped significantly in March and April, just as some California growers were beginning to ramp up their volume. When Mexico's volume dropped significantly in May, the market turned very hot. By all accounts, Mexico has more fruit this season than it did last season, and, to date, they have shipped less fruit. Of course, there are many marketing weeks left in the Mexican crop year to catch up.

Thomas does not expect a repeat of 2016 in early 2017. He believes Mexico will send a strong volume of product to the U.S. market for the late January push, but thinks it will be less than last year to guard against the post-Super Bowl glut that occurred in 2016. He is also not convinced Mexico has more volume than last year. He believes lack of volume during the late fall period might be reflective of what's on the trees.

HOW TO MAKE A CALIFORNIA AVOCADO ROSE

Culinarians and bloggers are having a field day with avocados by slicing, dicing, shaving and carving them into artistic shapes. One very popular creation is the avocado rose, which can be served by itself or used to adorn other dishes. Here's how to create a California avocado rose at home:

1. Oil a very smooth food safe surface. Cut one half avocado and carefully remove seed and peel. Very thinly slice the half width-wise.

2. Gently fan out slices with their sides still touching.

3. Beginning at one end, gently roll up the slices into a spiral rose shape.

4. If desired, pull, push or slightly flatten avocado "petals" to accentuate the rose look.

We are the Farm Credit System — a nationwide network of customer-owned associations supporting rural communities and agriculture with reliable, consistent credit and financial services.

FarmCreditAlliance.com • **(855) 611-4110** toll free

American AgCredit | CoBank | Farm Credit West

LET US EARN YOUR LUMPS.

At Index Fresh, we've been earning the trust of family farmers for more than a century. And we'd love the chance to earn yours.

INDEX FRESH®

800.352.6931
IndexFresh.com