

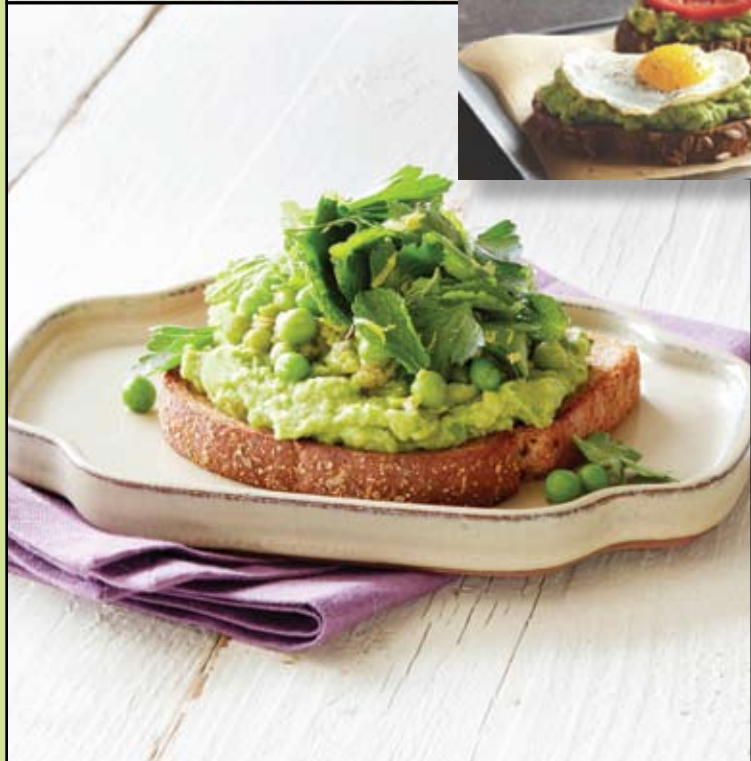
Summer 2015

From the Grove

The Latest News from the California Avocado Industry



WAKE UP TO BREAKFAST WITH
CALIFORNIA AVOCADOS



At Del Rey Avocado Company, we grow relationships



Wayne Brydon
Field Representative

Gene Bianchi
Grower

Getting to know their growers and investing in long term relationships, two of the many services that Del Rey Avocado field representatives provide to help bring delicious avocados into the market. Call them- they look forward to meeting you.



Bob Siemer Jessica Hunter
Wayne Brydon Gerardo Huerta

1260 Main Avenue, Fallbrook CA 92008
800-933-8325 :: www.delreyavocado.com

Grower Profile

Steve Serrao
Temecula, CA

32



From the Grove

Volume 5
Number 2

President
Tom Bellamore
CA Avocado Commission

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

Ad Sales
Tom Fielding
Office: 626-794-6823
Cell: 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



In This Issue

Summer 2015

- 10 **CAC Hosts Government Regulatory Tour**
- 12 **Spotlight on Kroger**
California Avocado Targeted Retail Promotions
- 20 **Israeli Researchers Visit California**
- 24 **A Landmark Season for California Avocado Advertising**
- 27 **UCR Researcher Spends Career Focusing on Avocado & Citrus**
- 29 **Commission Hosts Annual Field to Table Grove Tour**
- 32 **New Grower Finds Much Value in Research Grower Profile**
- 34 **Annual Grower Meetings Focus on the Future**
- 37 **CAC Campaign Capitalizes on Growth in Breakfast Use**
- 39 **PSHB Research Update**
The Search for Biocontrol Agents

Departments

- 4 Message from the President
- 6 Chairman's Report
- 8 From Your Commission
- 14 Better Growing
- 17 California AvoTech
- 22 Global Perspectives
- 41 Handlers Report

Volume 5, Number 2 SUMMER 2015

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.

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.

Message from the President



Tom Bellamore

A Smaller Board

Late last year, the California Avocado Commission (CAC) began a rigorous review of its long-term strategy for development and positioning of our brand—*California Avocados*. With the help of a produce industry strategist, CAC conducted in-depth interviews with retailers, foodservice operators, dietitians, industry stakeholders and others to gain insights to guide our marketing efforts.

We also convened three “Think Tanks” – all day sessions with growers, packers and board members – where we explored every facet of our strategy and the steps necessary to keep our industry viable. One concept that emerged early in two of the Think Tank discussions was the need to examine the structure of the CAC board to ensure that we are operating as efficiently as possible when it comes to implementing our strategy. Chairman Doug O’Hara lost no time in establishing a Governance Committee to do just that.

Concurrent with board deliberations on CAC’s long-term strategy, the Governance Committee met on several occasions for hours at a time before reaching recommendations for the CAC board to consider. It was the consensus of the commit-

tee that a smaller size board would likely function more efficiently. The current structure of the Commission board is anachronistic, a function of what the industry looked like in 1978 when CAC was formed. Back then, there were cooperatives as well as independent handlers. Accordingly, the Commission board was comprised of one co-op producer and one independent producer for each of the five districts, four handlers, and one public member, for a total of 15 members. Each producer and handler member has an alternate, so when the board convenes, 29 representatives are in the room, but for any absences. Over the years, to varying degrees, each of those 29 people were allowed to have a voice during the deliberative process.

At its May 2015 meeting, the CAC board voted to reduce the number of alternates by half. Doing so requires a change in the California Food and Agricultural Code sections that pertain to the operation of the California Avocado Commission, so a technical amendment must be adopted by the California Legislature. Once done and signed by the Governor, the new provision becomes effective the following January. If all goes as expected, 22 representatives

will be present at board day beginning in 2016.

More controversial was the Governance Committee recommendation to modify the way in which the handlers participate in the operation of the Commission. To a person, each committee member strongly believes that the handlers provide invaluable information in support of CAC’s marketing. Handlers are engaged in selling every day and clearly have their fingers on the pulse of a very dynamic marketplace where import and domestic shipments ebb and flow across the year. CAC’s Marketing Advisory Committee (MAC)—put in place a number of years ago after its predecessor, the Marketing Committee, was mothballed under a prior administration—has proven to be critical to the effective execution of the Commission’s advertising and promotion programs, and this is universally recognized. Opinions vary, however, about the handlers’ role in the CAC boardroom.

To the extent that a vote guarantees a voice, a strong case can be made for the status quo. The handler perspective is unique, and it often informs the most important of conversations about the Commission’s finances, timing of promotions, retail

and foodservice account performance, and competitive volumes. The right to vote confers responsibility that is taken seriously, and on board day, the handlers are present and vocal.

Alternatively, the Governance Committee concluded that the handler voice in the boardroom could be preserved in an ex-officio capacity. The committee envisioned a standing Marketing Committee, with no less than four major handlers, that could only be dismantled by a two-thirds vote of the CAC board, and a non-voting Marketing Committee representative at every board meeting.

When put before the board for a vote, the Governance Committee's proposal did not withstand the rigors of debate. Even a compromise position, which would have reduced the number of voting handler members from four to two, was ultimately re-

jected, although the outcome of that vote was close. For now, the board has opted for the status quo. As with most sensitive matters, incremental change is often more palatable than a radical shift in direction. As one board member put it: *the Commission's demonstrated success in brand building may be attributable, in part, to our structure, so where is the compelling reason to change?*

Regardless of where one comes out on the issue of handler involvement in CAC, discussion on this topic and other, governance-related matters is healthy and welcomed by CAC management. Such debate tells all the world that we are here, we are thinking about the future and that we intend to stay relevant and promote California Avocados for a long time to come. 🥑



Board of Directors

District 1

Member/Carol Steed-**Secretary**
Alternate/Suzy Thomas

Member/Jerome Stehly-**Vice Chair**
Alternate/Alex Gonzalez

District 2

Member/Charley Wolk
Alternate/Kellen Newhouse

Member/Leo McGuire
Alternate/Cristina Leon

District 3

Member/Ed McFadden
Alternate/Keith Reeder

Member/Doug O'Hara-**Chairman**
Alternate/Mario Martinez

District 4

Member/John Lamb
Alternate/Robert Grether

Member/Art Bliss-**Treasurer**
Alternate/Jason Cole

District 5

Member/Will Carleton
Alternate/Leo Murillo

Member/Rick Shade
Alternate/Jim Swoboda

Handlers

Member/John Dmytriw
Alternate/Gary Caloroso

Member/Steve Taft
Alternate/Donny Lucy

Member/Wayne Brydon
Alternate/Vacant Seat

Member/Gene Carbone
Alternate/Robb Bertels

Public Member

Leesa Eichberger

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

BROKAW NURSERY

Premium Certified Avocado Trees on Clonal Rootstocks

Dusa™ (Merensky 2)
Toro Canyon
Duke 7
Borchard

AVOCADO
KIWI
CITRUS

BROKAW NURSERY, Inc.
P.O. Box 4818 / Salicoy, CA 93007-0818
(805)647-2262 / Fax (805)647-6493

www.brokawnursery.com

Water Issues Present Challenges...But There is Hope

Growing avocados can be frustrating at times, and I think we all agree that it takes a certain passion and commitment to do what we do. Over the last 20 years we have dealt with everything from new invasive pests to the drastic rise in farming costs, but we have persevered and found a way to continue.

This brings me to our present and most challenging issue — water. I have seen years with low rainfall followed with a year of excessive rainfall; and I have seen low water levels in wells and reservoirs replenished with a year or two of adequate rainfall. The current situation is something I haven't seen — prolonged drought and dwindling water storage. There are many things we can do without or skimp on, but water is necessary and critical to our operations.

Some areas of California are worse than others, but all of California is feeling the pain. The south has adequate storage, for now, but is facing additional and more frequent cost increases. Many growers in Ventura County have wells that are holding up, but are subject to water cutbacks and allocations. Parts of Santa Barbara county are simply running out of water with no solution in the near future. Many wells in the San Luis Obispo area are going dry and growers have no choice but to stump their trees and hope for rain.

We are in a serious situation that could get worse — but not all is lost. Ken Melban and Director Charley Wolk have been tirelessly working on our behalf. Anytime a water district has contemplated raising rates or enacting cutbacks, they have lobbied for us by attending meetings and send-

ing letters. They have attended numerous Metropolitan Water District meetings to explain the importance of our operations and the importance of inexpensive, reliable quality water. I would like to thank them and the entire CAC staff for their efforts and hard work. They will continue the fight, as frustrating as it may be at times, and always have the growers' needs as their driving force.

What does the future hold in terms of rainfall? This is where I become the optimist. The latest long term weather prediction is a continued El Niño type pattern with late summer/early fall monsoonal rain. This could mean above normal rain in the mountains and avocado regions by the end of summer. This will not solve our long-term problem but it would bring some needed relief.

Now let's discuss the avocado crop. All signs point to a shorter crop this year. The Marketing Advisory Committee met a few weeks ago and the consensus of the packers was that the majority of the California crop would be picked by mid-July or early August. This is good as prices should remain steady on most sizes and Peru will be bringing in the majority of their fruit at this time. The only negative repercussion is that CAC's income will fall short of expectations. CAC's President, Tom Bellamore, has already notified his staff and they are prepared to cut back on many programs in order to maintain our present reserve levels and keep our assessment rate as low as possible. I commend Tom on his forward thinking and his staff for their willingness to sacrifice for the benefit of the growers.



Doug O'Hara

I am sure you have noticed new fruit on the trees and realize we may have a large 2016 crop. It is a little early to plan your picking strategies for next year, but if the weather prediction holds and Mother Nature cooperates we could potentially harvest one of the bigger crops in the last couple years.

Rest assured that all CAC programs are going full force. Tim Spann and Production Research are working on polyphagous shot hole borer research. Jan DeLyser and her marketing team are promoting our fruit in key markets at crucial times to help drive demand for our fruit. Ken Melban and his Industry Affairs team will continue advocating on our behalf on critical issues like water and opening new markets for our fruit. Keep up the good work, as I know you will.

In closing, I would like to stress that there is hope. As I said in the beginning of my report, we California farmers have been through many challenges and we always come back stronger. We have the privilege of growing the best avocados in the world and will continue to do so no matter what is thrown at us. I strongly believe that in the near future the reservoirs will be full, the snow pack will be deep, the rain will fall and I will be able to laugh at it all. Let's all hope for the same. 🥑



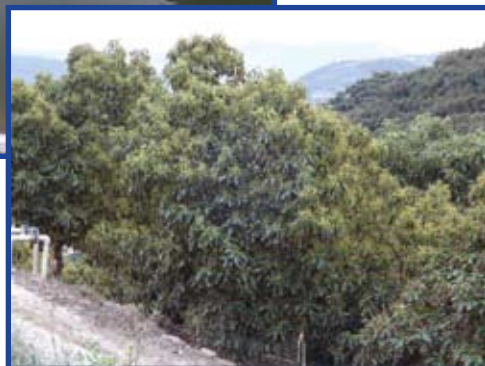
Save Water • Cleanse Soil • Improve Yield



Sierra Del Oro, Pauma Valley: Side by Side Comparison

1200 acre ranch planted with avocado (280ac.), citrus & other permanent crops. The irrigation is supplied by multiple wells, all in the same river bed with similar water quality. A 6" 750 GPM **ECOFLOW** was installed in June 2012 on one well that feeds the reservoir that waters a majority of the avocado trees. At the time, all avocado trees were in the same condition, but were in declining health & production. In 2012, the chlorides were 160PPM and has since climbed to 190+PPM. As you can see below, the **ECOFLOW** trees are healthy & back to full production, and the reservoir is algae free. The non-**ECOFLOW** trees have declined significantly. Pictures were taken March 2015. Sierra Del Oro has purchased another 6" unit, which was installed March 2015.

ECOFLOW



non-ECOFLOW



Currently 200+ Installed in Avocado Groves!

FOR MORE INFORMATION & SITE EVALUATION

Contact Earl Coleman at 951.587.8375 or earlcoleman288@msn.com

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

2014 California Avocado Acreage Inventory Survey Results

The California Avocado Commission's (CAC's) crop estimating team, in conjunction with GeoSpatial Partners, LLC, uses the latest remote sensing techniques to annually assess California's avocado acreage. In order to delineate avocado acreage into producing versus non-producing acreage remote sensing techniques are applied to satellite imagery collected during spring and summer months. The imagery processing techniques include segmentation of avocado polygons, change analysis from previous acreage surveys and classification of groves into categories including producing, topped/stumped, and new/young.

Aerial imagery (for a real-world view) and satellite imagery (for spectral and temporal data) are integrated into previously classified avocado acreage and analyzed for current condition in five primary avocado growing counties: San Diego, Riverside, Ventura, Santa Barbara, and San Luis Obispo. In addition, when available, the Commission utilizes high resolution aerial imagery collected through the National Agriculture Imagery Program (NAIP) in order to delineate new avocado plantings not identified in previous acreage surveys. Other minor counties' acreage is estimated based on ancillary data from county agricultural commissioners and our grower community.

The results of the 2014 avocado acreage inventory survey show California's bearing acres coming in at 51,478 acres, which reflects a decrease of more than 10 percent, near-

County	Producing Acres	Topped/Stumped Acres	New/Young Acres	Total Planted Acres	CAC Bearing Acres (Pro+Top)
San Diego	17,406	1,033	441	18,880	18,439
Riverside	5,235	261	481	5,977	5,496
Ventura	16,437	488	1,281	18,206	16,925
Santa Barbara	4,651	188	440	5,279	4,839
San Luis Obispo	3,567	254	187	4,008	3,821
Total 5 Counties	47,296	2,224	2,830	52,350	49,520
Total Minor Counties*				1,958	1,958
Grand Total				54,308	51,478

* Orange, Los Angeles, San Bernardino, San Joaquin Valley, Monterey

ly 6,000 acres, from 2013. While San Diego County represents the growing region with the largest decrease in bearing acres, with a decrease of over 2,600 acres, each of the five counties contributed to the overall reduction in bearing acres. Includ-

ed in this article are a summary of the 2014 Acreage Inventory Survey, along with an in depth look at how acreage classifications have changed from 2013 to 2014 for each of the five counties surveyed. 🥑

County	Year	Producing Acres	Top/Stump Acres	New/Young Acres	Planted Acres	Bearing Acres
San Diego	2014	17,405.9	1,032.8	440.6	18,879.3	18,438.7
	2013	20,643.6	438.8	985.5	22,067.9	21,082.4
	Change (+/-)	-3,237.7	594.0	-544.9	-3,188.6	-2,643.7
Riverside	2014	5,234.7	261.4	481.3	5,977.5	5,496.2
	2013	6,127.4	374.3	137.4	6,639.1	6,501.7
	Change (+/-)	-892.7	-112.9	343.9	-661.6	-1,005.5
Ventura	2014	16,436.5	488.1	1,281.0	18,205.6	16,924.6
	2013	17,089.2	138.4	87.1	18,070.4	17,692.5
	Change (+/-)	-652.7	349.7	1,193.9	135.2	-767.9
Santa Barbara	2014	4,651.5	187.9	439.7	5,279.1	4,839.4
	2013	5,707.7	185.9	306.8	6,200.4	5,893.6
	Change (+/-)	-1,056.2	2.0	132.9	-921.3	-1,054.2
San Luis Obispo	2014	3,567.4	253.5	187.1	4,008.0	3,820.9
	2013	4,213.9	116.0	88.7	4,418.6	4,329.9
	Change (+/-)	-646.5	137.5	98.4	-410.6	-509.0
Five County Total	2014	47,296.0	2,223.8	2,829.7	52,349.4	49,519.7
	2013	53,781.8	1,253.4	1,605.5	57,396.4	55,500.1
	Change (+/-)	-6,485.8	970.4	1,224.2	-5,047.0	-5,980.4

2015 Mid-Season Crop Update

The California Avocado Commission (CAC) would like to thank all of the growers who participated in the recently concluded Grower Crop Estimate Survey. Survey forms were mailed out in mid-April with a return date of May 8, 2015. This year's response represented 50 percent of the bearing California avocado acreage, and is on par with the Crop Estimating Team's preferred response rate.

Using various statistical analyses to evaluate information gathered

through the crop survey, satellite imagery and 2014 acreage inventory results, the Crop Estimating Team has estimated the 2014-15 California avocado crop to be coming in at 283 million pounds -- a decrease of 44 million pounds from the initial pre-season estimate of 327 million pounds. CAC management projects that the expected crop shortfall could result in a loss of assessment revenues of nearly 1.9 million dollars and has already taken proactive steps to adjust spending plans to account

for nearly 1 million dollars of the potential lost revenues. Rest assured that despite the cuts, the Commission's marketing efforts continue in full force, with programs structured to promote California avocados with key accounts and markets committed to California avocados throughout the remainder of the season.

Below, please find details of the mid-season crop estimate results including variety breakdowns and production by county. 🥑



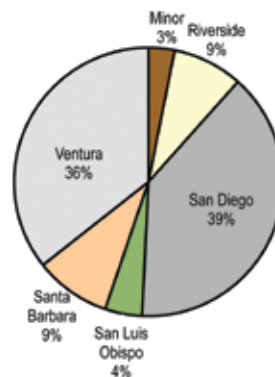
California Avocado 2014/15 Mid-Season Crop Estimate Update

Variety	Bearing Acres	Estimated Yield		Response %
		Lbs/Acre	Lbs (MM)	
Hass	49,023	5,511	270.2	51%
Lamb-Hass	1,612	6,276	10.1	47%
Other	843	3,513	3.0	41%
Total	51,478	5,503	283.3	50%

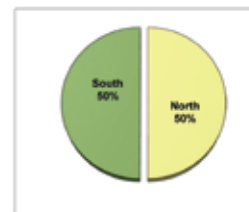
County	Hass Only			All Varieties		
	Bearing Acres	Lbs Per Acre	Lbs (MM)	Bearing Acres	Lbs Per Acre	Lbs (MM)
San Diego	17,405	5,920	103.0	18,439	6,015	110.9
Riverside	5,414	4,397	23.8	5,496	4,365	24.0
Orange	1,198	4,894	5.9	1,250	4,700	5.9
Ventura	15,881	6,088	96.7	16,925	5,961	100.9
Santa Barbara	4,748	5,390	25.6	4,839	5,360	25.9
San Luis Obispo	3,766	3,329	12.5	3,821	3,304	12.6
San Joaquin	143	2,947	0.4	191	2,206	0.4
Other	468	4,769	2.2	517	5,044	2.6

Estimated yields are on tree forecasts and do not attempt to adjust for weather factors or project carry-out. Bearing acres include producing and topped/stumped trees four years or older. ACE Statistics: 05/18/15

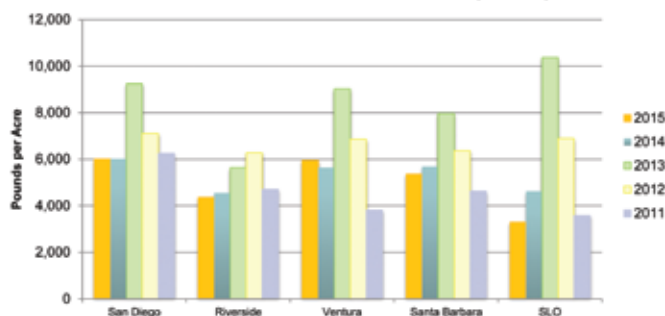
Crop Distribution by County



2014-2015 Crop



Last Five Years Estimated Hass Yield By County





CAC Hosts Government Regulatory Tour

By Ken Melban

Vice President of Industry Affairs

In late April, the California Avocado Commission and the California Citrus Quality Council partnered to host a field tour for 30 federal and state regulatory officials. Participants spent four days learning about California avocado and citrus production, the issues we face and the goals we are pursuing.

Achieving many of these “goals” requires support from the agencies involved, and the tour allowed Commission representatives to communicate with key decision-makers in a field setting. Participants included representatives from the U.S. Environmental Protection Agency, U.S. Department of Agriculture’s Foreign Agricultural Service, California Department of Pesticide Regulation and California Department of Food and Agriculture.

Issues discussed included the Commission’s efforts towards Emergency Section 18 Registrations for polyphagous shot hole borer/*Fusarium* dieback materials and expanding trade access for California avocados into China. In both in-



CAC Chairman Doug O'Hara and his wife Betty answer questions

stances, agency officials are directly involved in the necessary processes. Their understanding and strong grasp of the issues will provide us with the best opportunities for positive, timely results.

The learning went both ways, as Commission Board member Rick Shade commented, "All the folks I spoke with expressed a genuine interest in what we do. They were attentive and asked great questions, and also gave good insight into their jobs. I believe that everyone walked away with a stronger sense of all of us being on the same team."

Another benefit of the tour was the "cross-pollination" that occurred among the different agency officials as they were given an opportunity to step outside of their normal work environment and interact with representatives from other agencies. In many instances these participants had previously communicated with the other agency counterparts, but had never met in person. The tour provided an opportunity to bridge these gaps.

The Commission will continue interacting with the necessary agency personnel on the above mentioned efforts along with countless others that will require involvement with both federal and state agencies. It is important that



CAC board member John Lamb (center) talks with attendees

their knowledge of our issues and overall industry practices is at a high level to, as best as possible, ensure the interests of California avocado growers are adequately represented. 🥑



MAC SOLAR

HONESTY. INTEGRITY. QUALITY.

- * Eliminate Electrical Costs From:
 - Well Pumps
 - Desalination Plants
 - Custom Homes
- * Financing Available in Most Areas.
- * 3-7 Year Return on Investment is Typical.
- * 30% Federal Tax Credit Expires in 2016.

Call Today for a Free Estimate

(866) 634-5191

We Specialize in Agricultural Solar

Ranches, Groves, Orchards, Farms, Vineyards, etc.

SOME OF OUR HAPPY CUSTOMERS




www.macsolarpower.com



SUSTAINABILITY

CALIFORNIA AVOCADOS

Ever wonder what makes California Avocados so special?
Location... Location... Location...
 It's select California regions where calm coastal breezes waft through row after row of tree-lined groves, where the soil is rich, and the sun is gentle. So, remember you're not just bringing home an avocado... you're also bringing home a little piece of California.

California Avocados, delicious and good for you. Add avocado to your sandwiches, salads, soups and snacks.

Ralphs

© 2014 California Avocado Commission

California avocado POS card

Spotlight on Kroger

California Avocado Targeted Retail Promotions

In early April, various western divisions of Kroger stores began actively promoting California avocados with ads, bin inserts, radio and digital/social media support. The Kroger's promotion – which includes 224 Southern California Ralphs stores, 173 Fry's, Smith's and City Market stores in Arizona and Utah, 139 King Soopers and City Market stores in Colorado, and 178 Fred Meyer stores in the Pacific Northwest – will continue throughout the California avocado season.

The program activity began in Ralphs' stores the weeks of April 8 and 15 with a front-page circular ad featuring California avocado grower and CAC Chairman Doug O'Hara. Large, illustrated feature ads such as these produce an average lift of 141 percent in the retailer's avocado sales during the promotion period (*Hass Avocado Board 2014 Retail Advertising in the Avocado Category Study*).

Ralphs also utilized custom California avocado bin in-

serts, additional custom signage and in-store radio to encourage shoppers to look for premium California avocados. General market radio tags announcing the availability of California avocados at Ralphs supplemented the in-store promotions. Ralphs' integrated merchandising support and targeted consumer advertising drew attention to the fruit and encouraged shoppers to look for and purchase California avocados. The Ralphs activity is serving as a good template



Ralphs California avocado orchard bin insert



Ralphs feature ad showing California avocado grower Doug O'Hara

for other Kroger banners promoting California avocados.

Digital marketing and loyalty card/web-based value offerings are a key initiative for Kroger company banners. From the third week of May through mid-July, California avocado digital coupons will appear on the websites of each of the five Kroger banners in CAC's core markets: Ralphs, Fry's, King Soopers, Smith's and Fred Meyer. The coupons have an offer value of 50 cents off two *Hand Grown in California* avocados and are valid on all sizes of bulk California avocados. Up to 190,000 coupons will be printed by Kroger shoppers, encouraging California avocado sales.

Customer-specific marketing initiatives like the 2015 Kroger and California Avocados program help targeted retailers while encouraging distribution and sales of California avocados. 🥑



Ralphs California avocado display card

Managing Avocados During Drought

As every California avocado grower is painfully aware, California is in the fourth year of an unprecedented historical drought. As Ken Melban, CAC vice president of industry affairs, described at a recent grower meeting, it's no longer about the cost of water, but whether we even have water.

Managing avocados under these conditions is difficult and many growers are having to make hard decisions about their groves. While there is no ideal way to grow avocados under drought conditions, there are steps that growers can take to make sure that every drop of water they have is used efficiently and effectively.

Irrigation

There is arguably no more important thing to do during a drought than to service and maintain your irrigation system and its components. Your goal should be for every drop of water that enters your irrigation system — whether from a well or district water — to reach a tree by promptly fixing leaks and improving your system's uniformity. To help you in this task, most water management districts offer free water audits that will tell you about your system's efficiency and where best to make improvements specific to your situation.

There are a number of little things you can do to help improve your irrigation system's efficiency and save water. These include capping sprinklers to dead or diseased trees. If your grove has a mix of



In light of the drought and reduced groundwater availability, some California avocado growers in San Luis Obispo County have stumped their trees in an effort to preserve their groves

mature and young trees, change out the sprinkler heads near the young trees to lower-flow rate heads so you are not overwatering the young trees. Consider investing in pressure compensating emitters or sprinklers. Pressure compensating emitters maintain a constant flow rate over a range of pressures as is common between the top of a slope and bottom of a slope.

You can also save water by optimizing your irrigation management through scheduling and soil moisture monitoring. To properly schedule your irrigation you should utilize an irrigation scheduling calculator tool, such as the avocado-specific one that can be found on www.AvocadoSource.com. This recently-updated calculator has many features, such as allowing the user to adjust their system's distribution uniformity (DU) in order

to see how much water can be saved by improving the system's DU.

In addition to knowing how much water to apply to your trees, you need to decide when and how often to apply this water. This is where soil moisture monitoring comes into play. Soil moisture levels have several phases, from saturated to the permanent wilting point. In between these phases is what is known as "plant available water." This is the small fraction of water held in a soil that is easily available to the plant. Your goal in scheduling irrigation is to maintain plant available water levels with minimal to no periods in the saturated or permanent wilting phases. To do this, you need to monitor the soil in your grove since the plant available water content is influenced by the unique soil characteristics of your grove. Complete details on how

to monitor soil moisture and utilize soil moisture data to manage avocado irrigation can be found in the Fall 2014 issue of *From the Grove*.

Mulching

Mulching is the application of material to the soil surface without incorporating it into the soil. In their native rainforest environment, avocados are naturally mulched by leaves and other plant debris that accumulate on the forest floor. In cultivated avocado groves it is often necessary to supplement fallen leaves with other organic mulches, particularly when the grove is young. Ideally for avocados, mulches should be coarse material such as avocado trimmings, composted greenwaste or wood chips. Mulch should be spread evenly, four to six inches thick beneath the tree, but kept several inches away from the trunk.

Mulch helps to conserve water in several ways. Mulch reduces water loss due to evaporation by shading and insulating the soil surface. Mulch also helps to reduce water runoff, soil compaction and soil erosion. The combined effect is a reduction in rapid soil moisture fluctuations that help minimize plant stress. In addition, mulching helps to reduce weed growth; weeds steal water from trees and increase overall grove water use.

In addition to these physical effects on soil moisture, mulching improves root growth. Avocado roots require a lot of oxygen and flourish in the soil-mulch interface zone. More root growth means more water and nutrient uptake that leads to improved tree health and yields.

When considering mulch sources for your avocado grove, local is best. If you have trimmings and branches from within your grove, consider chipping and using these as mulch. If you need to bring mulch in from outside your grove it should be sourced from as near to your grove as possible to reduce the risk of in-

troducing invasive pests, such as the polyphagous shot hole borer. If you must bring in mulch from an unknown location, it should be composted or otherwise treated (heat, chemical fumigation) to ensure that it is pest free. Also be aware that mulches can be a source of weed seeds, particularly greenwaste. Sourcing mulch locally and knowing the source is al-

ways the best practice.

Stumping or Removing Trees

Reducing the number of trees requiring water in your grove, either by stumping or completely removing trees, is one option for dealing with drought. Stumping involves cutting the tree down to four to five feet in height, leaving about two-foot long

NEW!

Clonal Rootstock
Avocados

AVAILABLE NOW

**Micropropagated
Toro Canyon Rootstock**

- New Industry Option
- Toro Canyon grafted with your preferred variety
 - Lamb Hass PP9753
 - Gem PP11173
 - Sir Prize PP9709
 - Bacon
 - Hass
 - Fuerte
 - Zutano

DUARTE
TREES & VINES

Clean Plants
For Your Future

For more information contact:
Ed Needham
(559) 977-7282
ed@duartenursery.com

1-800-GRAFTED
www.duartenursery.com • Hughson, CA

stubs of the main scaffold limbs. The stumps should be immediately whitewashed with a diluted (50:50) water-based paint to protect against sunburn. Tree sealant should NOT be used on the cut surfaces; tree sealant will slow the tree's natural healing process and keep the cut surface moist, which can actually increase the chance for disease and rot to set in. It is best to stump as early in the year as possible, generally after the trees have been harvested.

When stumping, consider stumping an entire irrigation block. This will make managing irrigation much easier because the entire block can be shut off rather than having to cap individual sprinklers. Irrigation can be shut off to stumped trees until they start to grow new foliage, usually after one to several months. When the trees start to regrow, it is important to keep the soil moist but

not overwatered. Use of soil moisture sensors is critical during this period. A stumped block will require less water for several years following stumping as the canopy of the trees regrows. Stumped trees will generally be out of production for two years following stumping, producing a crop in the third year.

Deciding which trees to stump or completely remove from your grove isn't always easy. Stumping is generally a good option if the trees are in good health, but are simply too tall and their production has begun to drop off. Completely removing a block is a better option if the trees are diseased, in poor health, or are in a problematic area that is too difficult to manage. Removing and replacing trees will obviously reduce water use for several years as the young trees grow; however, production will be lost for a longer period compared to

stumping.

Another potential option that some growers may consider is topworking. Topworking trees starts similarly to stumping, but instead of allowing the original tree to regrow, new scion wood is grafted onto the stump. This may be a useful strategy if you wish to reduce the number of pollinizer trees in your grove or if you still have blocks of green skin varieties.

There is no ideal way to conserve water when growing avocados — they are thirsty trees. However, by combining several different tactics — improving irrigation efficiency, mulching, reducing the size of very tall trees or eliminating diseased trees — each grower can make incremental improvements to their grove that will help our industry survive until the rains return. 🥑

Additional Resources

Additional information on irrigation efficiency and management, mulching, stumping and topworking can be found in the following articles available online.

Determining Water Use Efficiency, K. Melban, *From the Grove*, Summer 2014

<http://www.californiaavocadogrowers.com/publications/from-the-grove/issue/grove-summer-2014>

Optimizing Irrigation Management through Soil Water Monitoring, D. Crowley, *From the Grove*, Fall 2014

Soil Moisture Technology and Irrigation Management, J. Escalera, *From the Grove*, Fall 2014

<http://www.californiaavocadogrowers.com/publications/from-the-grove/issue/grove-fall-2014>

Root Health: Mulching to Control Root Disease in Avocado and Citrus, J. Turney and J. Menge

http://www.avocadosource.com/papers/research_articles/turneyjerrold1994.pdf

Some Pros and Cons of Mulching Avocado Orchards, B.N. Wostenholme, C. Moore-Gordon and S.D. Ansermino

http://www.avocadosource.com/Journals/SAAGA/SAAGA_1996/SAAGA_1996_PG_87-91.pdf

Pruning and Canopy Management, G. Bender

<http://ucanr.org/sites/alternativefruits/files/121298.pdf>

Stump and Topwork – A Technique for Rejuvenating Mature Avocado Trees. R. Hofshi, M. Tapia and M.L. Arpaia

http://www.avocadosource.com/cas_yearbooks/cas_93_2010/cas_2010_v93_pg_051-071.pdf

By Tim Spann
Research Program Director

Avocado Plant Breeding Takes a Leap Forward

In January 2015 the avocado plant breeding program at UC Riverside (UCR) was reenergized when Dr. Patricia Manosalva joined the team. She joins the Plant Pathology and Microbiology Biology Department as an assistant professor, following a lengthy search to replace Dr. Greg Douhan. Dr. Manosalva has a very strong background in plant pathology and molecular biology and has taken the lead for the avocado rootstock breeding program.

As we've discussed in a number of previous articles in *From the Grove*, for the past three years the California Avocado Commission has been working to restructure the avocado breeding program to better address the urgent needs of the industry — salinity and Phytophthora. With Dr. Manosalva's arrival those changes are finally coming to fruition.

A New Emphasis on Rootstock Breeding

Even before her official start in January, she began communicating and planning with Commission staff and other members of the UCR avocado breeding team. Because of this,

Dr. Manosalva was able to prepare and submit to CAC a detailed, comprehensive proposal for jump starting the rootstock breeding program that the board approved for funding at its April meeting.

Perhaps the biggest change to the rootstock breeding program is the condensing of all efforts into one project. Previously, the Commission funded up to three different projects at any given time to work on the various aspects of new rootstock development. In some cases, this led to the duplication of efforts, materials falling through the cracks and questionable use of growers' funds. The new program will be directed by Dr. Manosalva with Drs. Mary Lu Arpaia and Peggy Mauk co-



Dr. Patricia Manosalva addresses grower questions at a recent CAC field day

operating on field testing and salinity tolerance screening, respectively. This setup will ensure good communication among the researchers and between the project team and CAC.

This new project includes a plan for fast tracking existing rootstock selections through the screening process to get the most promising ones

into growers' hands as soon as possible. There are almost 100 rootstock selections from the previous rootstock programs that have never been fully evaluated for salinity or Phytophthora tolerance. As part of the new rootstock breeding program, the evaluation of these selections will be expedited and the most promising candidates moved into field trials to collect the necessary data to decide whether they should be released. (See "Advances in Salinity Tolerance and Phytophthora Detection" in the Spring 2015 issue of *From the Grove* for an example of some of these promising rootstock selections.)

Another key component of the restructured program is revising the way rootstocks are screened for Phytophthora tolerance. Prior to his departure from the program, Greg Douhan began to develop a much better understanding of the dynamics of Phytophthora in California

avocado groves. Specifically, he found there are numerous different isolates of *Phytophthora cinnamomi*, some from northern growing regions and some from southern growing regions. These isolates differ in virulence and rootstocks that show tolerance to one isolate may still be susceptible to other isolates. Thus, revising how potential new rootstocks are challenged with Phytophthora and the mixture of isolates used in those challenge studies is a critical first step to ensuring that new rootstocks are as robust as possible when released to the industry.

Similarly, rootstock screenings to date have been for Phytophthora or salinity tolerance. However, in the field these two stresses often occur together, and there is very little data about their interaction in avocados. Thus, another early step in the new project will be to study the effects of Phytophthora and salinity interac-

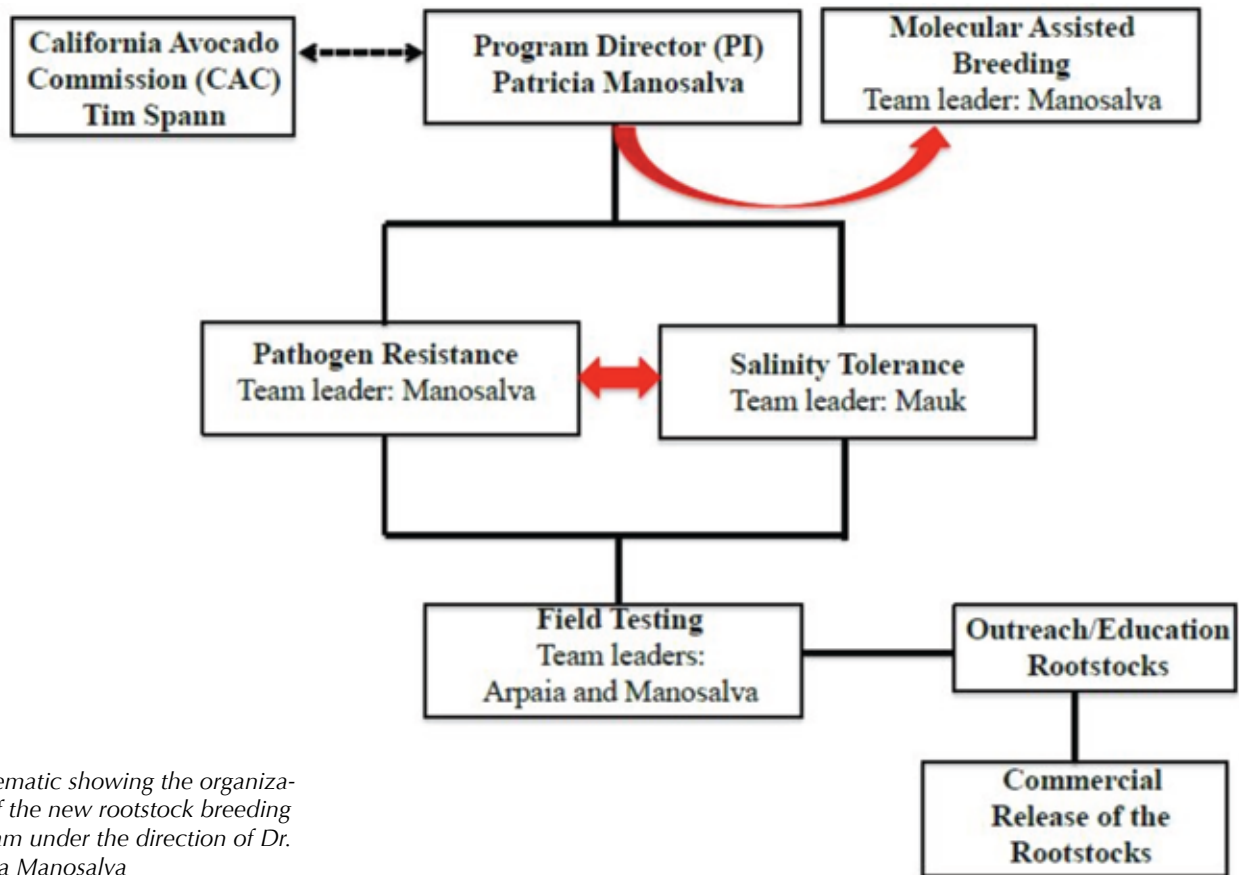
tions in avocados and to identify the best way to screen rootstock materials to ensure they have the best tolerance to both stresses.

The last component of the new program is to introduce modern molecular tools to the process of avocado breeding — specifically "marker assisted selection." A highly simplified explanation of marker assisted selection is as follows: when plants respond to various biotic and abiotic stresses (e.g., salinity, disease or insect attack) various genes are turned on or off. This is known as regulation. If a gene is turned on in response to a stimulus it is said to be "up regulated;" if a gene is turned off it is said to be "down regulated." Using modern molecular tools these gene regulation patterns can be observed. By observing gene regulation in response to different stimuli, scientists can start to understand which gene or group of genes are involved in various responses. These responses are then used as indicators or "markers" for specific traits. Marker assisted selection allows for the quick screening of large numbers of potential rootstock candidate seedlings very soon after germination.

In addition to allowing for more efficient screening of potential new rootstocks, the parent trees can be screened. The parent blocks from which seeds are collected can then be refined to contain the parents that possess the traits desired in a new rootstock, improving the chances that the seeds harvested will result in seedlings that have those combined traits. In essence, marker assisted selection allows for the use of modern molecular tools to expedite the traditional breeding process without entering the realm of a genetically modified rootstock.

A greater understanding of how the tree responds to various stresses not only allows for the development of better rootstocks, but also allows for a greater understanding of





A schematic showing the organization of the new rootstock breeding program under the direction of Dr. Patricia Manosalva

the interaction of those stresses with the tree. This knowledge can lead to improvements in grove management practices to better combat the various stresses being studied.

Scion Breeding

While there is a renewed effort on the rootstock side of the avocado breeding program, there is a de-emphasis on the scion breeding program. This decision was not made lightly or without controversy. However, following input from the Production Research Committee, the CAC Board and the industry at large, this path was determined to be the best way to address urgent industry needs while staying within budgetary constraints.

Although the Commission will no longer fund *active* scion breeding, the board recognizes the importance

of the genetic resources the program has built up over the past 20 years or so. Thus, CAC will provide continued funding for the scion program to keep this material alive and ensure it is not lost.

In addition, the Commission is interested in finding more permanent and secure ways of preserving the genetic resources from the scion and rootstock program, aside from just field plantings. To this end, Drs. Manosalva and Arpaia, along with CAC staff, met with Duarte Nursery personnel in early April to view and discuss the potential for their tissue culture technology to be used to preserve material where it is not exposed to the risks of the field (e.g., freezes, pests and diseases). The Commission is also following work being done by the Huntington Gardens and an Australian laboratory to develop tissue culture and cryopreservation tech-

nology for avocado. The group was recently successful in making major advances with this technology for *Magnolia* species, which are in the same order as avocado.

Dr. Arpaia and her team at UC Riverside also are working to secure funding through the USDA Farm Bill to keep the scion breeding program moving forward. The Commission strongly supports their efforts.

The new energy and knowledge brought to the rootstock breeding program by Patricia Manosalva is a welcome input to a program that has been stalled for the past several years. Although plant breeding is always a time consuming, high risk investment, we are optimistic that the program is on the right track and is poised to make tremendous advancements over the next few years that will genuinely benefit California avocado growers. 🥑



Dr. Akif Eskalen, Dr. Zvi Mendel, Dr. Stanley Freeman, Leo McGuire, Dr. Richard Stouthamer

Israeli Researchers Visit California

By Ken Melban

Vice President of Industry Affairs

In May, the California Avocado Commission hosted* Dr. Zvi Mendel, Department of Entomology, and Dr. Stanley Freeman, Department of Plant Pathology, from the Agricultural Research Organization, The Volcani Center in Bet Dagan, Israel. Both researchers have been working with Israeli avocado growers since the identification, five years ago, of the ambrosia beetle and the fungi it vectors.

The Israeli ambrosia beetle is believed to be the same

as the polyphagous shot hole borer (PSHB) in Los Angeles County. The purpose of bringing these researchers to California was to have them see PSHB/Fusarium dieback (FD) infested groves and to meet with University of California at Riverside (UCR) researchers and Commission board members. In addition, Drs. Mendel and Freeman presented at

**One-half of travel costs were paid by Index Fresh.*



Dr. Zvi Mendel, Dr. Jorge Macias, Dr. Stanley Freeman, Reuben Hofshi, Tom Bellamore

the Index Fresh Grower Seminars.

For the last few months, UCR researchers have been in contact with the Israeli researchers to compare notes on the behaviors of the pest complex and discuss possible control strategies. UCR researchers Drs. Akif Eskalen and Richard Stouthamer had just returned from their trip to Taiwan and Vietnam in search of possible biocontrol agents ahead of the Israeli's visit (see article entitled "Polyphagous Shot Hole Borer: The Search for Biocontrol Agents").

The timing allowed for a great exchange of information and ideas based on their recent scouting trip along with their current research activities. Drs. Mendel and Freeman also were able to discuss with UCR researchers and industry members the ambrosia beetle's impact on Israeli avocado groves. More information on the ambrosia beetle situation in Israel may be read in the "International Perspectives" article in this issue.

Upon visiting infested groves in California, Drs. Mendel and Freeman suggested that it appeared the point of attack was directed on stem and branch sections near bark areas already affected by other fungi. In their opinion, the successful attacks

may be related to the advanced age of the trees on those sites that support these pathogens. The UCR researchers will definitely give more attention to this possible association. In addition, since most avocado areas in California are still free of the beetle, they agreed that intensive monitoring for presence of the beetle should continue, and if beetle detection occurs increased phyto-sanitation measures should be taken immediately.

In December, the Commission also hosted Dr. Tom Atkinson, a renowned beetle expert from Texas. Since that visit he has continued to collaborate with Dr. Eskalen and they just recently submitted a new research project that will conduct extensive surveying of infested California groves to learn more about the beetle's behavior and possible interaction with environmental conditions.

The Commission will continue to pursue this type of collaboration in search of control strategies. The UCR research team is fully supportive of this synergistic effort as evidenced by the new survey project. All possible strategies will be considered as we attempt to slow the spread of this pest complex, supporting Commission President Tom Bellamore's mantra of "no stone will be left unturned." 🥑



Dr. Zvi Mendel, Dr. Stanley Freeman, Ken Melban

The 'Ambrosia Beetle' in Israel

The avocado orchards in Israel cover an area of approximately 18,000 acres, with 'Hass' covering about half of the area. During the 2014-15 season about 174 million pounds were produced, with approximately 55 percent of the crop destined for export, most of it to European markets.

Until recently, the avocado industry enjoyed low pressure by pests and diseases making the management scheme of commercial plantations comparable to organic farms. The great majority of the 90 species of phytophagous insects and mites known to feed on avocado trees in Israel are under good biological balance. Ten species (half of them invasive) are of economic importance, but only one, the ambrosia beetle, *Eurwallacea* nr. *fornicatus* (Coleoptera: Scolytinae) is now ranked as a serious pest.

For years, fungal pathogens did not pose a serious threat to avocado in Israel, with a limited incidence of damage caused by *Phytophthora cinammomi*. However, during the last decade *Botryosphaeria* spp. fungal pathogens have become an important issue.

The ambrosia beetle is a new invasive species to Israel, and to date the beetle has been recorded from 48 tree species representing 25 plant families. The beetle carries within its mandibular mycangia three primary fungal symbionts: *Fusarium eurwallaceae*, *Graphium* sp. and *Acremonium* sp.; these fungi also being cultivated in beetle brood galleries. Larvae and adult beetles feed on *F. eurwallaceae* and *Graphium* sp. The same beetle species and fungal complex also are known

from California (Los Angeles County region, known as PSHB), South Africa and Southeast Asia (Vietnam and China), with the latter probably serving as the origin of the beetle (R. Stouthamer and A. Eskalen, pers. communication).

To date, the beetle has spread to approximately 60 percent of the avocado plantations in Israel. In 25 percent of the infested plantations, the damage level is ranked as moderate to severe (comprising dieback of mature limbs and loss of yield). The *F. eurwallaceae* population in Israel appears to be uniform and clonal indicating a single introduction of the beetle. The beetle fungal interactions and the pathogenic role of these three fungal species in avocado dieback are under investigation.

The most typical symptom of attack by the beetle on avocado trees is the exudation of a sugary substance (mostly perseitol) that marks the penetration spots. Stems and branches of various diameters attacked by the beetle display this symptom within a few days after the beetle has penetrated the xylem. Many of the attacks on avocado do not end in successful establishment of the beetle, and infection by *F. eurwallaceae* alone results in typical cankers that increase in size, especially in large (> 4 inches) diameter branches. While the cortex does not seem to be injured by the assault, the xylem surrounding the gallery generated by the beetle is stained dark brown. The xylem staining is linked to the development of *F. eurwallaceae*, likely caused by products originating from the fungi, and may appear close to the gallery or up to 16 inches away

from the beetle penetration points. *F. eurwallaceae* does not significantly injure young vegetative avocado tissues. Infection by the fungus appears to be localized and restricted to a few centimeters beyond the galleries and therefore is not always detected in the stained tissue.

Successful branch colonization, as reflected by predominant development of the brood, is related to previous fungal inoculation by the beetle or in the base of weak, small diameter (.75 – 2.5 inches) branches usually during the previous season. Most of the flying beetles return to attack branches displaying the typical symptoms of the beetle assault. At this stage, new beetle penetrations are not associated with massive sugar exudation. In avocado, successful reproduction occurs mainly in thin branches, and attacks on the stem and large diameter branches do not terminate in brood galleries. However, in other suitable reproductive trees, such as English oak (several *Quercus* spp.), box elder (*Acer negundo*) or sycamore (*Platanus* spp.) the beetle attack and establishment is more successful on the trunks and large diameter branches than on thin branches.

Development cycle of the beetle may last between five and eight weeks. Adult brood emergence is dependent on the deterioration of surrounding tissue. Emergence in avocado takes place between one and two years after the initial (unsuccessful) attack. The thin branches usually desiccate after about two beetle generations. In tree species where the beetle colonizes much larger branches, they survive for longer periods, and may produce more generations

before moving to a new breeding site (branch, tree or plantation). Branch colonization happens usually close to the base of the branch near the shoulder of a larger one. The beetle and fungi development disrupt the water flow and the rest of the branch dries and wilts even before the emergence of the brood. Examining the beetle age distribution in the grove clearly showed that all developmental stages are found all year round. However, flight occurrences are intensified during the second half of the summer (July – September).

Tree susceptibility is ranked according to three main parameters: frequency of attack, gallery density and offspring production. Among several suitable tree species for beetle production, avocado is considered among the least susceptible. Although all avocado varieties are susceptible to some degree, differences in susceptibility to the beetle and the fungal symbiont complex were observed between several avocado varieties in the following order (most affected to least): Fino > Hass > Reed > Pinkerton > Nabal > Ettinger + Fuerte > Galil + Ardit. Information accumulated suggests that beetle attack frequency coincides with alternation as sugar exudation and dying branches increase after fruit ‘on’ bearing season. However, preliminary analysis of fruit yield data in Hass avocado orchards, as related to the ambrosia beetle infestation, does not imply any significant yield loss in the moderately infested orchards.

Several management strategies were examined during the last five years since the beginning of the ‘ambrosia problem’. The use of several fungicides and insecticides to cope with the problem was evaluated in both laboratory and field trials. Both compounds possessing systemic modes of action as well as insecticides for cover spray were assessed. Systemic compounds were ruled out due to a combination of inefficient transport through the water system, residue hazard and cost. Cover sprays are not considered a routine measure since they were not sufficiently effective and pose a risk to disrupt the biological balance of many potential insect pests. Preliminary treatments with commercial *Beauveria bassiana* (entomopathogenic fungus) products as a preventive measure were disappointing.

Our current recommended management in light and moderately infested avocado orchards is based on several measures: (1) extensive monitoring; (2) removing thin (<6 cm diam.) infested branches; (3) removing wilted branches and treating cuts on a main branch with Bifenthrin, a pyrethroid (1 percent) and (4) the bark area around the lesions on > 2.5 inches diameter thick branches should be treated with Bifenthrin (1 percent) 12 inches beyond the lesion on both sides of the branch in order to prevent further beetle attack. The effect of additional treatment with Acetamiprid (neonicotinoid), which aimed to kill the fungal symbiont, is under study. 🥑



Typical exterior symptoms of beetle penetration of a weakened avocado branch



Typical interior symptoms of beetle penetration into a weakened avocado branch - yet no successful beetle establishment and breeding



*Tree response two weeks after artificial inoculation of avocado branches with the symbiotic fungus *Fusarium euwallaceae**

A Landmark Season for California Avocado Advertising

The California Avocado Commission's consumer and retail trade advertising campaigns have introduced many "firsts" this season. The new consumer advertising campaign utilizes digital media and unique outdoor media vehicles with creative graphics and text designed for the specific location. CAC's new retail trade advertising campaign uses some groundbreaking digital media techniques.

Consumer advertising

CAC set forth three consumer communication objectives for this season: 1) to create a more pronounced point of difference between California avocados and competitive imports; 2) to bolster the premium position of California avocados; and 3) to get consumers to check for "California" on the avocado label.

CAC's "Distinctly Californian" advertising campaign showcases how the term "California" is synonymous with "avocado" in the culinary world — a significant point of differentiation and ownership for California avocados. Most consumers are familiar with classic dishes like the California Club, California Omelet and California Roll but may not realize that "California" menu items are those that include avocados. To that end, CAC's print and some digital ads focus on classic California dishes and demonstrate how essential California avocados are to these recipes.

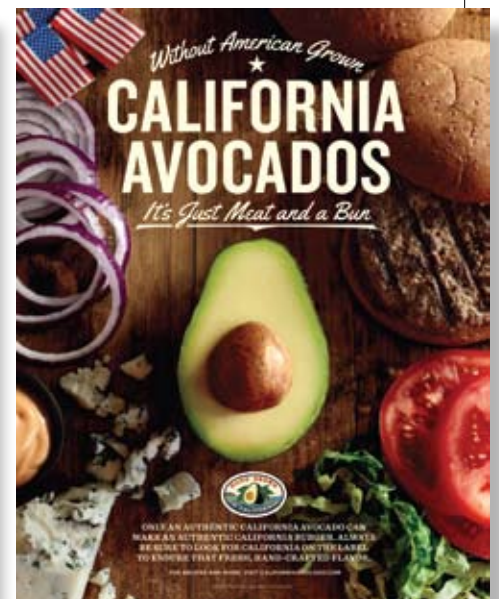
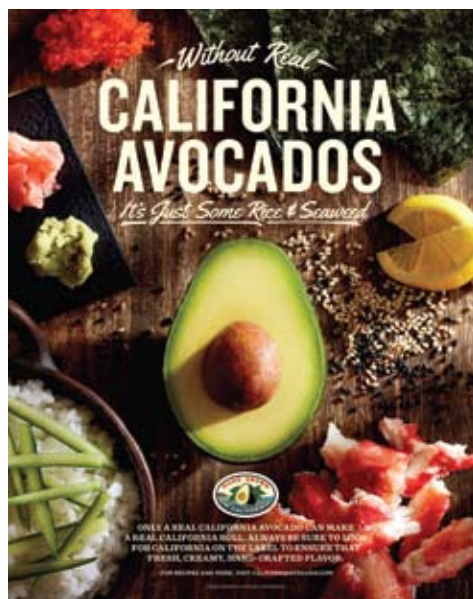
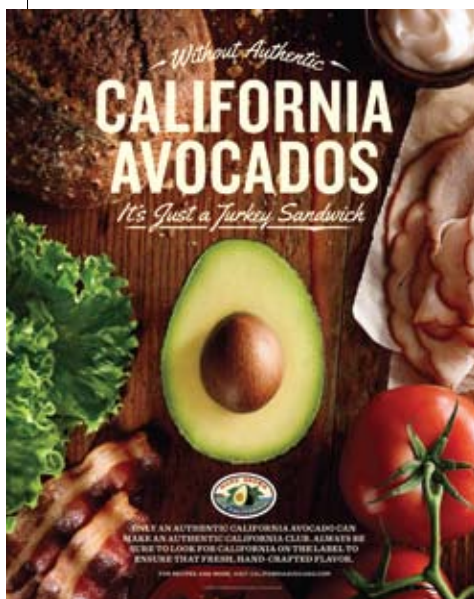
From May through July, full-page ads in *Sunset Magazine* and epicurean publications such as *Bon Appetit*, *Food &*

Wine, *Food Network Magazine* and *Saveur* will communicate the Distinctly Californian messaging.

Outdoor advertising throughout major markets in California, Portland, Seattle, Phoenix, Salt Lake City, and Denver also feature the messaging. In addition to general market outdoor boards that are placed around freeways, CAC has implemented a robust media buy targeting commuters who use mass transit. In San Francisco and Los Angeles, large wall-scapes were carefully selected to ensure the location of the ad was within neighborhoods that support a foodie culture and locally grown produce.

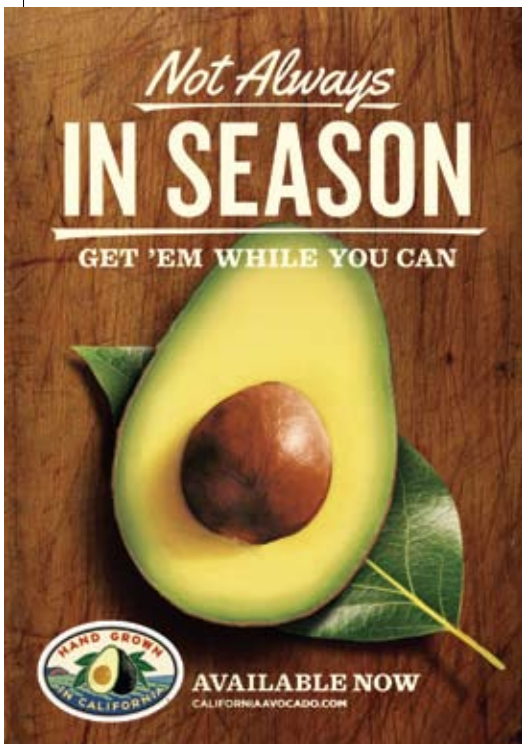
Additionally, CAC has branded one of the trolleys in Downtown San Diego — inside and out. The trolley's exterior has been wrapped with graphics and "Proud to be Labeled Californian" messaging reminding people to look for the California avocado label. The inside of the trolley shows a variety of messages about California avocados.

New this year is a partnership with Amazon Fresh in San





CAC has branded one of the trolleys in Downtown San Diego



vans and trucks with California avocado creative.

In the digital spectrum, nearly 36 percent of smartphone owners use their smartphone at the grocery store to search for coupons and offers, (*Source: Telemetrics Mobile Path to Purchase Study, 2013*) so CAC has added new digital components to effectively reach consumers when they are shopping. For example, CAC has employed new media technologies that communicate with consumers via their smartphone when GPS indicates they are in (or near) a grocery store carrying California avocados. Consumers receive a message advising them that California avocados are in

Francisco and Los Angeles. As part of the promotion, Amazon Fresh agreed to exclusively sell California avocados in California markets during the California avocado season. The program partnership includes email communication, digital ads, postcards within their delivery shopping bags plus wrapping their

season and directing them to the closest location to find California avocados.

This year's digital presence includes two new videos on YouTube. The videos strategically target viewers who have a tendency to engage with recipes and avocados. The videos feature California avocado grower, Tom Pecht and his family in an American Summer Holiday setting demonstrating how California avocados go from grove to table. The robust digital media effort includes standard digital ads with Distinctly Californian messaging urging consumers to look for California on the label.

Radio continues as an important component of the 2015 advertising campaign. This year's radio includes general market radio in all of the advertised markets with retailer specific tags, in-store radio and streaming radio on Pandora.

The Commission's consumer media plan will achieve more than 672 million impressions.

Retail trade advertising

Retail trade advertising is important to keep California avocado branding and leadership positioning top of mind with key retailers. The Commission's 2015 retail trade advertising campaign includes an innovative media plan and exclusive positioning placing California avocados in the forefront throughout the season. To kick off the season, an "American Grown" half-page front cover ad ran on March 16 in *The Packer*. CAC is the **first** advertiser in the history of the industry to grace the front page of the newspaper. CAC's cover ads, which will run almost every week during CAC's season, are a first for the produce industry and notable enough that *The Packer's* editor tweeted about the ads when they were launched.

On March 23, *The Produce News* featured a half-page ad



CAC's American Grown ad on the cover of *The Packer* for season launch. CAC ads will run in every issue of *The Produce News* during the California avocado season

on the front of a spadia (cover wrap) around the publication with editorial featuring CAC and other industry news. This space typically features a full-page ad on the front, back and inside cover pages. For CAC, the space is used to replicate the front page of their publication with the CAC ad featured on the bottom half—**another first!** A full-page ad also ran on the inside cover.

To maintain visible premium placement, CAC is using belly bands in key industry magazines. A belly band runs the width of a publication, is typically four inches high and wraps around the publication. For **another first** in the industry, a California avocado belly band wrapped around the April and June issues of *The Snack* magazine. The *Produce Business* also featured a belly band and a full-page ad

in the April, May and June issues.

New this year, *The Shelby Report* will run the cover page on glossy stock paper rather than newsprint. In April, May and June, *The Shelby Report West* features a CAC strip ad that is four inches high and runs the width of the publication along the bottom of the front cover page.

The campaign will be supported with ads in *Fresh Digest*, *Progressive Grocer*, and *PMA Fresh Magazine* for complete coverage in top industry publications during the season. Digital ads will run in *The Packer*, *The Produce News*, and *AndNowUKnow* and *FMI Smart Brief* online newsletters.

Ads were launched at the start of the California season and included coverage during the American summer holidays. To support the Produce Marketing Association (PMA) Fresh Summit, a half page ad will run in the October issue of *PMA Fresh Magazine*. Three ads in *The Packer* will showcase California avocados with creative emphasizing American grown, local, fresh and first to market, and copy thanking retailers for their loyalty to nearly 5,000 California avocado growers.

CAC's ad campaign worked in tandem with CAC's trade public relations to ensure ample coverage throughout the season. Additionally, due to the spadia in *Produce News*, CAC had editorial featured on the front cover of the wrap.

"We have received a tremendous amount of feedback from our trade ads," explains Jan Delyser, CAC's vice president of marketing. "Our ads stand out in the trade because of the front cover positioning and on-point messaging. The publications are excited too as they are getting requests to follow CAC's leadership positioning and buy the media space after our season ends. Other marketers are asking, 'Why didn't I think of this?'"

The 2015 trade advertising campaign's fresh approach to further differentiate California avocados from the competition has exceeded expectations. 🥑



CAC ads with the three different headlines running in *The Packer* and *The Produce News* throughout the season



(l to r) Chris Ambuul and Mike Sanders of S&S Grove Management Services with Dr. Joe Morse and an unidentified worker in an avocado grove this summer

UCR Researcher Spends Career Focusing on Avocado & Citrus

By Tim Linden

Joe Morse readily admits that his original academic leanings were toward engineering and away from entomology was a simple case of rebelling against his dad.

Roger Morse was an entomology professor at Cornell University in Ithaca, New York, for more than 40 years, specializing in bees. It was where Joe grew up. "We were both Type A personalities and there was a lot of friction when I was younger," said Morse.

He initially shied away from entomology and received a B.S. from Cornell in electrical engineering. However, it didn't take Morse long to recognize the genetic pull of the insect world, and he did do his graduate work in the field of entomology, receiving both a masters and doctorate in that discipline from Michigan State University.

The year was 1981 and he had been advised by colleagues and professors to begin the job-searching process because it typically took a handful of efforts to hone inter-

view skills and land a job at the right university. By this time, Morse and his father saw eye to eye and he looked forward to following his father's professorial path.

In fact, Dr. Roger Morse was among those who encouraged Dr. Joe Morse to apply to the University of California at Riverside when a position opened up as the younger Morse was finishing up his doctorate. "It was the second job I applied for and I didn't think I would get the job. In fact, I ended up accepting it, thinking I might change my mind because there was another job in Colorado that I really wanted that was supposed to open up."

The other job never did materialize and Dr. Morse has spent the last 34 years in Riverside with no regrets.

He was hired as an assistant professor and spent 20 percent of his time teaching and 80 percent researching.

He started his research career on citrus thrips and remained in the pursuit of solutions to that problem through

the 1980s and well into the '90s. "In June of 1996, a local Pest Control Adviser (PCA) brought me in to consult on what he thought might be citrus thrips on an avocado tree."

Though it looked very similar to a citrus thrip, Morse identified it as an avocado thrip, and thus began a new chapter in his research life. In fact, as he starts the process of wrapping up a very successful teaching and researching career in academia, Morse said he has spent virtually all of his work life "focused on applied and fundamental research dealing with the management of arthropod pests of citrus and avocados in California." He has specialized in the areas of integrated pest management, invasive species research, applied biological control, parasitoid behavior and ecology, insectary rearing of natural enemies, the acute and sub-lethal impact of pesticides on both target pests and non-target organisms, modeling and computer simulation, and pesticide resistance.

He also has pursued an interest in international agriculture and has been involved in citrus and avocado pest management and/or cooperative projects with researchers and industry personnel in Arizona, Florida, Hawaii, Texas, Argentina, Australia, Brazil, Chile, Cyprus, Egypt, Israel, Japan, Mexico, and New Zealand,

As the 2015 school year at UCR was coming to a close in

June, Dr. Morse, who became full professor years ago, was beginning to pack his bags for what will be the next two chapters in his research career. "I'm starting a one year sabbatical and then I will come back to UCR for one year before retiring."

He is quick to point out that the public perception of a sabbatical being a vacation is inaccurate. It must be approved by the dean and it must have academic value. Dr. Morse's proposal includes a minimum of six research papers – three on avocados and three on citrus. He spends 50 - 55 hours a week on research and teaching which leaves very little time to write. "This might be my last chance to work on these papers."

He has lots of data that he needs to get published before he retires. He does not want his work to be lost. The sabbatical will allow him to do so. He said the uninterrupted time allows him to devote four or five hours at a time on writing, which is what he needs to accomplish the task. Though he has published many articles and papers, he has a lot of work left to do, including work on perseia mites, avocado thrips, a specific weevil issue with avocados and preventive ideas on stopping the scale on Mexican avocados from infesting California groves. "I have a list of projects to do. When I finish the first six, I have others that will keep me busy."

For the past year, he also has been involved on polyphagous shot hole borer (PSHB) work. While he won't be involved in that effort on a day to day basis while on sabbatical, he will still be available for consulting purposes. And he plans to again work on solutions during his final year on campus for the 2016-17 year. Morse said PSHB is a difficult problem because it does involve two different species and the location of the pest makes it difficult to treat.

But it is the type of long term research that Morse and many of his ilk have thrived on for decades. He said any task actually involves the solving of many sub-problems throughout the process, which makes it interesting and fulfilling, even if it is a multi-year project.

Dr. Morse is not sure what retirement holds for him, but he suspects it will include a move out of California. "I grew up in a green environment and California, around Riverside, is a little too brown for me. I am going to check out Thailand (where a sister lives) in January of 2017, and the East Coast and Seattle also are possibilities." 🥑





Attendees at the 2015 Grove Media Tour pose with California avocado growers Randy and Joann Axell

Commission Hosts Annual Field to Table Grove Tour

The California Avocado Commission (CAC) regularly hosts grove tours for key influencers and stakeholders, such as media, foodservice partners and retail accounts in order to promote the farm-to-fork story of California avocados. The tours also provide information that helps to differentiate California avocados and communicate their premium quality allowing the Commission to deepen relationships with these influencers while providing a behind-the-scenes look at the care taken to produce California avocados.

In late April, CAC hosted a two-day grove tour in Ventura with attendees including consumer and trade media, registered dietitians (RD), foodservice operators and retailers. The attendees were treated to a variety of events, tours and meals throughout the weekend that highlighted the culinary and nutritional benefits of California avocados, while also telling the production story.

The tour kicked off with dinner at Salt Restaurant in Calabasas where chef David Iino wowed attendees with a multi-course menu featuring *Braised Boneless Short Ribs with Avocado Smashed Potatoes* and a *Chocolate Lava Cake with Chocolate Avocado Anglaise*. Past CAC Chairman Ed

McFadden attended the dinner and answered guests' questions about growing avocados.

The following morning, breakfast was hosted at Four Seasons Westlake Village, with California avocados front and center on the menu including items such as *Chilled California Avocado, Mango, Honey and Greek Yogurt Smoothie Shooters* and *Mini Egg White Frittatas with California Avocado, Oven Cured Tomatoes and Spinach*. Following breakfast, the group visited Brokaw Nursery, where Aimee Smith, sales manager, led a guided tour demonstrating the process of grafting avocados and nurturing the baby plants to full-sized trees.

Next, the attendees were shuttled to grower Randy Axell's avocado grove, Rancho Rodoro, where he discussed his life and history as an avocado farmer. The attendees were given the chance to try their hand at picking avocados (harder than it looks!). Lunch was served in his barn, with food provided by Chef Pink of Bacon and Brine. The menu featured dishes such as *Avocado Gazpacho Shots with Flowering Coriander* and *Vegan Key Lime and Avocado Tartlets with Avocado Blossom Honey*.

The group's final stop was a tour of the new Mission Produce packing operation in Oxnard. The guests were able to watch as incoming fruit was sorted, washed and packed for retail and foodservice customers. Attendees were able to ask questions and take pictures of Mission's innovative technology, and thoroughly enjoyed getting a behind-the-scenes look at the level of care and safety taken in every step of the process.

On the final evening of the tour, guests were treated to an overview of the nutritional benefits of California avocados, led by CAC RD Ambassador Katie Ferraro. The well-known registered dietitian hosted a presentation that featured information on avocado nutrition, highlighted the versatility



Brokaw Nursery Sales Manager Aimee Smith demonstrates the process of avocado plant grafting



Media RD Trish O'Keefe, RDN poses with her hand-picked California avocado



gillian_ferguson 2 weeks ago
 Had fun hanging with these guys this weekend. This 40 acre farm in Santa Paula produces 200,000 lbs of avocados every year.

susanesherrick, lovehardnyc, robgold89 and 83 others like this.

fpproducehunter #pendulous

ktlallo

legenderryberry Dreamy

putapuredukes Ok avocados are my most fave and I've never seen them au naturale! So sac-esque!!!

hollyfloral Luckiest

skylarcmiel Aka heaven!

of the fruit and gave an avocado nick-and-peel demonstration. Attendees were very engaged with the question and answer session led by Ferraro and CAC's Jan Delyser after the demonstration. Attendees then enjoyed a final California avocado-centric dinner and lingered well after the meal discussing all they had learned about California avocados and each other over the past two days.

CAC has built deep relationships with food media, food bloggers, third-party registered dietitians, trade media and foodservice representatives. This year's grove tour attendees were a mixed group with representatives from each of those categories. These stakeholders have become advocates for the California avocado industry in the digital, media and foodservice spheres, helping CAC share the California avocado story with consumers and inspiring them to choose California avocados.

To date, this year's tour has garnered more than 1.2 million impressions, and we expect to see continued results over the next month as our attendees post more coverage. 🥑

THE PRODUCE NEWS

Dietitians, bloggers get up-close look at California avocado industry
 BY JESS GIBBS | APRIL 27, 2015

VENTURA, CA — Dietitians and bloggers from across the nation got a first-hand look at the California avocado industry during a media tour April 25-26 hosted by the California Avocado Commission.

The tour encompassed stops at a leading avocado nursery, a longtime avocado grower and the country's largest packaging house, giving attendees a thorough look at one of the most popular crops in the Golden State.

En route to Broken Shaves in Buellton, CA, Jan Delyser, vice president of the commission, told tour attendees that the state is expecting a crop of about 327 million pounds this season, which will be harvested by approximately 5,000 growers who value avocados for its producing a high-quality "tender green" crop.

At Broken Shaves, the state's largest avocado tree producer, Sales Manager James Madrigal-Sheriff led an informative demonstration on the first five years of the life of an avocado tree, from seed to sale to a grower.

Following the stop at the nursery, the tour proceeded to Rancho Redden in Santa Paula, CA, where grower Randy Asati, a third-generation avocado grower, invited attendees to pick avocados on his 27-acre avocado orchard.

Asati walked guide in his orch, telling attendees, "I love being able to spend every day on our farm and in the grove. It's very satisfying to be able to give something from a tree seed to a full tree."

After the grove tour, Asati invited attendees into his historic barn where Chef Paul of Boons & Bites in Solvang, CA, and the Food Network's "Curbstout Kitchen" team prepared a California avocado-themed lunch.

The final stop was at Mission Produce's new state-of-the-art avocado packaging house in Oxnard, CA, which is the largest avocado packaging in the world — and is led by Trifilio. Peru is completed in just a few weeks.

Mission officials led attendees through the operation and explained the technology & equipment to get the highest-quality — and safest — product to consumers.

Following the tour of the packaging house, the commission hosted a dinner for attendees that featured California avocados in each course. Prior to the dinner, Katie Ferraro, a registered dietitian who works with the commission, outlined the nutritional virtues and versatility of avocados during a demonstration.

Delyser said the avocado category has exploded in recent years and acknowledged that production in Mexico, Peru and Chile has enabled consumers to reach untapped levels. But she said California holds a special place in the minds of some U.S. consumers who prefer a "tender green" avocado when available.

The California avocado season runs from April through September, and the state produces 90 percent of the nation's avocado crop. Seven varieties of avocados are produced commercially in the state, with the Hass variety accounting for 93 percent of the total crop volume.

Facebook, Twitter, LinkedIn, YouTube, Instagram icons.

USDA MARKET WATCH, The Source PRO-ACT, The Path to Increased Profit Starts With Superior Ripening Technology.

RIGHTINGS: CAC's media center tour. Jan Delyser, vice president of marketing at the California Avocado Commission, with Randy Asati, owner of Rancho Redden.

Grower Profile



New Grower

Finds Much Value in Research

By Tim Linden

Temecula avocado grower Steve Serrao has only been in the business for a few years and has only planted one acre of the eventual 11 acre grove he expects to have. But he believes he has already learned a very valuable lesson.

"A new grower has to be research-oriented. We cannot do business as usual in the avocado industry," he said. "We have to embrace new products and a new way of doing things."

Serrao said high water costs are chief among the many challenges facing any avocado grower, but especially a new one. He believes that to be successful, he had to do a plethora of research and is carefully plotting out the future of his grove.

Research comes easy to this India-born doctor who is currently completing his third year of residency in internal medicine at Loma Linda University Medical Center in Loma Linda, CA. After he graduates this year, he will continue his career at Riverside County Hospital.

Growing up in India and spending much of his early life in Dubai, Serrao said he was very well acquainted with mangos and got involved very early in life with tree cultivation. It sparked a life-long interest in agriculture and the desire to become a grower when the opportunity arose. Several years ago he bought an abandoned avocado grove in Temecula and began working the land. With the help of grove manager John Brown, they removed the old trees and bought 550 new ones.

Serrao uses the same terms when speaking of his medical and avocado work. "I have 550 patients out there," he said.

He talks of finding prescriptive solutions for some of the trees' issues, including using new technologies and products that will lower the water's pH for the good of the trees. He believes just like being a good doctor, a good grower is



Steve Serrao

detailed-oriented and can adapt to different challenges and a different set of circumstances on an ongoing basis.

After clearing his grove, research told him that the only way to survive is to plant high density groves with a concentrated plan for pollination. "We planted 550 trees on one acre with a mix of Zutanos and Hass. Every sixth tree is a Zutano and it is surround by six Hass."

He said research showed him that this would result in a

high degree of pollination and more fruit.

The plan is to keep the trees small with a harvest expectation of 15,000 to 20,000 pounds per acre. Serrao wants to grow extra-large fruit and is willing to sacrifice quantity for quality and size. He explained that the high-density planting with a 10 foot by 10 foot configuration is what he needed to plant to pay for the high cost of water. For the most part, he said a low density grove takes as much water as a high density grove, so it makes more sense to spread that water out over more trees. And he believes keeping the trees small is also a way to save water. "Big trees need more water," he said.

The Serrao grove utilizes irrometers to know when to water, and micro-jet sprinklers to put the water exactly where it is needed.

The 2015 season is the first time the trees have produced fruit. The grove was stripped in January and February and yielded about 1,500 pounds. "We thought we would get 2,000, but we had a lot of wind that took its toll."

In fact, he said his first year of production was hit with what he called the triple whammy of wind, tremendous heat and "to top it off, we got snow."

Serrao added: "We wanted to get the fruit off the tree quickly so we could rehabilitate them for the next season," he said, using another term from the medical profession.

Speaking in mid-April, Serrao was very pleased with the flowering of his trees for next year's crop stating that it was significant. "But it's too early to tell what type of crop we will have," he said. "I have only been in the business a couple of years but I have learned that until the June drop, you don't know what you will have."

To increase the flowering, Serrao used a foliar agent, which he said not everyone agrees with but his research said it should make a difference.

Next year, he plans to plant an additional 1,000 trees on two more acres. He currently has a trial of 20 trees of a new Hass variety that is touted to have less tipburn. Seemingly, nothing Serrao and his advisor do is done without copious amounts of research and planning.

He is optimistic about the future of avocado growing in California and believes it can be a profitable endeavor with careful planning. Before planting a single tree, he explored his options and considered wine grapes, but determined that avocados had a better upside potential. Serrao is going to remain a full-time doctor so he only has a limited amount of time to devote to avocado growing. But he insists that it is more than a hobby. With his lifelong interest in agriculture, he calls this pursuit "a great fit" and one that he is passionate about. 🥑



GROWTH THROUGH INNOVATION

West Pak employs the world's most advanced, fully automated avocado grading system. Our grader is manufactured by Compac, a New Zealand company offering the latest in color, blemish and shape sorting technologies.

Manual grading is based on the discretion of each individual grader. Compac accurately and effectively takes the grey out of the equation regardless of hours worked. Complex digital maps analyze each piece of fruit and determine its quality characteristics.

Growers receive a consistent and well documented grading result. If you are interested in the 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

Annual Grower Meetings Focus on the Future

By Tim Linden

At the series of California Avocado Commission annual grower meetings held in April, President Tom Bellamore took a different tack than is usually the case.

“We usually talk about the past year, but today we are looking forward,” he said.

The past is interesting, but the California avocado industry has gone through dramatic changes in the marketplace over the past decade, and Bellamore wanted to focus on how the Commission and staff view the industry moving forward. He reviewed the efforts of the past several years and articulated a long term marketing strategy that strives for premium positioning for California fruit.

It is no secret that the volume of California avocados represent a much smaller market share than it did even a decade ago. With this year’s marketed volume projected to be under 300 million pounds, California only represents about 15 percent of the volume of avocados that will be sold in the United States. Even a large crop – which may well be in the works for next year – will still only be 20-25 percent of total volume.

Bellamore said with these facts in mind, CAC has been working toward creating product differentiation and helping growers achieve the best possible pricing for California avocados during the months in which California competes. CAC has been focused on building demand for the California brand, while also increasing grower productivity, and protecting the investment growers have made in their operations and in the California brand. Last year CAC launched a labeling campaign that was expanded this year to gain additional exposure for the California fruit.

“We wanted to create a market situation for California avocados that returns value substantially above amounts received by all other avocados,” he said during the event held in San Luis Obispo.

This strategy came into question during 2014 when Peru

flooded the market with an abundance of fruit during the middle of the California season that resulted in a dropping of the market price and a reduction in orders from some longtime California avocado customers. As such, CAC embarked on fact-finding mission to determine if its long term strategy is viable. During the off season, CAC staff and board members met with stakeholders and marketing experts as well growers, packers and marketers.

In reviewing that effort, Bellamore said the questioning of CAC’s focus revealed that the short-term strategy of creating a premium position is “spot-on.” California needs to continue to refine its value proposition and further differentiate its offering. Bellamore noted that it does take actions by the entire industry working together to achieve this. First and foremost, California needs to deliver top quality product each and every time to the grocer’s shelf. The close proximity to market will help the industry achieve this goal.

From CAC’s perspective, the marketing strategy is to target premium customers who have a “willingness to pay” the higher price the product commands. To achieve this, CAC has been cultivating relationships with high-end retailers whose customers place quality above price by rewarding those accounts who take the extra effort to promote the California brand.

While California avocados are sold to retailers across the country, Bellamore and the CAC staff are placing an emphasis on “core” western markets. They differentiate the California avocado based on freshness, quality, and safety. CAC’s new “Distinctively Californian” advertising campaign continues to communicate the “*Hand Grown in California*” logo and capitalizes on the growing interest in locally grown.

As detailed in Bellamore’s “President’s Message” in this issue, he also discussed governance issues as the board is determined to make sure that it is designed in a manner to foster innovation, and flexibility.



Avocado thrips

Avocado leafroller

Orange tortrix

Lepidopterous larvae



Delegate® Insecticide. The innovative mode of action of Delegate is broad-spectrum enough to control multiple pests, yet it maintains populations of most beneficials. Mites aren't flared, and secondary pests stay...secondary. You also get favorable pre-harvest and re-entry intervals, plus minimal personal protective equipment requirements. To learn more, talk to your PCA or visit www.dowagro.com.



Dow AgroSciences

Solutions for the Growing World

*Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow
Always read and follow label directions. www.dowagro.com



CAC President Tom Bellamore discussed the group's premium pricing strategy during the April grower meetings

Vice President of Marketing Jan DeLyster also presented a more detailed look at CAC's efforts to create the premium positioning for California fruit. She spoke of the specific target markets as well as the type of retailers and foodservice operators that CAC has successfully cultivated. The "sweet spot", she said, is retailers who are loyal to the brand throughout the season, will pay a premium for the product and promote it very well. However, the size of the crop fluctuates from year to year and CAC also has to be mindful of the need to market to buyers who are opportunistic or who might only focus on California promotions during holiday periods. Each of these customer classifications are important to the overall success of the California avocado industry.

DeLyster detailed the merchandising and marketing efforts for 2015, and also discussed the consumer advertising campaign "Distinctively Californian." Conducted through several different avenues, including digital social media, this campaign connects California avocados with other iconic California menu items, such as a *California Club Sandwich* and *California Roll*. It also reinforces the labeling campaign by giving

packers a distinct reason to call out point of origin for California fruit.

Of course, one of the keys for establishing a premium price is to deliver a premium product. Toward this end, CAC Research Program Director Tim Spann updated the audience of growers on many different cultural management projects designed to overcome challenges and improve the quality of the fruit. Numerous articles in this issue cover the topics Dr. Spann covered, including polyphagous shot hole borer, drought, plant breeding, production research, pest and disease management and cultural management.

Also on the dais was Ken Melban, CAC's vice president of industry affairs. He detailed several different grove visits by various groups including a Chinese delegation and U.S. Congresswoman Julia Brownley. In this April meeting,

Melban also previewed a California visit from Israeli researchers which was scheduled to take place in May. That visit did occur and is covered in this issue, along with an article written by those researchers detailing Israel's efforts on its own PSHB-related issues. 🥑



CAC Research Director Tim Spann outlined efforts designed to mitigate the impact of the polyphagous shot hole borer

CAC Campaign Capitalizes on Growth in Breakfast Use

In 2013, the California Avocado Commission (CAC) launched a campaign to expand consumption of California avocados at breakfast; since then the Commission has continued its breakfast promotions.

The fall 2013 Avocado Tracking Study conducted by Bovitz Inc. showed that only 35 percent of consumers in California avocado advertising markets eat avocados at breakfast (as compared to 76 percent and 81 percent consuming avocados for lunch and dinner, respectively). This data indicated a clear opportunity to increase breakfast-time consumption of avocados.

Around the same time there was a noticeable uptick in avocados used on foodservice breakfast menus. According to a September 2014 report from the NPD Group/Crest®, during the last five years breakfast has accounted for 100 percent of the foodservice industry's growth. At the same time, operators have expanded their use of fresh avocados for breakfast. The 2012 Avocado Menu Trak indicates a 64 percent increase in avocado mentions since 2005 with a strong preference for breakfast entrees.

To that end, the Commission launched its 2015 season in April with a targeted press release featuring four California Avocado Breakfast Toast recipes. Avocado toast has become an "on-trend" menu item at restaurants and on social media — hundreds of Avocado Toast recipes are routinely posted on Pinterest, for example. The Commission's press release featured four easy-to-prepare recipes crafted by Artisan Chef



Artisan Chef partner Maxine Sui created California Avocado Toast with Prosciutto, Fennel and Medjool Date and California Avocado Toast with Pickled Red Onions, Egg and Esplette Pepper

WAKE UP TO BREAKFAST WITH CALIFORNIA AVOCADOS



are also a part of the newly launched Distinctly Californian Campaign (see article, page 24).

As for the trade portion of the California avocado breakfast campaign, the Commission is supplying a “Wake Up to Breakfast” recipe booklet to retailers. A press release distributed to produce and grocery publications has generated more than 33,000 impressions, including an article in *The Produce News*. CAC also is including breakfast menu items such as the *California Avocado Scramble* in its foodservice advertising campaign. The ads appear in both print (*Restaurant Hospitality*) and digital (*Eat*

partners Maxine Sui and Jessica Koslow and celebrated the launch of the California avocado season.

In an effort to inspire consumers to incorporate California avocados as part of a healthful breakfast, the Commission has created a breakfast page on CaliforniaAvocado.com that features a variety of avocado-centric breakfast recipes ranging from smoothies and omelets to baked goods. Digital ads that feature key steps to creating a California omelet

Beat) venues.

Finally, this season consumers can enjoy creative avocado-centric breakfast menu items at a variety of foodservice locations. The Egg & I units (105) in Ft. Collins, Colorado have added layers of avocados to their *Monterey Benedict* and 188 Corner Bakery units in Dallas, Texas now offer the *Anaheim Scrambler*. Sixteen units of Lyfe Kitchen, in Memphis, Tennessee, showcase wellness and flavor with the *Spinach and Avocado Frittata*. 🥑

CAC launched the California avocado season with Artisan Chef Jessica Koslow's California Avocado Butter and Smoked Trout Toast and California Avocado Pea Toast





An avocado grove with several different cultivars in Taiwan

PSHB Research Update

The Search for Biocontrol Agents

By Tim Spann

Research Program Director

During the end of April and first week of May, Drs. Richard Stouthamer and Akif Eskalen visited Taiwan and Vietnam to continue the search for potential biocontrol agents of the polyphagous shot hole borer (PSHB). This was the team's second visit to Vietnam, having previously visited in April 2014, and their first trip to Taiwan. Vietnam has been identified as the center of origin for the Los Angeles/Orange County population of PSHB and Taiwan is the apparent native range of the San Diego population.

Taiwan

In Taiwan, the beetle populations were found to be very low and the researchers were only able to capture a small

number of beetles in avocado groves and none from the surrounding wild areas. In an infested avocado branch sample that was collected and dissected in a cooperator's lab, several wasp cocoons were found associated with the beetles. Samples of this wasp were sent back to the United States and DNA analysis indicated that it is a species of bethylid wasp.

Bethylid wasps are common parasitoids of Lepidoptera (butterflies and moths) and Coleoptera (beetles) species. A bethylid wasp has been used successfully as a biocontrol agent against another ambrosia beetle, the coffee bean borer beetle, widely considered one of the worst pests of coffee. Thus, finding one associated with PSHB samples is promising. A parasitoid would be an ideal candidate for in-

production as a biocontrol agent since parasitoids are generally highly host-specific.

It was also observed in Taiwan that the beetle, when present, did not appear to be as successful in establishing its fungal garden in the host tree as here in California. The mycangia (specialized mouth parts) of beetles collected in Taiwan were examined to determine what fungi they are carrying. Three different species of *Fusarium*, based on morphology, were found — one similar to the species in the San Diego beetle population and two other species. In addition, a *Graphium* species was found, but no *Acremonium* species, which is similar to the situation in San Diego. Genetic sequencing of all of the fungi found is ongoing to finalize their identification.

The researchers have developed several hypotheses to explain their observations in Taiwan. The low beetle populations may be the result of good biocontrol. Alternatively, the avocado groves in Taiwan are not monocultures like California groves. Instead, Taiwanese avocado groves consist of many different varieties and this diversity may affect the beetle's and fungi's ability to adapt to their host. With respect to the beetle's apparent poor ability to establish their fungal gardens, there may be antagonistic fungi or bacteria present that affect the beetle's fitness.

Drs. Stouthamer and Eskalen were very impressed with the quality of the scientists and their facilities — many of the scientists have been trained in the United States. They are optimistic that the Taiwanese researchers will be invaluable partners going forward and will be able to help answer many of the questions necessary to move these initial findings forward.

Vietnam

After two weeks in Taiwan, the researchers traveled to southern Vietnam, having visited northern Vietnam in 2014. No beetles were found in avocado groves in Vietnam, but the beetle is a major pest of acacia, which is grown in large plantations for timber. Richard Stouthamer noted that the avocado groves in Vietnam are very diverse, often interplanted with banana and other tropical fruits, whereas the acacia plantations are monocultures. What role this diversity plays in the beetle's apparent host preference is unknown. It is worth noting that the Vietnamese beetle is the same as the beetle in Los Angeles and Orange Counties, which also seems to have a greater affinity for non-avocado hosts in the environment, even though it can and does infest avocado.

During their visit to Vietnam in 2014, the researchers found a species of fly that appeared to be a predator of the beetle. Their Vietnamese cooperater, Dr. Thu, has been working on rearing beetles and the fly to conduct the necessary research to determine if it is, in fact, a predator of the beetle and, if so, how specific it is to the beetle. Dr. Thu's work is being supported by USDA Farm Bill funding that Dr.



A cocoon attached to the head of a female beetle



A pupae from cocoon

Stouthamer was successful in securing. Once that funding is in place, Dr. Thu's work will progress more quickly. He will also deploy traps to capture more beetles and potential biocontrol agents that will be sent to Dr. Stouthamer for identification.

A Long Road Ahead

Finding a potential biocontrol agent is just the first step of a long process. Once a potential biocontrol agent is found, it must be proven to grow or feed upon PSHB. Following that, researchers will need to create a list of California native species to test the biocontrol agent against in order to demonstrate its specificity to PSHB. That list is submitted to the USDA who reviews it and makes additions or changes to it, before sending the list to a biocontrol committee for approval.

Once the list is approved, research is conducted to evaluate specificity. The research data is sent to the USDA for review by the committee, which then recommends approval to the USDA. Once the USDA approves the recommendation, it must be published in the Federal Register for public comment before any releases can be completed. This is likely a two-year process — possibly more. Despite the long and arduous path, a biocontrol agent may be our best long-term solution to PSHB. 🥑

Short California Crop But a Good Season

Several handlers agreed that this year's California crop, though short, offers a nice blueprint for successful marketing in the future, regardless of the size of the crop.

Speaking on June 1, Bob Lucy, a principal at Del Rey Avocado Co., Fallbrook, CA, said about two-thirds of the crop had been marketed by that date this year compared to only half the previous year. Del Rey provided California avocados for some Super Bowl promotions and also sold significant volume in February and March. That did not happen in 2014 but Lucy said during a typical year California fruit can and should be harvested for sale during the late winter and early spring months. It is a time when California's fruit is at an acceptable maturity level for many growers.

Rankin McDaniel of McDaniel Fruit Co., also headquartered in Fallbrook, was very complimentary of the marketing efforts of the California Avocado Commission in 2015. "California avocados have done very well this year," he said in late May. "We are very pleased with the marketing of avocados and the overall growth of the commodity. CAC has done a marvelous job and created great demand for California fruit."



He noted that prices have remained very consistent even though volume was often at 40 million pounds per week – an unimaginable number just a decade ago. He said as California competes against Peru and Mexico in the late spring and early summer time frame, the California fruit should command a premium price in the marketplace. He predicted a three tier pricing system, which was

already occurring as Peru entered the market with its first fruit.

Matthew Clark of Eco Farms believes California avocados will keep their premium price throughout the summer aided by the shortness of the crop. He noted that the original estimate of 327 million pounds for Golden State fruit had been adjusted downward to 283 million pounds in late May. "And we don't think we are



going to reach that.” He said ECO Farms believes the crop will end up in the 250-265 million pound range.

Dana Thomas, president of Index Fresh, Bloomington, CA, also marveled at the consistent price that has been the order of the day this year. “It has been a nice consistent market,” he said. “Amazingly consistent. Prices have been consistently high and there hasn’t been a lot of ups and downs,” he said of the market price for California fruit.

Thomas said overall demand for avocados continues to rise and he is very bullish on the future of the market for all points of origin. He noted that 20 years ago he believed there was tremendous potential for increased sales, and he still believes that, even though sales have tripled in those two decades. “I’m still a big avocado booster,” he said.

The 2015-16 Crop

Looking ahead, handlers are cautiously optimistic that there will be a lot more California fruit next year than this year. The early bloom was good and there also has been a late bloom in many areas. While a heat wave did impact the bloom in

San Diego County, Lucy said San Diego should still have a very good crop next year, but probably not a record setter. He is hopeful that the San Luis Obispo area and its Morro Bay region also will have good supplies next year. The Del Rey executive said that for cultural reasons that region has quite possibly the best tasting avocado that is produced anywhere, yet supplies have been down two years in a row because of lack of water. For the most part, Morro Bay growers rely on well water and during the California drought many have seen their production fall dramatically because of lack of water. “It’s all about water,” he said. “There is good bloom for next year and hopefully an El Niño can kick in and replenish the wells.”

Thomas of Index agreed that there has been a very good bloom this spring, which has the potential of creating “a better crop than we have seen for the last two years.” But he cautioned that there are a lot of environmental factors that have to play out over the next six months before the 2015-2016 crop is made. “Water is going to continue to be a big issue,” he said.

After two straight years of California crops that were around

the 500 million pound figure in 2012 and 2013, the last two years have produced 40 percent fewer avocados with crops in the 300 million pound neighborhood. And, in fact, as noted earlier, some don’t expect this year’s crop to even hit the revised estimate of 283 million pounds.

However, there is reason for optimism as the wish for El Niño conditions is not just idle chatter. The spring has seen torrential rains in the lower Midwest and Texas caused by the El Niño effects, which is the result of specific combinations of Pacific Ocean water temperature and high pressure climatic conditions. Climatologists say those conditions currently exist and there is an increasing chance that the result will be greater than normal rain in California and the West Coast in the 2015/16 rain season. The latest odds by climatologists predict a 70-80 percent chance that the conditions will persist through the summer and into the fall.

Some of these climatologists predicted the same thing last year, which did not materialize. Paul Roundy, a professor of atmospheric sciences at the University at Albany in New York, admits he thought there was an 80 percent chance of the El Niño developing last year and he sees the same strong possibilities this year. He notes that an 80 percent chance still means there is a 20 percent chance that the El Niño conditions present in the spring will not result in the expected increase in rain in the West in the fall. However, he stands by the prediction and says that if the conditions that existed in April and May persist through the summer, there is a very good chance significant rain will come this fall.

California avocado growers are among those hoping the odds truly play out in their favor. 🥑



**LENDING
A HAND
SINCE
1916**

We are the Farm Credit System — a nationwide network of customer-owned lending institutions focused exclusively on agriculture.



FARM CREDIT

We've been around since 1916 and we're not going anywhere — except forward. When you need financial services for your farm or ranch, come to us. Because this system works. For you.

Find the Farm Credit member location near you.

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

American AgCredit

| CoBank

| Farm Credit West



MEET THE BOSS

At Index Fresh, the avocado inspires everything we do. What else would you expect from a company that's been owned by family farmers for more than a century?



AVOTERRA
"INDEX FRESH"

800.352.6931
IndexFresh.com