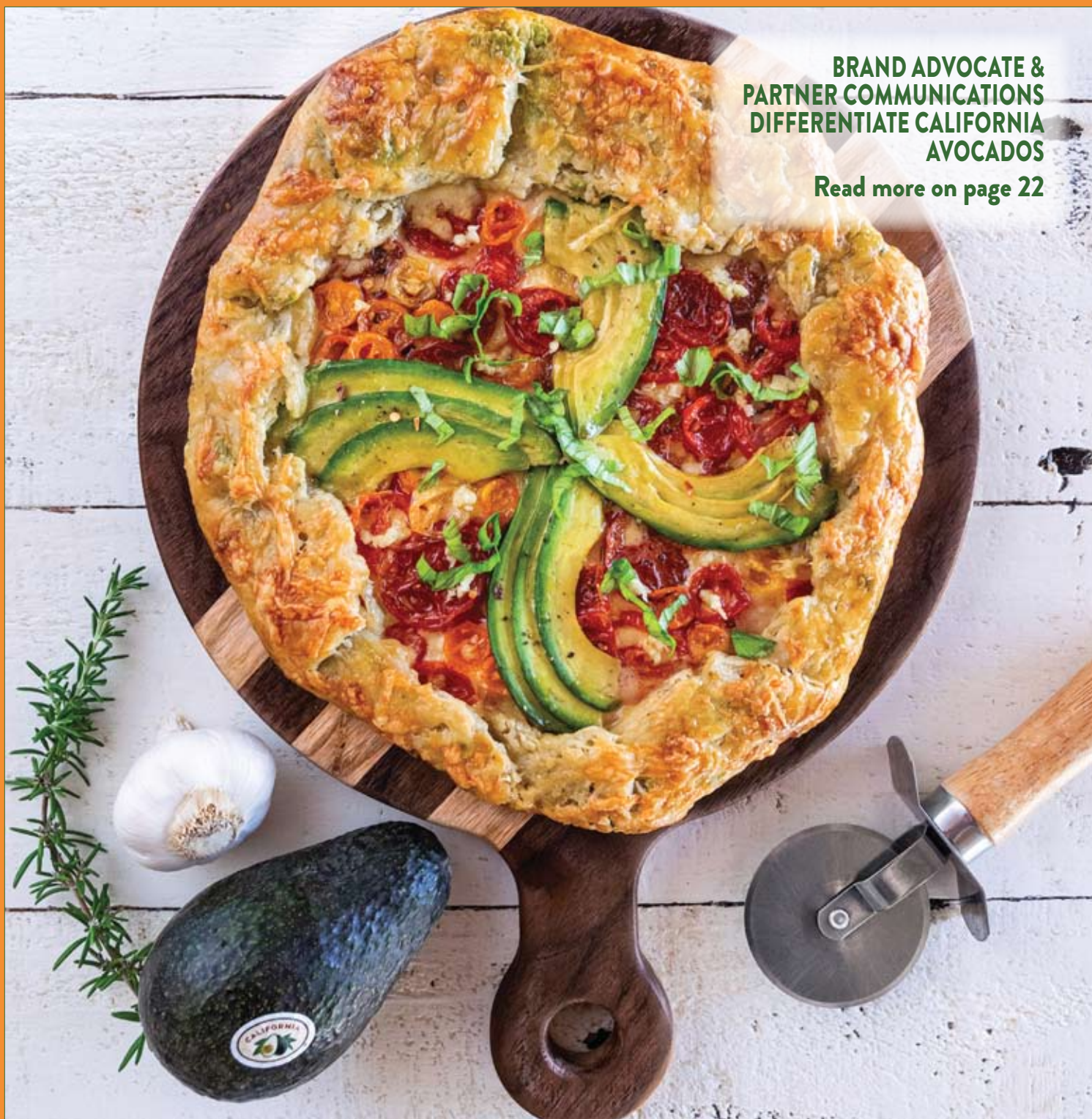


From the **Grove**

The Latest News from the California Avocado Industry

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AVOCADOS**

Read more on page 22



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Grower Profile

28

Robert Jackson
Fallbrook, CA

From the Grove

Volume 11, Number 3

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Fall 2021

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

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Measuring

In August, the California Avocado Commission's board of directors had a protracted discussion about the upcoming season and how best to deploy CAC's limited resources to address the industry's needs. This is a necessary step in preparation for the annual setting of the assessment rate and adoption of a detailed operating budget, but also a prelude to the strategic planning the board will conduct with an incoming CEO to set the course for seasons extending beyond 2022. Much of the discussion saw the board grappling with the age-old issue of allocation of resources between marketing and pressing issues such as productivity and rising input costs.

Views on how the budget should be constructed are often colored by an individual's perception of return on investment and the effectiveness, or lack thereof, of the various marketing and non-marketing activities that constitute a one-year business plan. That one-year plan is meant to be an incremental step along a strategic pathway designed to advance the industry toward an idealized yet achievable destination. Return on investment relies on measurement, and it was this topic that seemed to fuel the board's debate, carrying with it all the emotion that comes with conviction as opinions are expressed around the table.

On the marketing side, it seems everyone would like clear evidence that a dollar spent on a particular activity nets a certain increase in the price received by growers when they sell their fruit. With respect to non-marketing activities, much of the focus rests on yield. If resources are spent and productivity stays stagnant or wanes, the investment failed.

Would that it were so simple, yet this is where your gut leads you, telling you that measuring effectiveness *should* work this way.

Measuring the effectiveness of marketing programs is, for *all* commodity boards, a shared and persistent challenge. Direct, empirical measures are hard to come by or non-existent, and the variety of other tools and indicators that are used leave one feeling less than certain about conclusions that can be drawn from what amounts to being a sea of data points.

At the core of the problem is the obvious—the California Avocado Commission is one GIANT step removed from the deal, from where the transaction takes place. We have virtually no control over packer behavior in response to their customers. We are not Mission Produce nor Calavo; we cannot gauge the effect of our marketing efforts by looking at sales performance by size, by lug, by variety. Our marketing



Tom Bellamore

strategies and executions are buffeted by winds of the market that shift as effortlessly as those we feel when we walk outside. Time it right, do your research and make informed decisions and you can ride those winds. Other times you fall victim to the doldrums.

This fundamental weakness of not being in control of the deal does not mean we cannot or do not measure performance. Quite the opposite. There is a long list of tools and techniques that CAC and all the other commodity boards use for this purpose, and it is appended here: <https://bit.ly/cac-measuring-performance>.

As important are the independent evaluations conducted by credentialed agricultural economists that every commodity board commissions, using methodology embraced by the U.S. Department of Agriculture's Economic Research Service. Since 1978, CAC has looked to the University of California for such services. The UC Davis Department of Agricultural Resources and Economics' most recent study on the effects of marketing by CAC appear in: "Economic Impacts of the California Avocado Commission's Advertising and Promotion Programs 2013-17," which can be found on CAC's website. The authors noted the basic challenge of calculating the value of marketing back to growers, stating, "We cannot construct

a model to evaluate just the CAC's promotion expenditures because grower price for fresh avocados is determined in a national market that is influenced by international factors. Sales increases in local markets where the CAC promotes contribute to demand growth in the national market, but the impact on overall market prices and sales volumes cannot be evaluated in isolation."

The researchers analyzed CAC's retail promotion programs and did statistical modeling. They concluded that CAC's strategy to position California avocados as a premium product and to create loyalty for them relative to other origins, with a heavy focus on key Western U.S. markets, is "a very sensible strategy." The researchers also reported "benefit-cost ratios estimated for total

avocado promotions in the U.S., which ranged from 1.64 – 3.62, apply also to CAC's promotions. This represents a substantial return of California growers' expenditures to promote fresh avocados in the U.S."

The researchers concluded "if we take the midpoint of the 1.64 – 3.62 benefit-cost range, a dollar invested by California growers in promoting California avocados returned \$2.63 in additional profits. These conclusions should come as no surprise. The avocado success story in the U.S. in terms of achieving a stunning increase in per capita consumption while maintaining or increasing real prices to other growers, has made avocados the envy of the produce industry."

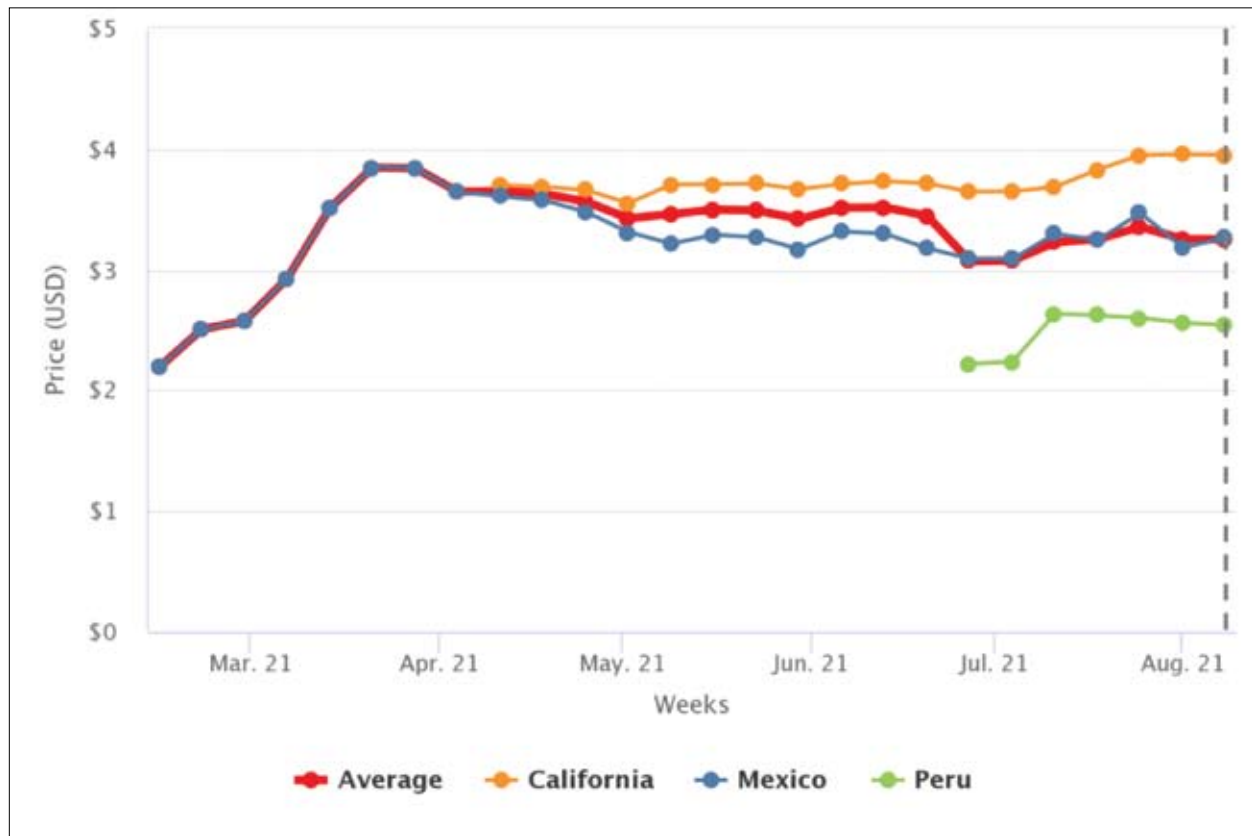
The UC Davis study also concluded that, "CAC's effectiveness in

promoting fresh avocados over the five-year review period was comparable on a dollar-for-dollar basis to Avocados from Mexico, with both being very successful in increasing returns to their members".

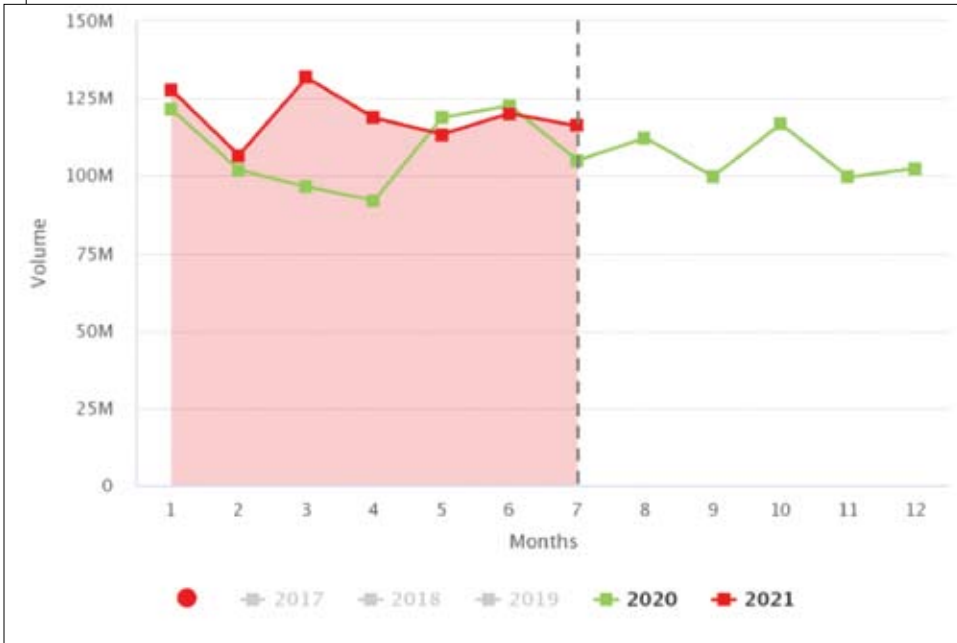
Other, independent data analysts crunch the numbers and reach conclusions that broadly hint at performance. This, from FreshFruitPortal.com as the California season was underway:

Currently, the average prices are mainly made up of those from the Hass variety, whose volumes are from California, Mexico and Peru as shown in the graph below. It is also worth noting, according to the graph is that avocados from California have the best average prices in the U.S. market.

Hass avocado prices in the U.S. market by origin (USD/KG)



The telling sentence in this report is "This price increase happened despite high volumes arriving in the U.S. market in July, as can be seen in the following graph."



Board of Directors

District 1

Member/Jessica Hunter-**Secretary**
Member/ Ryan Rochefort-**Vice Chairman**
Alternate/Michael Perricone

District 2

Member/John Cornell
Member/Ohannes Karaoghlanian
Alternate/Charley Wolk

District 3

Member/John Lloyd-Butler
Member/Robert Grether-**Chairman**
Alternate/Maureen Cottingham

District 4

Member/Rachael Laenen
Member/Jason Cole-**Treasurer**
Alternate/Doug O'Hara

District 5

Member/Andrew Prechtl
Member/Randy Douglas
Alternate/Daryn Miller

Handlers

Member/Gary Caloroso
Member/Peter Shore
Alternate/Connor Huser

Public Member

Daniella Malfitano

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

Shifting gears, now let's give some thought to measuring the effectiveness of CAC programs aimed at improving the grower's position, particularly productivity. Such efforts can take various forms and may be long or short term in nature. Rootstock improvement is an example of a project with a longer time horizon in terms of practical implementation, whereas a webinar on proper fertilization technique could be expected to give more immediate results.

Either way, measuring the success of an activity aimed at increasing grower productivity ultimately comes down to tracking yields, grower receptivity to the information provided and the rate of adoption. Like the sales transaction, these are things the Commission has no direct control over. Implementation of any new idea, whether it stems from research or a neighbor, rests in the hands of the grower, and herein lies the weak link. A grower who is under-irrigating because of the high price of district water can listen to webinars *ad nauseum* and still not be able to act on information provided that will increase yields.

Does that mean CAC should not

design programs and methods of disseminating information on how to improve productivity? Of course not. We cannot stop trying. What we *can* do, however, when the measurement (in this case, yield) falls short is to shoulder the failure together and try to solve the problem constructively, with new and fresh thinking.

Allocating assessment dollars to the essential functions of CAC—marketing and promotion, production research and issues management—will always be a matter of striking a balance. CAC strives to keep the assessment burden on growers reasonable while getting the greatest return on investment possible. Measuring return on investment, as shown here, is difficult and one's idea of progress or whether assessment dollars are being spent wisely is often influenced by personal circumstances. Understanding and accepting the realities that go along with trying to measure commodity board programs, both marketing and non-marketing ones, is a step in the right direction when it comes time to balance the resource mix. 🥑



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2021 CAC General Election Underway

Ballots for the annual California Avocado Commission General Election were mailed to commercial producers and all handlers of record on September 27, 2021. Ballots must be postmarked by October 27, 2021, and sent to the California Department of Food and Agriculture in the postage paid envelope provided.

The elections will be held for one producer member seat and one producer alternate seat in each of the five CAC districts, as well as one handler member seat and one handler alternate seat. Below are the declared candidates in the 2021 General Election:

District 1

Michael Perricone – Alternate Seat Preferred
Ryan Rochefort – Member Seat Preferred

District 2

Charley Wolk – Member Seat Preferred
Ohannes (Onnig) Z. Karaoghlanian – Member Seat Preferred

District 3

Robert Grether – Member Seat Preferred
Maureen Cottingham – Alternate Seat Preferred

District 4

Jason Cole – Member Seat Preferred

District 5

Daryn Miller – Member Seat Preferred

Handler

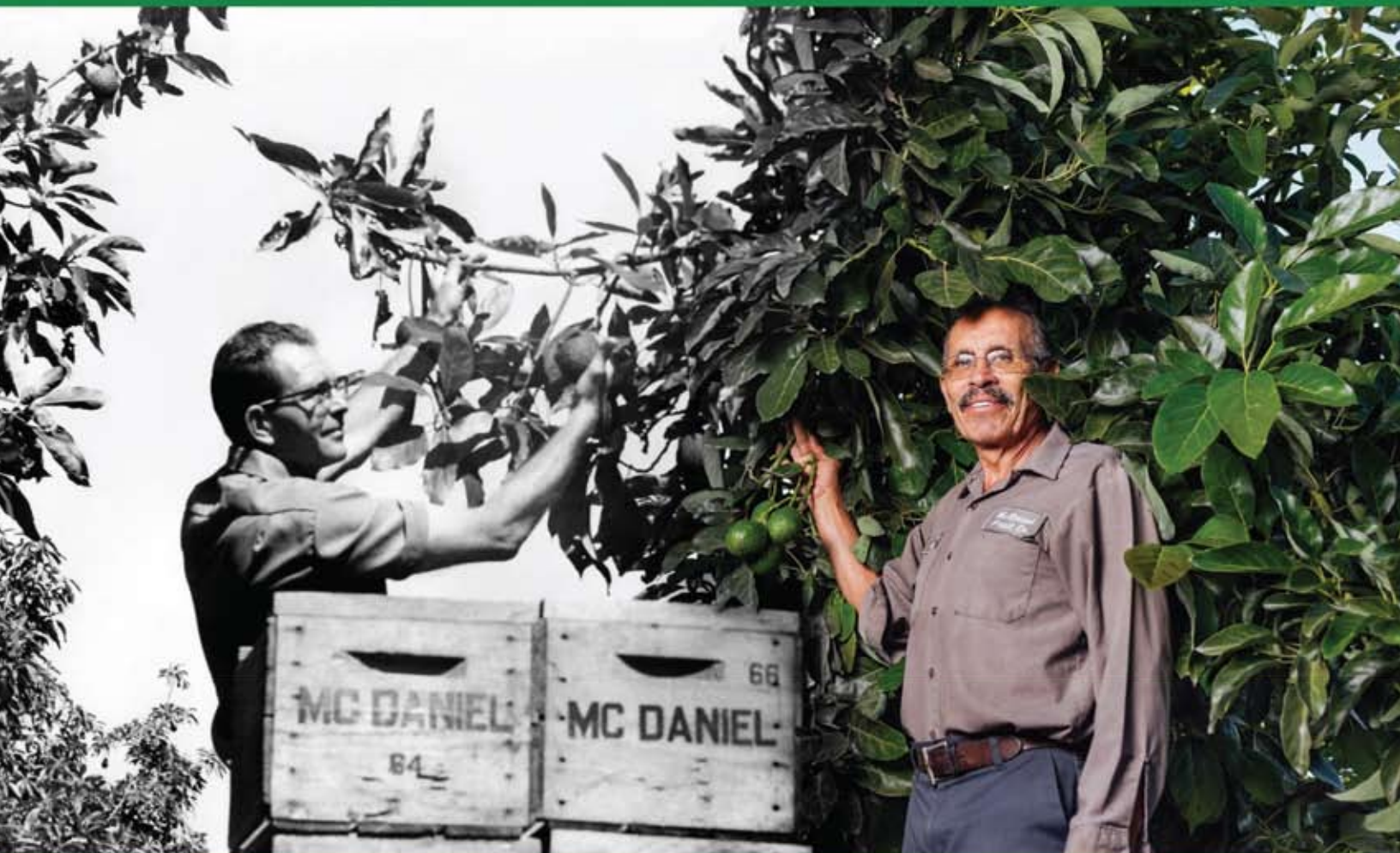
Connor Huser – Member Seat Preferred
Peter Shore – Member Seat Preferred

Please note that the 2021 General Election ballots continue using the ranked voting method, where voters rank candidates in order of their preference (1st choice, 2nd choice, etc.). The candidate receiving the highest number of first choice votes will be offered their choice of available seats. The candidate receiving the highest combined total of first and second choice votes will be offered the second available seat. The CDEA will announce the election results to the CAC Board and seat new board members on November 18.

VOTE (NO MORE THAN 3)			DISTRICT 1 CANDIDATES ONE MEMBER AND ONE ALTERNATE SEAT ARE AVAILABLE	BOARD SEAT PREFERENCE MEMBER, ALTERNATE, OR NO PREFERENCE
1 ST CHOICE	2 ND CHOICE	3 RD CHOICE		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	John Smith	Member Seat Preferred
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Jane Clark	Alternate Seat Preferred
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Write-in (Optional) <i>must include write-in name / phone number / email address</i>	

Example of election ballot with ranked voting method

If you are a commercial producer and did not receive a ballot, please contact April Aymami at the Commission at aaymami@avocado.org or 949.341.1955. 📞



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Increasing the Productivity of GEM Avocado Orchards Using High-Density Planting

By *Sonia Rios*

Subtropical Horticulture Farm Advisor, Riverside & San Diego Counties

Gary Bender

Subtropical Horticulture Farm Advisor (Retired), San Diego County

Ben Faber

Farm Advisor, Ventura & Santa Barbara Counties

Anil Shrestha

Professor — Weed Science, Fresno State University

Tim Spann

Spann Ag Research & Consulting

To remain profitable and competitive within the marketplace, California avocado growers must maximize productivity and lower production costs. However, several factors limit the productivity, profitability and competitiveness of the California avocado industry. These include the rising price of irrigation water, soil salinity and toxicity, shortage of qualified labor, and pests and diseases. One business model used by several crops within the agricultural industry is to increase productivity per acre by planting trees at a higher density.

California growers have traditionally planted at a 20' x 20' spacing (109 trees per acre) and have thinned trees when the canopy closed. Several countries have shifted the industry standards towards high density planting for avocado. The conceptual background of HDP in fruit growing was pioneered in temperate fruits and first practiced in California in the 1960s. Since then, there has been a rise in establishment of commercial HDP orchards throughout the world. HDP systems are normally understood as a system in which a higher number of plants are accommodated per unit area in comparison to the conventional planting density. However, the exact limit of planting density is yet to be determined, as HDP is not well defined. It varies with growing regions, species, variety, rootstock, management system adopted and economic return from the orchard.

In Chile, there are approximately 70,000 acres of avocados planted in a range of latitudes similar to those in California. Chile has pushed for higher levels of production efficiency by increasing tree density and lowering labor costs. Planting at 7.5' x 7.5' (774 trees per acre) is the current standard density in Chile for new plantings. Densities as high as 4' x 4' (about 2,700 trees per acre) also have been observed. Obvi-

ously, at that spacing trees are very crowded, compact and short. Tree height is managed from the time of orchard establishment. Orchard management practices include removal of water shoots, tree topping and cutting side branches to reduce shading. A significant difference where most HDP is practiced is the availability and use of plant growth regulators, such as paclobutrazol, which aid in reducing plant growth. These materials are not and may not be available in the U.S. in the foreseeable future.

Pruning is commonly done in spring right after harvest and again in the fall to ensure that vegetative growth is not stimulated during summer and early autumn as that can affect flower bud induction. Failure to follow those guidelines results in the need for severe tree pruning later, which in turn would have a short-term negative impact on productivity. But with tree heights of only six to eight feet, fruit harvest is more cost effective. At 5-6 cents per pound (vs. 25-30 cents per pound for California), pickers can make \$50 per bin (versus \$80-100 per bin in California) and at these attractive prices, owners can secure and retain their workforce.

At an ultra HDP (4' x 4') grove, trees come quickly into production (20,000 pounds per acre, two years following planting in one orchard) with yield expectations of over 30,000 pounds per acre at full production after four years. At lower planting densities, maximum productivity is reached after six years with yields of at least 10,000 pounds per acre.

Research on orchard crops in general and more specifically in South African avocados has determined that the height of the trees should be about 80% of the in-row spacing for optimum production. Therefore, our 10' x 10' planting should have a height of eight feet. (A 20' x 20' spacing should have a height of about 16 feet.) This height allows sunlight to pass



High density trial with full coverage mulch and microsprinklers – three different densities.

over the top of a neighboring tree and shine light on the lower canopy of the next tree. This arrangement tends to keep leaves on the trees all the way down to the ground, which in turn allows the fruit low in the tree to be picked without using ladders.

A high density trial with Hass on Toro Canyon was established at Pine Tree Ranch in Santa Paula in 2014. Blocks of trees were planted in four densities: 7.5' x 10', 7.5' x 15', 10' x 15' and 15' x 15'. The trees also had a pruning regime imposed on them: two-branch removal yearly, top and one side yearly and whole canopy pruning. Because of irregular weather patterns and resultant poor bearing, it was difficult to get good yield data. It also allowed for vigorous vegetative growth. The trial was terminated in 2019 when it was determined that it was becoming too difficult to keep the closer plantings from shading neighboring trees.

Emeritus Gary Bender, UCCE Subtropical Horticulture Farm Advisor conducted an HDP trial in 2012-2017 in Valley Center, CA, with Hass. Instead of the traditional 20-foot spacing of avocado trees, Bender planted his experimental grove with 10' x 10' spacing of small Hass trees grafted to Dusa rootstock from South Africa, which is root rot tolerant and high producing. He also planted a Zutano tree in the middle of every nine trees. The Zutano avocado tree, like Bacon and Fuerte trees, is a pollinizer. During his career, Bender observed that Hass trees located near Zutanos were heavy with fruit. Within three years Bender's high-density yield average was 19,173 lbs/acre, while the San Diego County and best-managed groves average 5,925-9,000 lbs/acre.

After the harvest in the third year, the trial required pruning of the tops and the sides in order to maintain the struc-

ture of the trees. We intend to evaluate the GEM variety in a similar trial. GEM has a more columnar growth habit, better lending itself to HDP. It is more precocious and bears its fruit in the canopy interior. It has a slower growth habit as a result of its early and heavy fruit production. If the GEMs require less pruning than Hass, that would be a real boost for the economics of the grove.

Significant work has been done on the 'Hass' avocado variety, but very little published work exists on GEM, a new variety with very different growth habits. We propose a comprehensive evaluation of HDP in avocado with the variety GEM at three different spacings: density 1 (7.5' x 7.5' ft), density 2 (spacing 10' x 10'), and density 3 (8' x 12'). Replicated field experiments have been established at Pine Tree Ranch in Santa Paula, CA. Fruit yields from each treatment will be determined. The study will thus determine the most economical spacing for commercial growers. This will be a long-term study, approximately 4-5 years. This will provide critical, science-based information to the California Avocado Commission and all California avocado growers. Additionally, we will author educational posts containing distilled versions of our research on the Topics in Subtropics blog and Newsletter after the completion of our second- and third-year data collection. Finally, we will submit articles to *California Fresh Fruit* magazine and the Commission's *From the Grove* and technical manuscripts to science publications, such as *American Society for Horticultural Science*. We also will host field days and share information with the California Avocado Commission and California Avocado Society.

Funding for this trial is from the UC Hansen Trust with support from CAC. 🍌

Road Trip Recipes: Plated with California



Chef Oliver English prepares his Sweet and Spicy California Fish Burger along the coastline of the Mendocino Headlands.



The best avocados
have California in them.

Soaring visuals shot in the Henry Cowell Redwoods showcase “The best avocados have California in them” campaign tagline.



The unique geography of the Trona Pinnacles is the perfect place to whip up and enjoy California Avocado Chicken Chili.

Road trips have long been a popular summer activity, but in a pandemic world more travelers are opting to hit the road and visit national parks and outdoor destinations. To dial up the connection between California avocados and the “California Lifestyle” the California Avocado Commission partnered with chef and health food enthusiast Oliver English to film new road-trip recipe videos amongst some of the state’s most stunning backdrops.

To bring to life “The best avocados have California in them” campaign tagline, Chef English took California avocados on the road to film recipe videos featuring three simple, unique dishes consumers can cook while traveling. Chef English prepared *White Chicken Chili with California Avocados* amidst the unusual tufa spires known as the Trona Pinnacles located in the California Desert Conservation Area. To showcase the California coastline, he was filmed oceanside preparing a seafood-California avocado pairing — a *Sweet and Spicy California Fish Burger* — in the Mendocino Headlands. With the Henry Cowell Redwoods towering above him, Chef English whipped up a *California Avocado Fajita Bowl*. In each video, the chef

demonstrated the easy-to-prepare recipe and then the final scene cut to him enjoying the freshly prepared California avocado dish within a gorgeous California outdoor backdrop.

This slate of new media assets was used to drive brand awareness and demand for California avocados with a series of pre-roll ad placements and posts on social media beginning June 21. The pre-roll video ads, which appeared before a video or other content a person had chosen to play online, ran on Channel Factory, the Food Network, POPSUGAR and Spotify delivering more than 3 million impressions thus far. The videos also ran on Hulu during National Avocado Day on July 31 and are posted on CAC’s YouTube channel.

By embarking on a road trip through some of the state’s most picturesque locations, the Commission leveraged the perception of California as a “premium state,” increased its cultural relevance and embraced the California lifestyle. Imagery that pairs California avocados with an aspirational on-the-road Golden State lifestyle encourages consumers’ willingness to seek out and pay more for premium California avocados. 🥑



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Mission's Key International Markets for CA Avocados

Distribution Centers



By Tim Linden

European Avocado Market Continues to Expand

Within five years, avocado consumption in the European Union and the United Kingdom is expected to equal or surpass what is sold in the United States, making the EU-UK the world's largest avocado market.

That is the view of Xavier Equihua, CEO of the Washington, D.C. based World Avocado Organization, a multinational non-profit group that promotes the consumption of avocados in the EU-UK. WAO represents many of the world's largest avocado producers, exporters and importers, including grower-shippers from Colombia, Mexico, Mozambique, Peru, South Africa, Spain, Tanzania, the United States and Zimbabwe.

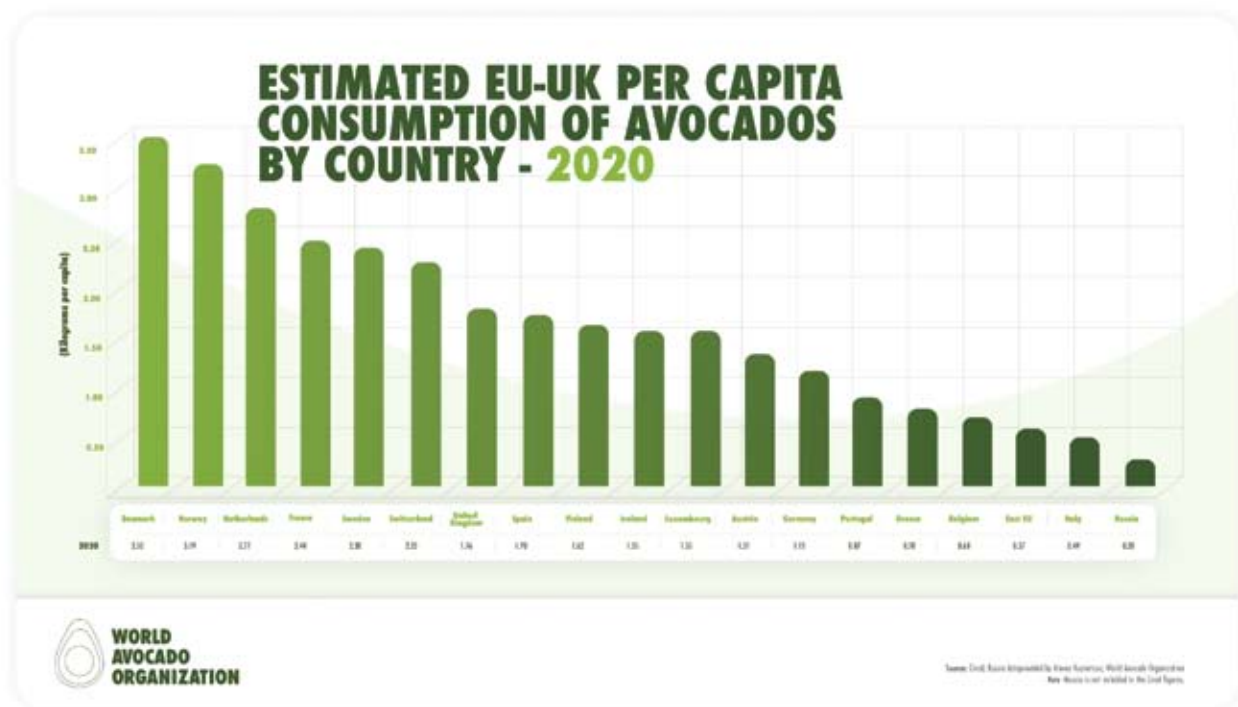
WAO was established in Febru-

ary 2016. It launched its first marketing program in four EU countries in 2017 and now has programs in 13 EU countries and the UK. Equihua believes the numbers speak for themselves as the EU-UK have been on a steep growth curve since WAO began its first marketing effort. Though sales in Europe dipped in 2019 because of a drop in world supplies that year, overall sales have doubled since 2016. In 2021, it is estimated that Europe will consume about 1.8 billion pounds.

While that volume is still about one billion pounds below total U.S. consumption projections for 2021, Equihua notes that per capita consumption is now growing at a much faster pace in the EU-UK market than in the U.S. In 2020, U.S. avocado sales increased

by 5.8% while the EU-UK registered a 23% increase. The additional volume also was mostly centered in 14 of the 29 countries that are part of EU-UK. This year consumption in the EU-UK is expected to grow by at least 8% while the U.S. is looking at a rate growth of 2-3%.

Equihua believes that by 2026, European avocado sales will equal or surpass those in the U.S. He points to several factors supporting his optimism. Most importantly is the demographic difference between the two regions. While avocado sales in the U.S. have grown tremendously over the past two decades and cut across a wide swath of American consumers, the presence of 60 million Latinos and about 200,000 Mexican restaurants and eateries is an important driver of that growth. In-



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deed, research on avocado consumers in the U.S. does reveal that heavy and super heavy users—about one-third of the U.S. households—now represent around 90% of all avocado sales. Equihua notes that a sizable number of the super heavy consumer category has Latin American roots and specifically of Mexican descent.

Though avocado consumer research in Europe is not as robust as in the United States, Equihua points out that avocado consumption on the other side of the pond is not nearly as concentrated as it is in the U.S. He says only a small population of European consumers are of Latin American descent and grew up eating avocados. Consequently, the growth has come from a much broader base, which has expanded as WAO has introduced new populations to the avocado. While consumers in France have been the leading purchasers, Equihua believes both the UK and Germany will eventually surpass

France. This is due to the UK's more diverse demographics, and Germany's larger population and keen interest in healthier eating. In addition, there are 15 additional EU countries that are very low consumers of avocados where WAO is not currently doing any promotions.

While reaching consumers in each of these countries is a complicated task because of language and retailing differences, Equihua says WAO's current winning strategy has proven successful. It now promotes avocados in 14 languages via the top retailers in EU-UK. For example, in 2020 WAO launched new retailer marketing tactics such as e-coupons during the pandemic—something that had never been done by European retailers. WAO also creates customized, language-specific promotional material for each country and each individual retailer. WAO cannot take a one-size-fits-all approach as that would not work in an area with 24 official languages and many different

eating habits and customs. The corresponding increase in awareness, public relations and sales also has been accomplished on a relatively small budget.

Another factor that points to an increase in avocado sales in Europe is the large number of countries supplying the EU-UK. While one state from Mexico dominates avocado sales in the U.S., followed by California and Peru, Equihua says there are at least 16 countries supplying the EU-UK market. As that market expands, more origins will only complement such growth, including California which already sells some avocados to Europe in small quantities. California avocado marketers could find it profitable to look for niche sales opportunities in the EU-UK.

Another factor leading Equihua to believe that the EU-UK market for avocados will eventually surpass that of the U.S. is its sheer size. The EU-UK has a population of more than 514 million with a similar per capita income as the United States. That's 35% more consumers than in the U.S.

One of the biggest concerns for the worldwide avocado industry is whether supply and demand can remain in sync. Equihua sees increased production coming from South America (including Peru, Colombia and Brazil) but is uncertain if increased production in the Americas can keep up with worldwide demand. "The big question then is Africa," he says, noting that it has both the climate and the land to become a major avocado producer. "At least 10 of the 54 countries in Africa, ranging in diversity from Morocco to Tanzania to South Africa, now produce and export avocados to the EU-UK," he said. 🥑

(Xavier Equihua is also the president of the U.S.-based Peruvian Avocado Commission, charged with promoting that country's avocados in the United States. Peru is the leading supplier of avocados to Europe and the third leading supplier to the United States.)



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CA GROWN Advertising Launch Features California Avocados

(Editor's Note: Reprint of this article is courtesy of *The Produce News*, who originally included it in their July 21, 2021 newsletter. Images courtesy of CA GROWN.)

California Grown has launched a new advertising campaign, Grown to be Great, to help build affinity and awareness for CA GROWN specialty crops. One of the first crops to be featured in the campaign is California avocados, which are in peak season now. The ads showcase beautiful California avocados on an attention-getting bright green background with the descriptor, "California GROWN Avocados" and the tagline, "because sometimes labels matter."

The multi-layered digital campaign launched July 12 within the Western Region of the United States. Using social channels (Facebook, Instagram, Pinterest), video partners (YouTube, SpotX) and innovative content partners (GDN, AdTheorent, Dot Dash), the advertising is expected to deliver more than 82 million impressions.

Executive Director of the Buy California Marketing Agreement Cherie Watte said, "At California Grown, we believe that everyone has a right to eat the world's best fruits, nuts and vegetables. So, if some people tend to get a bit obsessed about eating and cooking with all our fresh, locally grown ingredients – we really can't blame them. After all, California Grown commodities are grown to be great."

The BCMA intends the campaign to deepen target audience relationships with the CA GROWN brand and will distribute CA GROWN branded assets and content series to engage with users. This campaign puts the crop, in this case California avocados, front and center. The visuals are bold, bright, monochromatic color, paired with witty and pun-driven creative copy.

"Our ads are intended to break through the culinary advertising clutter," said Watte. "To demonstrate our California Grown community's obsession with using the best ingredients, we created a digital series of avocado portraits showcasing the California avocado label, because labels matter."





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Jan DeLyser, vice president marketing of the California Avocado Commission is enthusiastic about the program because it adds a layer of support for California avocados during its peak season and in markets where the fruit has its strongest distribution.

“The Commission is a proud member of the BCMA because its purpose and activities support California grown products and are complementary to our own marketing initiatives,” said DeLyser.

She noted that many of the Commission’s retail partners use the CA GROWN license plate art to call out California avocados’ origin in feature ads and on display, so the addition of BCMA’s digital campaign complements and supports them

as well.

The CA GROWN advertising will be complemented by influencer outreach. For California avocados, popular blogger Teri Turner of @nocrumbyleft created a *Spring Avocado Toast* recipe. Sarah Gim of @thedelicious, shown expressing some California avocado love in the campaign art below, created a recipe for *Strawberry Avocado Salsa*. 🥑





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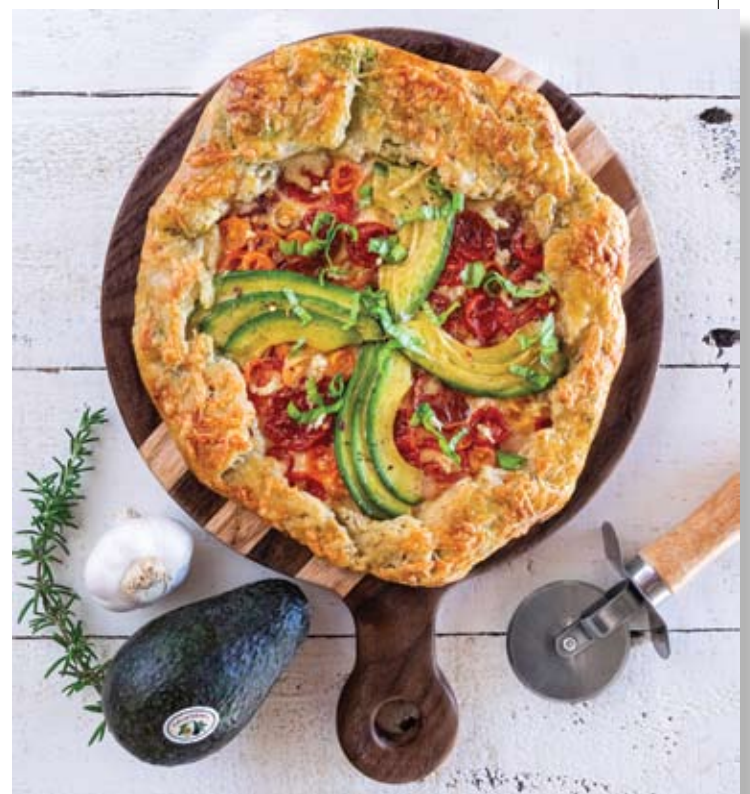
Brand Advocate and Partner Communications Differentiate California Avocados

Recent data shows 72% of the public uses some type of social media, so it's only natural California avocado consumers often search for recipes, meal inspiration, ideas and expertise across social media channels and blogs. Through leveraging third-party partners with significant social followings, the California Avocado Commission is able to expand its reach to more consumers. The Commission strengthens credibility and relationships through partnerships with well-known and trusted influencers, including brand advocates, health and wellness experts and via collaborations with the Produce For Better Health Foundation and Buy California Marketing Agreement (CA GROWN – see article on page 18).

Brand Advocates Continue to Generate Awareness and Educate Consumers

This year, the Commission partnered with third-party brand advocates and influencers who have a high social media and blog following. The results extended audience reach, drove awareness of California avocados and encouraged consumer purchases throughout the season.

From March through June of the 2021 season, the Brand Advocate Program resulted in successful partnerships with six bloggers who highlight health, wellness and food topics on their channels to spark inspiration and amplify awareness amongst existing and potential California avocado consumers. Each Brand Advocate was carefully chosen for their compelling story capabilities, beautiful photography, loyal social media following and existing love of California avocados. These partners educated their followers and generated awareness of the California avocado season by creating intriguing recipes



Adam Merrin and Ryan Alvarez of Husbands That Cook shared their savory Heirloom Tomato and California Avocado Galette recipe.

focusing on a variety of different topics during each of the four months of this year's program.

CAC strategically chose themes for the Brand Advocates that would best serve consumers with easy to make, at-home



Ashley Boyd of Pink Owl Kitchen blended ripe California avocados with frozen and fresh fruit for a refreshing Tropical Avocado Smoothie.

recipes while also challenging the creativity of its partners. For example, the theme for the beginning of California avocado season was “No/Low Waste Meals,” where CAC asked its partners to share a recipe that uses little to no food waste while highlighting California avocados. This theme challenged the Brand Advocates to create a sustainable recipe while positioning the versatility of California avocados. Another theme during the season was “California Coastal Cuisine,” directing partners to share a recipe that resonated with the Golden State and emphasized the benefits of purchasing California avocados. In addition to the blog posts, the photography and subsequent messages were syndicated throughout their respective social channels, including Facebook, Instagram and Pinterest. This messaging provided a call-to-action to look for and purchase California avocados while they are in season and at their peak, showcasing the availability, importance and benefits of purchasing California avocados as well as driving traffic to CAC’s social media channels and website. Throughout the

season, CAC hand selected the best recipes from this program to include on CaliforniaAvocado.com.

With each Brand Advocate sharing their preference for California avocados, they encouraged their followers to look for California on the label when shopping for avocados at their local grocery stores. The Brand Advocate Program earned more than 131 million impressions across blog and social media channels from March through June.

Living Well Brand Advocates Share How They Use California Avocados to Reach Consumers Hungry for More

In recent years, the habits and lifestyles of California avocado consumers have focused on health and wellness. To keep up with these trends and share how California avocados can be a part of a healthy eating plan, CAC also partnered with six Living Well Brand Advocates, including four registered dietitian nutritionists. This group developed six new recipes and several articles for the CAC website, participated in television broadcast interviews and posted rich content on their own social media platforms.

The Living Well Brand Advocates flexed their culinary dietitian creativity from the utilization of popular multicooker appliances to time-saving meal preparation and family-friendly recipes for the everyday consumer. Recognizing that consumers have prioritized foods for boosting their immune system, CAC tapped one of its Living Well Brand Advocates to share how California avocados may contribute to healthy immune function. Several California avocado key messages and USDA-approved nutrition messages were featured throughout the Living Well Brand Advocates’ content and appearances, spreading positive avocado nutrition information to targeted consumers.

Consumers are more interested than ever in their own health and well-being, turning to registered dietitians and health and wellness influencers for their credible knowledge and voice. Tapping into these partners allowed CAC to utilize and build relationships with these health, wellness and lifestyle experts to tell the premium California avocado story and communicate seasonal availability. To keep the fruit top of mind for consumers, the Living Well Brand Advocates Program developed themes to stay on top of the nutrition, food and lifestyle trends that developed throughout the COVID-19 pandemic and continue to be of interest to consumers. The content developed provided useful information and tips, as well as recipes to include California avocados in meals that are nutritious, delicious and easy to prepare.

As a result, the program continued to build awareness for California avocados as a healthy and versatile addition to one’s diet, garnering nearly 3 million impressions from March through August.



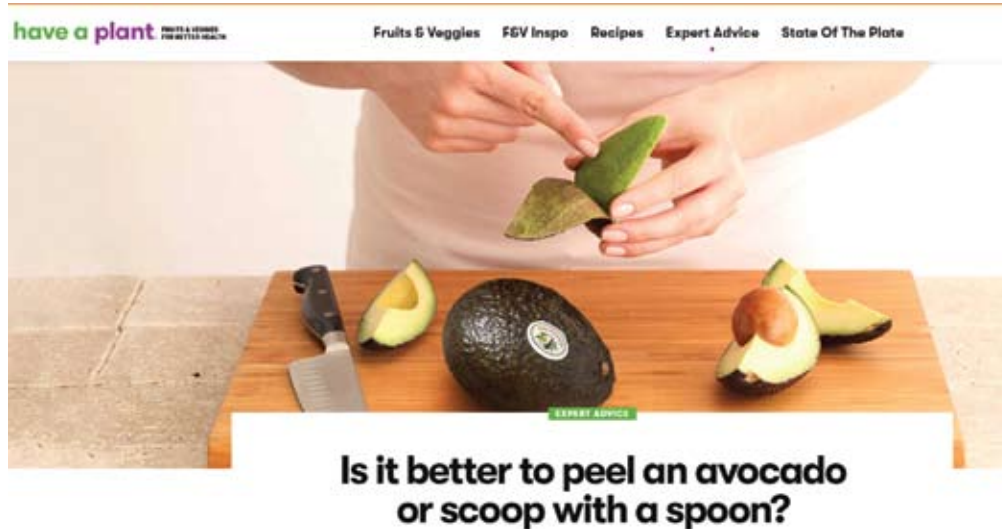
Culinary Expert Patty Mastracco demonstrated her recipe for Crispy California Avocado Potato Tots on KPMH26 FOX TV Great Day Fresno Family Cooking.



Board-certified Holistic Nutritionist Sophie Uliano explored the role of California avocados in boosting your immune system in her website article video and Facebook Live.

To share the California difference message and increase consumer desire for California avocados, CAC partnered with the Produce for Better Health Foundation to share information about what makes premium California avocados unique with their Have A Plant fans. As experts in the industry, the Commission shared knowledge and expertise throughout California Avocado Month in June on the PBH Have A Plant website, newsletter and social media channels.

In the Expert Advice section of the PBH website and social channels, CAC informed website visitors that “It is better to peel an avocado rather than scoop it with a spoon” to ensure receiving all its beneficial nutrients. Utilizing the California Hass avocados results from a 2009 UCLA phytonutrients research study, CAC highlighted the “nick and peel” method and USDA-approved nutrition message that can only be used by California avocados: “In California avocados, the greatest concentration of beneficial nutrients is in the dark green area of the fruit, just below the skin.” This California avocado content was of great interest to the PBH audience, earning a spot in the top 15 performing promotions on Facebook and Instagram and in the top 10 on Twitter. In addition to the website and social media content, this information also was shared in the PBH newsletters.



California avocado expert advice on fruitsandveggies.org.



PBH consumer newsletter banner ad.

As a result of this year's PBH program, CAC garnered more than 226,000 impressions on the website and almost 100,000 impressions through social media, including Instagram, Facebook and Twitter. CAC also shared California avocado messaging in two separate PBH newsletters, both delivered to nearly 54,000 subscribers. 🥑

Proactive Work on the Large Avocado Seed Weevil, *Heilipus Lauri*

Proactive Biocontrol and Integrated Pest Management Programs have been funded by the California Department of Food and Agriculture's Office of Pesticide Consultation and Analysis. These programs have been initiated, in part, as a response to increasing problems invasive pests are causing for California agriculture.

The concept underlying this CDFA program is the identification of potential pests in advance of their anticipated incursion into California. One example of an imminent invasion threat is the spotted lantern fly. This pest is native to China, is well established in the northeastern U.S., is a known pest of grape and nut crops, and has high potential to be moved accidentally into California from the northeastern region. As a response to possible invasion threats, grants have been issued to develop proactive biocontrol and IPM programs in advance of the establishment of potential new invasive species in California. The idea is to have natural enemies prescreened and approved for release and IPM programs developed for rapid roll out should invasive pest populations be detected in California and determined unfeasible for eradication.

This proactive approach runs counter to the typical response to pest invasions, which tends to be reactive,

management plans are developed after the pest has invaded and established. Often, it takes several years to develop these programs and during this period the pest population is building, spreading, and causing economic or environmental damage. Proactive management may be able to reduce significantly time lost during management program development which, in turn, could reduce the negative impacts resulting from the invasion event. Consequently, these proactive programs can be viewed as insurance policies, you hope you don't need to use them, but they are really helpful to have in place should you require it.

The avocado industry in California has been supportive of this proactive management approach. Grower funded research resulted in the identification of the sex pheromone of a highly destructive pest, the avocado seed moth, *Stenomma catenifer*. This pheromone is used widely in parts of Mexico from where fruit are exported to California. Further, U.S. Department of Agriculture - Animal and Plant Health Inspection Service is now requiring the use of the pheromone for monitoring orchards in other countries (e.g., Ecuador) where this pest is native and from which fruit are exported to California. Additionally, the natural enemy fauna, especially

larval and pupal parasitoids attacking *S. catenifer*, were extensively studied in Guatemala and Peru, two other countries where this pest is native. This information may be very valuable for bio-



Heilipus lauri, the large avocado seed weevil.

control programs in California should they be needed.

One insect pest that was identified as a potential invasion threat to California avocado growers was the large avocado seed weevil, *Heilipus lauri*. This avocado pest is native to parts of Mexico and Central America. Around 60% of Hass fruit have been reported as being damaged by *H. lauri* in unmanaged orchards in Morelos, Mexico. It is particularly destructive in Colombia, South America, where it may have been accidentally introduced inside of seeds imported from Mexico for germination and use as root stocks. Damage levels to fruit in heavily managed Hass orchards



Feeding damage to a Hass avocado caused by a *Heilipus lauri* larva.

in Colombia can reach ~4-8%.

Female weevils use their long snout or rostrum to drill holes into fruit. Females lay eggs in these holes and weevil larvae that hatch from eggs burrow through the avocado pulp to feed on the seed. This feeding damage results in unmarketable fruit. Because weevil larvae are protected within fruit this life stage is difficult to control with insecticides.

With support from the CDFAs program and the California Avocado Commission a three-year project has been undertaken to proactively develop management tools for *H. lauri*. The goals of this project are to: (1) Identify the aggregation pheromone used by these weevils to recruit male and female weevils to feeding and mating sites. Identification of a pheromone that is efficacious would be a very powerful tool for monitoring incursions into California and for use in certifying Hass avocado orchards in Mexico and Colombia, for example, as being weevil free. The pheromone also may be useful as a pest management tool and could be used for mating confusion or in mass trapping programs. (2) Identify natural enemies, especially parasitoids, associated with eggs, larvae, and pupae. If discovered,

these natural enemies may be useful for future biocontrol programs targeting this pest in California should it be necessary. (3) Aspects of the basic biology of this pest also are being investigated. These include flight mill studies to determine how far weevils can fly, their preferences for fruit of different avocado varieties, and effects of seed sizes on weevil development.

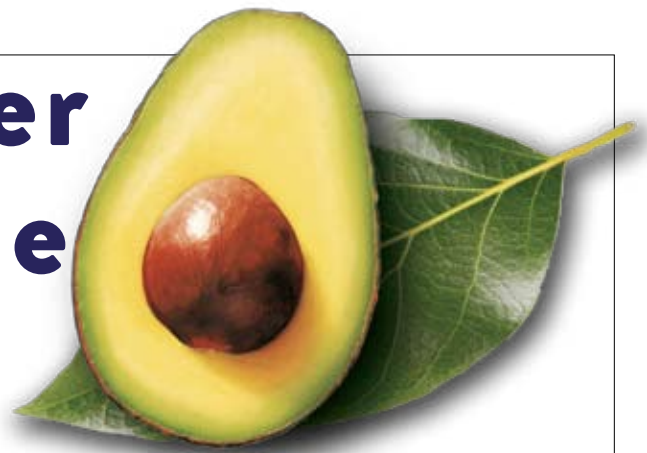
Field work in Mexico is being done in collaboration with colleagues from the Colegio de Posgraduados, Posgrado en Fitosanidad, Entomología y Acarología, in Texcoco near Mexico City. One field survey was successfully conducted in February 2020 and resulted in the collection of infested Hass avocado seeds. These infested seeds were moved under USDA-APHIS permits back to the quarantine facility at UC Riverside where weevils have been used for experiments (e.g., pheromone isolation and identification and flight mill studies).

As results from this project on the large avocado seed weevil come to hand, they will be shared with avocado growers in California. Please stay tuned, there will be more to come in future issues of *From the Grove*. 🥑



Oviposition holes drilled into Hass fruit by female *Heilipus lauri*.

Grower Profile



GEM Offers Bright Future

By Tim Linden

When Robert Jackson was a teenager in Fallbrook, CA, his father gave him a summer project to plant and irrigate avocados on an eight-acre parcel of land that the elder Jackson owned.

“I had no idea what I was doing,” said Jackson as he looked back on the 1972 effort. “We don’t own that land anymore, but the trees survived; they did pretty well.”

It was that experience that led Jackson to get back in the avocado business about a decade ago. “It’s in my blood,” he noted.

In between that first experience and his foray back into avocados, Jackson has lived a full life. “I grew up in Fallbrook and went to Fallbrook High School,” he stated. “My father, who was a neurosurgeon (Dr. Fred Jackson), was involved in planting avocados in the late 1960s and early ‘70s. My father owned two avocado groves here in the Fallbrook area. The first was at our 10-acre home in the Morro Hills area of Fallbrook where he planted one of the first Reed avocado orchards in the area. Later, he planted approximately 23 acres surrounding the Fallbrook Air Park, which he named ‘Aero Avocados.’”

But the younger Jackson did not follow his father’s footsteps into the medical field or agriculture. “I went to Berkeley (University of California) and studied biochemistry in both college and grad school.”

Jackson eventually realized that a biochemistry career was not to his liking. He switched professions graduating from the Pepperdine University School of Law in 1982. After a short stint at a large firm in Orange County, Jackson came back to North County and opened his own firm, the Law Offices of Robert W. Jackson. He still works full time in the law pro-



fession with offices in Fallbrook and Cardiff. Handling serious personal injury claims on behalf of injured victims involving spinal injury and brain injury claims is his niche. In recent years, Jackson has handled a lot of cases representing victims of wildfires against the utility companies and other government entities that have been deemed responsible for many of these fires. He noted he has been one of the lead plaintiff attorneys on some of the larger wildfire cases that have arisen over the past few years.

It was about a decade ago that he bought his first grove and has been adding acreage in the Fallbrook area ever since. Today he has about 230 acres of avocados under cultivation in multiple groves and another recently purchased 90 acres that will soon be planted with avocado trees. Jackson also owns two lemon ranches with a total of about 70 acres of trees. He manages his seven avocado and lemon groves under Jackson Ranch LLC.

His decade of acquisitions points to an optimistic view of



Ranch owner Robert Jackson with grove manager Jaime Serrato.



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Two-year-old GEM trees on Dusa root stock at Ridge Creek. The trees at the top of the photograph are 5- to 6-year-old Hass trees that have been treated with gibberilic acid to increase yield.

the future of avocado production in the North County and attorney Jackson pleads guilty to that offense. His optimism is rooted in a number of factors, including an extremely knowledgeable grove manager, careful attention to the water situation in each grove and a strong belief in high density plantings of the GEM variety.

“The best decision I made (in regards to avocado production) is hiring Jaime Serrato as my grove manager,” Jackson said. “I believe he is the best grove manager in the business.”

Under his company name Serrato Grove Management, the longtime North County resident and agriculturalist manages about 2,000 acres of fruit for a handful of growers. Serrato grew up in the area, started working in groves at a young age and made it a career after going to community college for a few years and getting married. Like Jackson, Serrato is bullish on the GEM variety.

“We are now having extreme heat conditions every year and longer summers,” Serrato said. “The GEM variety withstands the heat much better than Hass. I’m pretty excited about the GEM.”

The veteran grove manager explained that GEM trees carry their fruit on the interior of the tree, which offers protection against both heat and wind.

Jackson noted this allows the GEM fruit to yield a fine crop even when the environmental conditions are not optimum. Add to that the high-density plantings that the Jackson/Ser-

rato team has championed and you have a winning combination.

Serrato believes the best example is a relatively new Jackson-owned grove of 50 acres. “We used 10 by 12 (foot) spacing with 375 trees per acre.”

The grove is only in its very early stages with trees one to four years old, but Serrato expects it to yield on the high end of the spectrum. In looking at the early results and surveying other similar groves, he is estimating the ranch will yield 15,000 to 25,000 pounds per acre annually over a 10-year period. He said production this past season has proven to be much better than on similarly planted Hass groves. He also likes both the GEM and the Reed varieties because they tend to produce larger fruit, with 48s and larger being at the peak of the sizing curve.

Jackson stated that thus far, his groves have yielded between 10,000 and 16,000 pounds per acre on average. He has Reed and Hass varieties, along with his newly planted GEMs.

As he was initially looking to purchase a grove a decade ago, Jackson recalled that he went into the project with a clear understanding that “water is king.” He has only purchased groves with a good water source and has made substantial investments in well drilling. As such, he has kept his cost per acre to a level that has convinced him that production in North County can be very profitable. “If you are off the (water) grid, the break-even point is about 6,000 pounds per acre. If you

are using district water, you need to average about 10,000 pounds per acre,” he said.

While the 10,000-pound figure might seem daunting, Jackson believes it is achievable with the GEM variety. “GEM really is the future of the avocado industry in California,” he said. “It’s a great eating piece of fruit, it’s conducive to high density and it yields very well.”

But Jackson again praised Serrato for the work he has done managing all of his groves. “Our best Hass groves are giving us 15,000 to 20,000 pounds per acre.”

Serrato contends that one of the keys has been his use of gibberellic acid, which is a growth regulator. He said it has worked very well on citrus trees, so he decided to try it on avocados and has gotten equally great results.

Jackson noted the work avocado researchers at the University of California Riverside have done with gibberellic acid that has developed the perfect application protocol. “We’re advocates of gibberellic acid, which really can increase yields,” he said. “But you have to apply it at the right time. There is only about a two-week window when the avocados are at the cauliflower stage. If you miss that window, you are not going to get good results.”

The 2021 season has proven to be a good year, according to Serrato, and he is expecting an even better one in 2022. While it is very early to predict, he said Jackson’s groves should average more than the 12,000 pounds per acre they returned this season.

The owner noted the 2022 crop is not expected to be a huge crop overall and one of the keys to profitability will be the opening grove price set by the packing houses. “There will be no need to set a low price,” he argues. “We have been working with a couple of packing houses that did a very good job for us this year.”

In terms of buying avocado acreage, Jackson said there are still good groves for sale at reasonable prices. He did note that 35 years ago the I-15 corridor that runs through North County was properly dubbed the “Avocado Highway” because there were groves on both sides of it for miles at a stretch. “That’s no longer the case,” he said. “Most of the avocados are gone; they’ve been pushed out by development. But there is still a niche for avocado growers. You have to be smarter, more adept and willing to change.”

Jackson is married to Lucy Jackson and has two sons, Robert and Justin. 🥑

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New Findings on Botryosphaeria Branch Canker and Dieback of Avocados in California

Botryosphaeria branch canker and dieback of avocado (*Persea americana* Mill.), commonly referred to as Avocado Branch Canker, and formerly known as Dothiorella canker, is a fungal disease that currently represents a threat for avocado production worldwide because of the important economic losses resulting from reduced yield of affected trees and their premature death.

Over the past several years, avocado growers, private consultants, and extension specialists have all noted that ABC is increasingly common in avocado growing areas of California. A statewide survey of mature avocado orchards, conducted more than 10 years ago, showed widespread occurrence of ABC disease in avocado producing counties of California. Furthermore, advances in molecular techniques allowed for more in-depth investigation of the pathogens, revealing a diversity of fungal species within the Botryosphaeriaceae family as the causal agents of this disease.

These pathogens can survive as parasites or saprophytes, but many are latent pathogens of woody shrubs and trees that may live undetected in an asymptomatic host until stressful conditions weaken the host and symptoms are expressed. By definition, a latent



Fig. 1. Symptoms of Avocado Branch Canker on Hass: (left) wood discoloration and canker and (right) shoot dieback symptoms.

infection involves a parasitic relationship of the pathogen and the host that eventually induces macroscopic symptoms. Moisture stress (drought), as experienced in California in recent years, is associated with an increase in *Botryosphaeria* infection and canker expansion. These fungi overwinter as pycnidia (small dark ‘pimple-like’ structures) on the surface of diseased wood under the bark. Following hydration during the rainy season, pycnidia release asexual conidia (spores) that are spread by rain splash and wind, disseminating the fungi from tree to tree, and from one part of the tree to another.

Although these fungi can infect a wide range of woody plants through lenticels, ABC mainly develops when

conidia land on freshly cut or damaged wood from fresh pruning wounds and other mechanical tools or sunburn damage. The conidia germinate and invade the woody tissue via xylem vessels and damage the vascular system. Cankers form around the initial infection point. Symptomatic branch cankers exhibit necrotic, friable bark, red-brown cankers and branch dieback associated with characteristic whitish exudate of perseitol, while internally the wood becomes reddish brown (**Figure 1**). Rarely, these fungi also form flask-shaped sexual fruiting bodies (pseudothecia) — almost always intermingled with the pycnidia on the outside of cankers — producing sexual fungal spores (ascospores) disseminated by wind and

rain splash to infect the plant via fresh pruning wounds.

Once inside the plant, *Botryosphaeria* are very difficult to control. The absence of registered fungicides against ABC is a serious concern for the California avocado industry. Following a 2018 meeting with the California Avocado Commission, our plant pathology group at the University of California, Kearney Agricultural Research and Extension Center (Parlier, CA), received funding from the Commission to learn more about the prevalence of *Botryosphaeria* species in California avocado groves and their pathogenic life and disease cycles in relation to the avocado phenological stages, cultivar susceptibility, and prevailing weather conditions.

During an initial survey in 2017, in addition to *Botryosphaeria*, *Colletotrichum* fungi of the Glomerellaceae family also were recovered in the cankered tissues, but to a lesser degree. The presence of *Colletotrichum* fungi raised the question of whether or not they also play a role in avocado canker formation or simply colonize avocado wood tissues as saprophytes. Historically, one *Colletotrichum* species, namely *C. gloeosporioides*, has been known to occur on avocado and other tropical fruits crops. It is typically a postharvest pathogen that causes avocado fruit rotting, but it also occurs in orchards, both as causal agent of anthracnose on leaves and fruits and of latent infections.

The overall goal of this research is to gain further insights on the etiology and epidemiology of ABC and anthracnose, which are critical to developing and providing disease management recommendations for the industry. Specific objectives during the first year of research were to: 1) determine the extent of ABC and anthracnose problems in avocado groves, the occurrence of latent infections, and sources of in-

Table 1. Sampled avocado orchards in counties of production in California.

County	City	Number of orchards sampled	Avocado cv ¹	Date of sampling
Ventura	Santa Paula	4	Hass	November 2018
	Pomona	1	Hass	November 2018
	Fillmore	1	Hass	November 2018
	Fillmore	1	Citrus	November 2018
San Diego	Bonsall	1	Lamb Hass	November 2018
	Bonsall	1	Hass	November 2018
	Valley Center	2	Hass	November 2018
	Pauma Valley	1	Lamb Hass	November 2018
	Pauma Valley	1	Hass	November 2018
	Fallbrook	1	Hass	November 2018
Riverside	Riverside	4	Hass	November 2018
San Luis Obispo	Morro Bay	1	Hass	November 2018
	Morro Bay	1		April 2019
	San Luis Obispo	1	Hass	November 2018
Tulare	Exeter	1	Hass	November 2018, April 2019
			Gem	
			Carmen	
			Unreleased avocado cultivars	

¹ Samples collected in November 2018 and April 2019 include symptomatic and asymptomatic twigs, branches with or without sunburn damage, symptomatic or asymptomatic leaves, peduncles, petioles, mummies, and fruits.

oculum in mature avocado groves; 2) identify the most aggressive species of fungi; 3) study the life cycle and disease cycle of these fungi in avocado groves; 4) determine when and how avocado shoots are infected; 5) determine what factors influence disease expression; and 6) determine whether infections remain latent (dormant) but later cause disease symptom expression.

Survey of old mature avocado groves, plating of sampled avocado tissues, and pathogen isolation and incidence

Field surveys were conducted in the fall of 2018 and spring of 2019 in 22 commercial and experimental groves located throughout California avocado growing regions. Orchards were located and surveyed in collaboration with a UC horticulture specialist, UC Cooperative Extension advisors, and pest control advisers in San Diego, Riverside, Ventura, and San Luis Obispo (Table 1). The orchards varied in age and consisted of

the Hass and Lamb Hass. Samples from GEM and other unreleased cultivars were sampled from an experimental orchard at the UC Lindcove Research and Extension Center (REC) in Tulare County (Table 1). Infected wood tissues (necrotic, cankered, or dead branches / twigs) with or without sunburn damages and other symptomatic and symptomless avocado organs (twigs, leaves, fruits) were collected from trees showing characteristic dieback symptoms.

Isolations were performed on acidified potato medium by plating sections of necrotic and green, healthy tissue (Figure 2). Growing fungal isolates subsequently were identified at the genus level based on colony and conidial morphology. The incidence of *Botryosphaeria* and *Colletotrichum* and other recovered fungi were then determined.

Analyses of pathogen incidence data from the surveyed orchards, in both sampling years, showed that *Botryosphaeriaceae* causing ABC were the fungi predominantly associated with

the cankered branches (Tables 2 and 3). These fungi were present in every sampled grove and caused symptoms on all surveyed cultivars, including Hass, GEM, and Lamb Hass (Tables 2 and 3). In addition to woody tissue, these fungi also were detected on other avocado organs, including leaves, flowers, fruit stems (peduncles) and young and mature fruits. Moreover, *Botryosphaeria* also were present in symptomless tissues (flowers, twigs, leaves, fruits), thus revealing the presence of latent infections, because isolations are made after a harsh surface sterilization that cleans the host tissue of any propagules of these fungi or other contaminants.



Fig. 2. Isolation of fungi by plating sections of infected avocado tissues on acidified agar medium.

Table 2. Incidence of *Botryosphaeria* in cankered avocado branches collected in 2018 from several avocado orchards in California.

County	Orchards	Cultivar	Branch cankers ^b	Number (%) of cankered branches yielding ^a				
				<i>Botryosphaeria</i>	<i>Colletotrichum</i>	<i>Phomopsis</i>	<i>Alternaria</i>	<i>Fusarium</i>
Riverside	RC1	Hass	192	49	17	0	34	12
	RC2		101	42	1	11	30	22
	RC3		50	26	4	0	56	12
Ventura	PIR	Hass	263	62	18	0	7	9
	G3		104	84	9	0	0	5
	LIM High density		162	21	30	9	4	27
	LIM-O		32	53	44	0	0	0
	DA1		180	50	26	0	12	1
San Diego	West-L	Hass	117	80	11	0	1	8
	ZRT		42	57	17	0	0	10
	Mesa-C		63	29	21	3	14	16
	Starbeam		51	20	6	2	29	39
	NIG		32	6	9	0	16	69
	West-L		94	67	27	0	10	15
	Starbeam		53	76	6	0	8	15
San Luis Obispo	GR1	Hass	38	90	14	0	0	0
GR2	223		82	9	0	1	0	
Tulare	Lindcove Station	Hass	70	1	0	0	36	4
		Gem	10	10	0	0	70	0
		Carmen	30	3	7	0	13	0
			Total=	45	14	1	17	13

^a Branch samples per orchard yielding indicated fungi. Numbers in bold are averages per orchard.

^b Number of cankered branches collected in each orchard.

Table 3. Incidence of *Botryosphaeria* on cankered branches with or without sunburn injury.

County	<i>Botryosphaeria</i> (%) in cankered branches/twigs			
	No sunburn		With severe sunburn	
	Range	Mean	Range	Mean
Riverside	20 - 82	53.4±23.9	20 - 100	71.9±35.8
Ventura	5 - 100	60.2±35.6	20 - 100	65.9±25.5
San Diego	10 - 100	50.4±40.4	27.5 - 100	75.2±23.5
San Luis Obispo	55 - 60	57.5±3.5	20 - 100	77.9±26.2

In other words, these pathogens are ubiquitous and simply looking for a point of entry (i.e., wound) to enter the tree. In fact, an important observation from this survey was that *Botryosphaeria* were recovered at high frequencies from infected twigs or dead tissues that sustained sunburn damage compared to wood tissue with no sunburn injury (Table 4). This type of injury also facilitates pathogen infection and emphasizes the need to protect wood tissue from sunburn.

In contrast to *Botryosphaeria*, *Colletotrichum*, the causal agent of anthracnose, was less common in the cankered tissues of both Hass and Lamb Hass, but along with *Alternaria* saprophytic fungi, they were most frequently isolated from symptomatic leaves (Tables 3 and 5). This result indicates that *Colletotrichum* pathogen(s) may act as secondary invaders of avocado xylem tissues.

Throughout this survey, numerous fruiting structures that produce asexual and sexual spores of *Botryosphaeria* (pycnidia and pseudothecia: (Figure 3) and *Colletotrichum* (acervulli and perithecia) were observed on both living and dead tissues (branches and leaves) from the orchards. This further

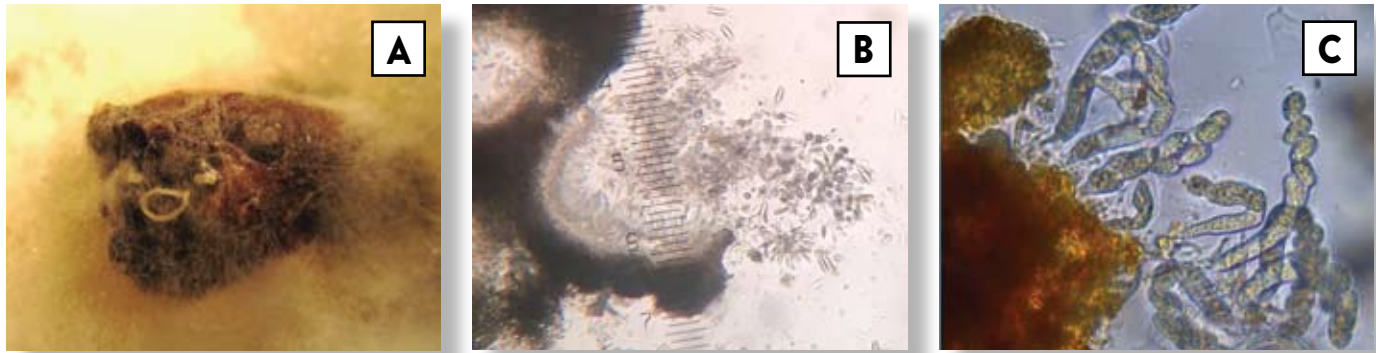


Fig. 3. Oozing pycnidia of *Botryosphaeria* on dead avocado branch (A); Pycnidia releasing spores in rainy conditions (B); and pseudothecia in avocado tissues with windborne ascospores (C).

Table 4. Incidence (%) of *Botryosphaeria* in symptomatic avocado leaves collected in 2018 from several avocado orchards in California.

County	Orchards	Cultivar	Infected leaves ^b	Pathogen incidence (%) ^a				
				<i>Botryosphaeria</i>	<i>Colletotrichum</i>	<i>Phomopsis</i>	<i>Alternaria</i>	<i>Fusarium</i>
Riverside	RC1		53	15	13	2	72	8
	RC2	Hass	23	0	4	0	48	4
	RC3		53	2	17	0	96	0
	PTR		20	0	0	0	80	0
	G3		30	20	23	3	57	0
Ventura	LIM High density	Hass	81	0	19	0	84	3
	LIM-O		11	27	64	9	0	0
	DA1		120	15	32	0	51	1
	West-L		42	41	36	0	14	7
	ZRT	Hass	10	0	0	0	100	0
San Diego	Starbeam	Hass	15	0	0	0	47	53
San Luis Obispo	NIG		41	7	68	0	22	2
	West-L	Lamb	31	23	90	0	29	0
	Starbeam	Hass	30	0	0	0	93	3
San Luis Obispo	GR1	Hass	52	43	66	0	0	0
	GR2		10	0	0	0	100	0
			Total = 622	12	27	1	56	5

^a Leaf samples per orchard yielding indicated fungi. Numbers in bold are averages per orchard.

^b Number of infected leaves collected in each orchard.

Table 5. Incidence (%) of *Botryosphaeria* sp. in symptomatic avocado tissues collected in Spring of 2019 from four avocado orchards located in San Luis Obispo County.

Orchard	Cultivar	Infected tissue sample		Pathogen incidence (%) ^b					
		Type	Number ^a	<i>Botryosphaeria</i>	<i>Colletotrichum</i>	<i>Phomopsis</i>	<i>Alternaria</i>	<i>Fusarium</i>	
GR1	Hass	Leaves	101	19	73	1	11	6	
GR3			50	46	12	4	22	0	
GR4			80	6	76	9	53	1	
GR2			160	22	26	4	28	0	
			Total = 391	23	47	5	29	2	
GR1		Twigs	161	67	24	10	6	3	
GR3			100	85	5	1	2	6	
GR4			50	24	24	14	16	4	
GR2			163	82	7	14	5	9	
			Total = 474	65	15	10	7	6	

^a Number of infected leaves collected in each orchard; numbers in bold are averages per orchard.

^b Tissue samples per orchard yielding indicated fungi.

indicates how these pathogens survive and establish in groves and the difficulty growers will have trying to eliminate these sources of pathogen inocula and infection. Other fungi, including *Fusarium* and *Phomopsis*, also were isolated from the samples, but at lower proportions (Tables 2, 3, and 5).

Identity of the causal pathogens at the species level and impact on avocado cultivars

The use of molecular methods allowed the classification of the isolated pathogens at the species level. Representative isolates of the identified *Botryosphaeria* and *Colletotrichum* genera were selected for maintenance and mycelia were used for DNA extractions. Species identifications were determined by sequencing of specific genomic regions and comparison with established databases. Once the fungal species were identified we wanted to know which ones were more aggressive on avocados. This was first done by assessing the isolates' pathogenicity on healthy, detached green shoots (1-year-old) of Hass and GEM varieties of avocado. Excised shoots were wounded by removing a piece of cambium with a cork-borer and then inoculated by placing agar plugs infested with one isolate of representative fungi onto the wound. Control shoots were inoculated with uninfested agar plugs. Shoots were in-

cubated at room temperature (~75.2°F) and under humid conditions for two weeks. Resulting canker lesion lengths were measured and isolations were made from these shoots to confirm pathogenicity.

Our DNA analyses of the recovered fungi confirmed that common species (about 11 species) of Botryosphaeriaceae are found in avocado groves throughout California. These include species such as *Lasiodiplodia theobromae*, *Botryosphaeria dothidea* and *Neofusicoccum*, with the latter being the most prevalent species throughout the sampled areas. This new information shows that there is no distribution of *Botryosphaeria* according to their geographic origin as reported earlier, but also leads to new questions on how best to manage these pathogens. Our new molecular data showed that avocado anthracnose disease is actually caused by several *Colletotrichum* species within the *C. gloeosporioides* species complex, comprising *C. alienum*, *C. perseae*, *C. siamense*, *C. fructicola* and *C. gloeosporioides*. All of the six selected species of the Botryosphaeriaceae were found to be pathogenic to Hass and GEM avocados, with *Lasiodiplodia* and *N. nonquaesitum* species being the most virulent (aggressive) (Figure 4). Furthermore, inoculations of wounded detached shoots of various unreleased avocado cultivars, grown at the Lindcove REC, showed that they are susceptible to *Botryosphaeria* infection. All of the six species of the Botryosphaeriaceae were also found to be more aggressive than the *Colletotrichum* and *Phomopsis* species (Figure 4). Ultimately, these studies confirm the role of the *Botryosphaeria* pathogens as the primary causal agents of ABC and the role of *Colletotrichum* as secondary invaders of avocado xylem tissues. A possible interaction between the two pathogens remains to be investigated.

Conditions for pathogen infection in avocados

Botryosphaeria infection can quickly lead to cankers with favorable environmental conditions. To explore the effect of temperature on disease expression and development, the effect of various temperatures on the growth of selected pathogens was assessed in controlled laboratory environments. Results from this growth rate assay revealed that the pathogens differed in their ability to grow under different temperature regimes. Pathogen growth rates generally increased from 68 °F to 86 °F, and only *Lasiodiplodia* continued growing above 95 °F (Figure 5). This indicates that the latter could become more predominant in warmer growing regions.

Phenology of infection of ABC and factors influencing disease initiation and development

Field experiments at the Pine Tree Ranch (Santa Paula, CA) were carried out to examine *Botryosphaeria* infection and disease progression on avocado shoots and other attached organs in relation to avocado phenological stages. The influences of wounding and environmental conditions on infection at different times of the year also were assessed. Pathogen inoculum availability on green, symptomless tissue (latent infections) also was monitored after surface-disinfestation. Monthly, artificial inoculations were performed with mycelial plugs of two *Botryosphaeria*

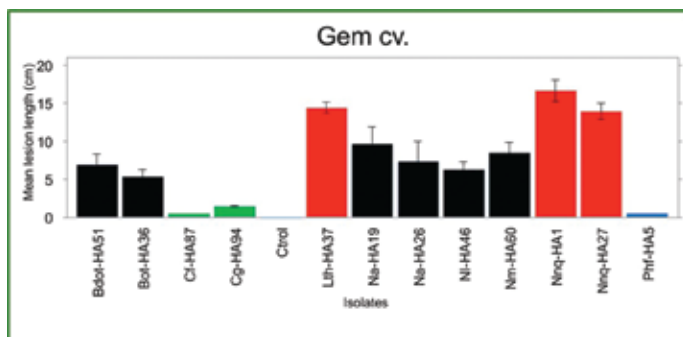


Fig. 4. Canker lesion length (cm) caused by *Botryosphaeria* (black and red bars = most virulent), *Colletotrichum* (green bars) and *Phomopsis* (blue bar) species on detached GEM avocado twigs 2 weeks after inoculation. Vertical bars represent the standard error of the mean ($P = 0.05$).

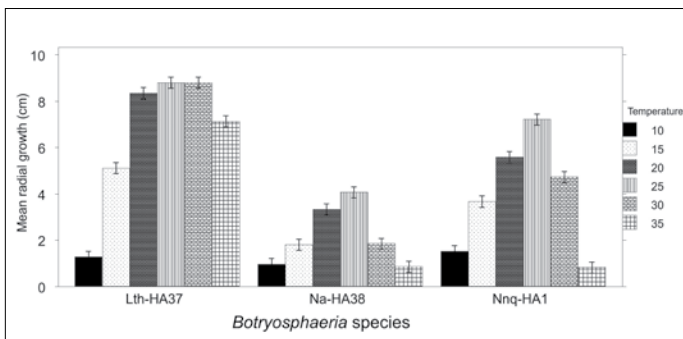


Fig. 5. Effect of temperature on the growth of three *Botryosphaeria* species. Vertical bars represent the standard error of the mean ($P = 0.05$).

pathogens (*L. theobromae* and *Neof. nonquaesitum*) or a conidial suspension (*L. theobromae*). Inoculations with mycelial plugs were done on wounded, healthy green (2019) and lignified (2020) branches of Hass and Lamb Hass cultivars. Inoculations with spore suspensions were done on wounded

contrast, non-wounded tissues did not develop any symptoms but exhibited latent infections. Symptoms occurred on twigs, leaves, and developing fruits when humidity conditions were maintained for a long period by covering the tissues with a plastic bag. The fact that infections occurred mainly on wound-

reduce the chances of successful infections on unwounded tissues.

Effects of water stress on infection

The influence of water and heat stress factors on disease initiation and development by Botryosphaeriaceae on avocado also were determined in lath-house experiments. Initially healthy looking young potted-avocado trees (GEM and Hass on Dusa or Toro Canyon rootstock) were obtained from a commercial nursery and placed near our greenhouse at UC KARE. A set of trees were continually irrigated for about 5 weeks while the other set was not. The non-irrigated trees developed canker and dieback symptoms, apparently through naturally occurring infections, after the applied water stress event, while irrigated plants did not develop any symptoms. Subsequently, pieces of asymptomatic and symptom-

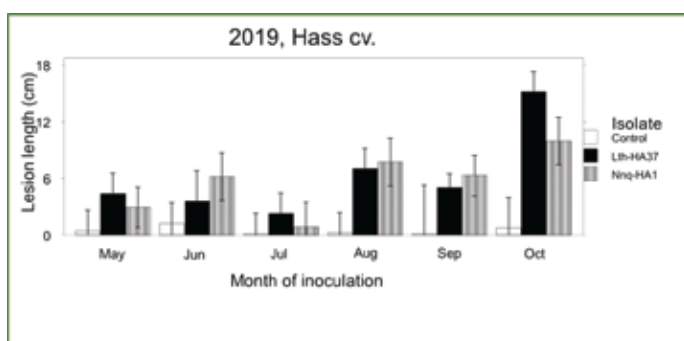


Fig. 6. Canker formation on wounded branches of Hass avocado following inoculation with two *Botryosphaeria* species (*Lth-HA37* and *Nqq-HA1*). Control are branches inoculated with agar plus free of the pathogens. Vertical bars represent the standard error of the mean ($P = 0.05$).

twigs or non-wounded tissues. Canker lesion lengths on green and/or lignified branches were recorded two and four months after inoculations, respectively.

Our monitoring of the weather conditions and occurrence of latent infections in symptomless avocado tissues (natural infections of flowers, twigs, leaves, fruits) showed that the conditions at the Santa Paula site were generally dry. Despite this, *Botryosphaeria* pathogens were detected on avocado tissues collected in the grove, but at a low level. Results from monthly, mycelial plug inoculations on wounded, green and lignified branches showed that both branch types were susceptible to *Botryosphaeria* infections throughout the inoculation and sampling periods and regardless of the avocado phenological stage or ambient air temperature fluctuations (Figure 6). Inoculations with spores resulted in the development of canker lesions on wounded branches. In

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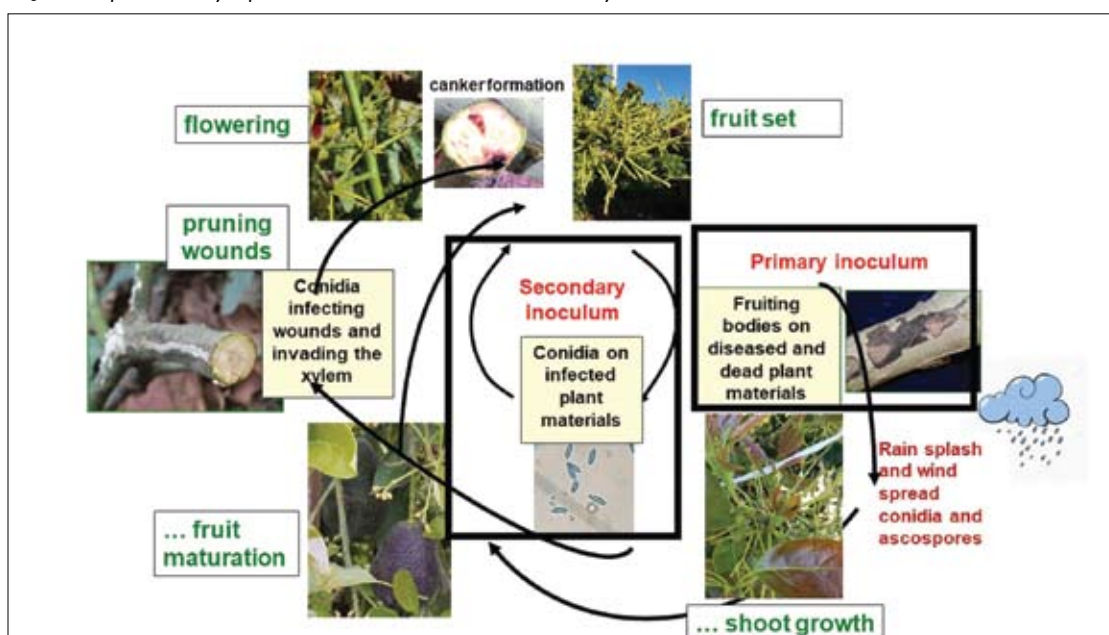
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Fig. 7. Proposed *Botryosphaeria* canker and dieback disease cycle.



atic twigs were plated on acidified agar medium followed by isolations of the associated fungi. Results showed that *Botryosphaeria* fungi could be recovered among other pathogens, indicating that they can exist latently in twig tissues prior to exposure to water stress, which can induce the disease.

The effect of water stress was also assessed in two consecutive summers by exposing a set of potted Hass avocado trees to sunlight and 25% irrigation regime (stressed trees) vs. a set of plants placed under shade and subjected to 100% irrigation regime (control plants). Records of canker lesion sizes from both sets were collected about two months after inoculation with *L. theobromae*. Stressed avocado trees had larger canker lesion sizes compared to the control plants (data not shown).

Conclusions and recommendations

This study shows that:

Botryosphaeria are prevalent in avocado-producing regions of California and are the primary fungal pathogens associated with ABC; it also led to a better understanding of the pathogen

life and disease cycles as illustrated in (Figure 7).

Inoculum is present year-round, and infections can occur throughout the growing season regardless of the phenological stage and ambient temperature, year-round, with wounds being the primary sites of infection.

Adherence to best management practices recommended for the management of canker and dieback pathogens also should be followed for managing ABC in avocado groves. These practices include:

- a) avoid pruning during or immediately after rain, dew or heavy fog;
- b) pruning out dead limbs and twigs that carry the pathogen fruiting structures during dry periods followed by immediate removal of pruning debris from the grove to the extent practical to reduce inoculum levels;
- c) sanitizing pruning equipment;
- d) properly pruning dense canopies to increase air flow and reduce humidity;
- e) reducing tree stress and maintaining trees in good condition through appropriate irrigation and

fertilization practices.

The utilities of various fungicides in protecting pruning wounds against ABC infection and of kaolin-based products in providing a physical barrier against sunburn injuries are under investigation. These chemical and physical approaches may become part of an integrated management strategy against this disease. Additional work was performed during the second year of the project to investigate the prevalence of ABC pathogens in newly established orchards and the significance of nursery inoculum in ABC epidemiology in young trees to gain further insights into controlling these pathogens. 🍌

Acknowledgements

We thank the California Avocado Commission for funding this project. We also thank Tim Spann for his assistance, the avocado growers for extending their kind cooperation and permission to access their farms and collect samples, and Brokaw Nursery for donating the trees used in water stress experiments.

2020-21 Highlights from Retail and Foodservice Chain California Avocado Promotions

By partnering with major retail and foodservice chains to develop unique California avocado promotional campaigns, the California Avocado Commission can help deliver solid returns for growers by helping to secure distribution, broadening brand awareness, creating a sense of urgency among consumers to enjoy the fruit during its peak season and expanding usage of the fruit among targeted audiences.

Retailers Urge Consumers to Enjoy California Avocados During Peak Season

This season, across the western U.S. and with targeted customers east of the Mississippi, the Commission worked with retailers on in-store promotional opportunities and integrated social media campaigns to drive awareness of California avocados' availability.

Walmart, which purchases size 60 and smaller California avocados, ran an on- and off-site California avocado media campaign in western units throughout May and June. The campaign showcased a "spotlight video" with influencer overlays during California Avocado Month, expanding awareness of the fruit's seasonal availability. These digital pieces secured 4 – 5 million impressions and helped encourage demand for smaller sized California avocados.

Natural Grocers stores in Arizona, Colorado, Idaho, Montana and Utah featured organic California avocados as part of their June Meal Deal promotion. The all-organic retail chain paired its California avocado advertising promotions with loyalty card offers for shoppers, ensuring customers saw the California avocado creative during peak season. In June, the chain focused on Father's Day with a Meal Deal promotion showcasing fresh California avocados as the perfect "upgrade" to hamburgers grilled at home. The sales results were impressive for a first-time promotion with a 21% lift in sales (6,500 cases over the previous year) for the locally grown fruit.

The Fresh Market features all sizes of California avocados – including both conventionally and organically grown fruit. As part of its merchandising and promotions, The Fresh Market created a magazine insertion showcasing the Golden State fruit and distributed it in-store and via mailer. More than 1 million magazines with the insertion were distributed, helping

broaden awareness of California avocado distribution at this east-of-the-Mississippi retailer.

Highlights from the latter portion of the season are as follows. In July, CHEF'STORE locations promoted both bulk and bagged California avocado products with two ads and featured the fruit in advertising flyers and as the centerpiece of an in-store sales contest. The Commission hosted additional sales contests throughout July and August at Albertsons/Vons/Pavilions, Bristol Farms and Gelson's units. Save Mart, including Lucky and Food Maxx, also participated in a CAC sales contest and supplemented their promotions with social media posts, a Summer Blast co-promotional opportunity with the California Milk Advisory Board Campaign and a digital billboard ad using the California campaign ad near a new Lucky California store that was opening in Pleasanton. Additional California campaigns pairing the fruit with Hatch chiles took place at Gelson's, Mollie Stone's and Save Mart.

California avocados were featured as the Dietitian's Pick of the Month for July at Hy-Vee units. To expand usage of the Golden State fruit, Kroger ran a California avocado promotion featuring a unique recipe ebook and showcased the Commission's *Avocado and Egg Breakfast Muffins* recipe. Nugget



CHEF'STORE's bagged California avocado ad ran in in July.



Save Mart locations took part in CAC's in-store display sales contest.

Markets conducted a California Avocado Blitz through the latter portion of the summer while Stater Bros. ran Summer Grill and Chill promotions and Sprouts highlighted the fruit as part of its California in-store campaign. Raley's featured fresh California avocados as part and parcel of their Summer Promotion and Safeway NorCal made a California-focused merchandising push and ran summer ad features. New Seasons conducted a focused push with a digital flyer showcasing the availability of California avocados and PCC Community Markets held a member event promotion to show how California avocados are perfect for all manner of summer occasions.

The Commission also helped targeted retailers align California avocado promotional activities taking place at their stores with coordinated social media programs. CAC planned, developed and implemented a variety of multi-platform social media programs unique to each targeted retailer that could be shared on the retailer's various digital and social platforms. In addition, the Commission crafted complimentary social and digital advertisements for these key accounts. These assets were then shared on the Commission's social platforms (Facebook, Instagram and Twitter) to promote the availability of the fruit at the retail partners' locations. The promoted posts also were linked to the "store locator" available on the CaliforniaAvocado.com website to ensure consumers could easily

find avocados at a retail store closest to them.

Social media support was provided to a wide range of the Commission's retail partners. To support CAC's "First of Season" promotion, Gelson's created and posted a social media campaign featuring a *California Avocado Steak Sandwich* recipe created by CAC Living Well Brand Advocate Manuel Villacorta. During Cinco de Mayo, Mollie Stone's created a social media campaign for their Instagram and Facebook platforms, as well as the Mollie Stone's blog. Each of the posts featured CAC's *Three-Way California AvoTacos* with a mouth-watering photo of the recipe. Raley's kicked off California Avocado Month by sharing a California avocado beauty image and copy provided by the Commission on their Instagram channel. Stater Bros. Markets featured the *California Avocado Hatch Chile Grilled Cheese* recipe on their Facebook page as part of their Summer Grill and Chill promotion.



Stater Bros. Markets shared this California Avocado Hatch Chile Grilled Cheese recipe on its Facebook page.

By providing retailers with social media support the Commission was able to promote availability of the fruit, and drive consumers to retail partner stores. CAC also leveraged the communications power of third-party advocates who shared key California avocado messaging, recipes, usage and versatility ideas across their websites, newsletters and social media channels. The social media activities, which kicked off in March and continued throughout the season, have garnered 4.1 million impressions thus far.

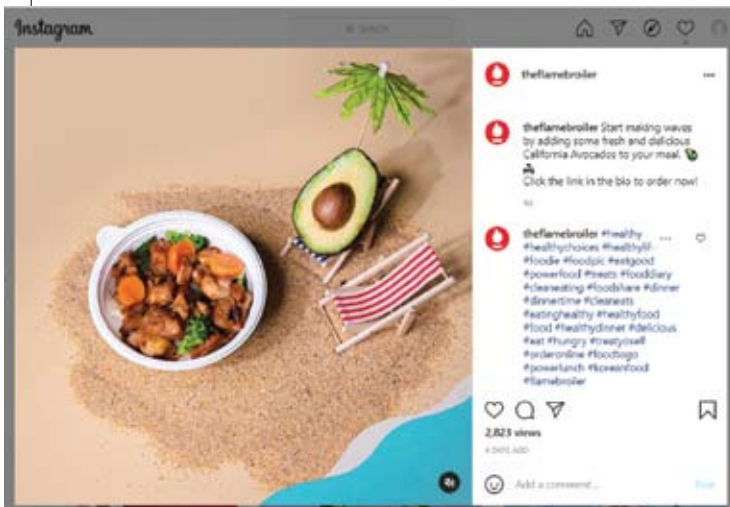
Foodservice Chain Promotions Highlight Versatility of Locally Grown California Avocados

California avocado menu items that appeal to a wide range of dietary lifestyles have been featured in a variety of foodservice chain promotions this season. These programs help build awareness of the fruit’s seasonality and versatility. The unique menu items also encourage demand for the fruit in meals away from home and pique consumer interest in preparing California avocado-inspired dishes at home — ultimately encouraging sales of the fruit.

units of Tustin-based Wahoo’s Fish Taco chain featured *Sunset Chicken Salad*, *Ceviche* and any bowl, entrée or burrito “Kahuna Style” with freshly made California avocado guacamole. From May 30 – July 3, the Seattle-based Nordstrom Restaurant Group featured *Avocado Toast*, *Avocado Shakes* and *Avocado Quinoa Salad* across all of its Western U.S. locations. Mixt, a San Francisco-based chain, ran a Celebrate California Avocado promotion at its 16 units from June 15 – September 1.

Santa Ana-based chain Flame Broiler ran a California avocado upsell promotion from July 1 – August 15 at 160 units located in Arizona and California. Throughout the month of July 238 units of Irvine-based Habit Burger in Arizona, California and Nevada showcased their *Santa Barbara Char Burger* promotion featuring California avocados. Forty-one Jimboy’s Tacos units in California and Nevada featured a wide range of California avocado dishes including *Guacamole and Chips*, *Stuffed Quesadillas*, *Taquito-MG*, *Avocado Salad*, and *Taco Salad* beginning July 1 and ending mid-August. Carlsbad-based Rubio’s featured the Golden State fruit on its menu at 160 units in Arizona, California and Nevada throughout the entire month of July. During the latter portion of July and early August, Ike’s Love and Sandwiches, which is based out of San Francisco, featured fresh slices of California avocados on its *Hunter Pence Sandwich* in 69 units also located in Arizona, California and Nevada.

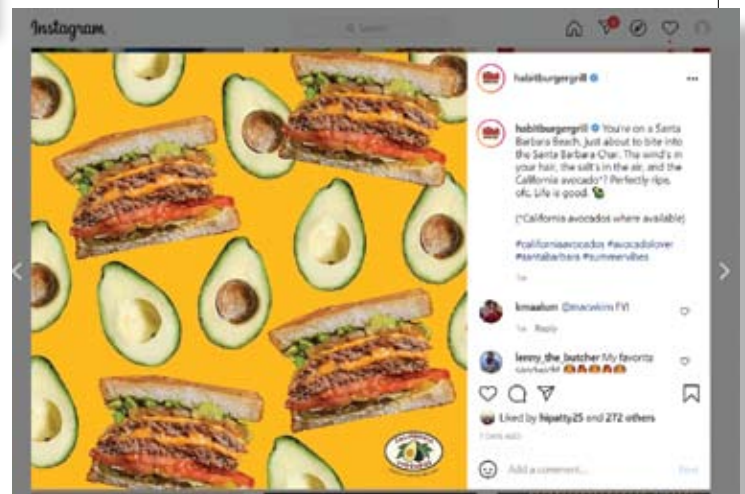
Partner retail and foodservice chain California avocado promotions reached consumers no matter where they were — on the street, in the car, at home, in the store or dining out — during the height of California avocado season. Coordinating and integrating on-site, digital and social media promotional activities provides the Commission with extensive opportunities to showcase what makes California avocados unique, the myriad ways they can be enjoyed and how the fruit is part of the iconic California lifestyle. 🥑



Flame Broiler’s Instagram called out the availability of California avocados.

This year 20 Southern California NORM’s restaurant units celebrated the California avocado season by proudly announcing to their diners that fresh California avocados were on the menu. From May 15 – July 1, patrons of the Southern California-based diner-style restaurant chain could add a quarter wedge of fresh California avocados to any dish for 99 cents. As part of the six-week promotion, the California Avocados brand logo appeared on NORM’s main website page in the rotational photo gallery. In addition, the chain promoted its California avocado offer with posts across its social media channels and in its newsletter.

Beginning May 15 and running through July 31, the 43

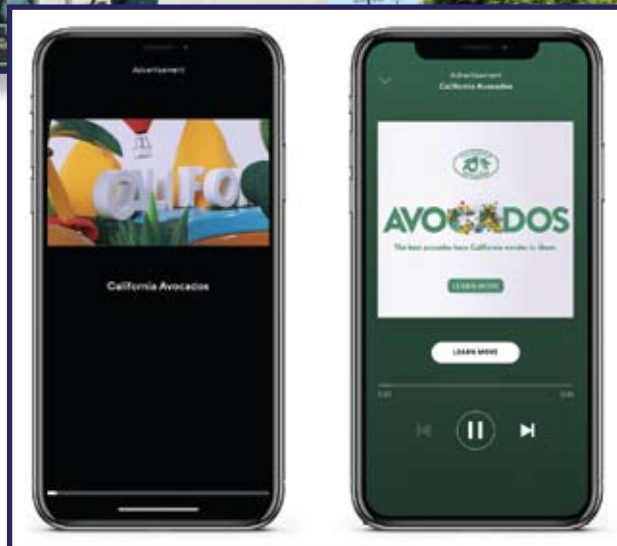


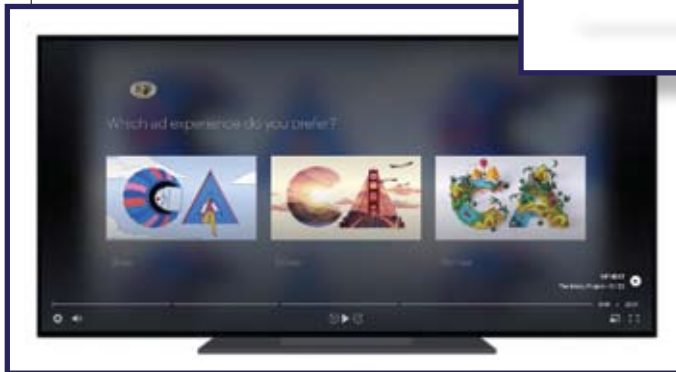
On its Instagram Habit Burger encouraged diners to enjoy its Santa Barbara Char Burger with fresh California avocados.

California Avocado Consumer Advertising Highlights

In 2021 the California avocado consumer advertising campaign, “The best avocados have California in them” utilized a wide variety of creative executions that were very well received by targeted consumers. To assess the campaign comprehension and evaluate the creative video assets, a key component of the ad program, the Califor-

nia Avocado Commission used the services of Instapanel with a study that blended quantitative and qualitative research. Overall, study panelists had very positive reactions to the campaign. After exposure to the videos, those who indicated California avocados are different from avocados of other growing regions increased 14 points to 81%. Those who said they were more likely to pay a premium for California avocados increased 18 points to 87%. To reach targeted consumers this California avocado season the Commission used the advertising campaign in a new mix of traditional and digital media as well as brand collaborations. Examples of some of these ads are shown in this article. 🥑





By *Ken Melban*
Vice President of Industry Affairs

CAC Launches Sustainability Webpage

The term sustainability has become prevalent over the last few years, with catchphrases like “Go Green” and “Reduce, Reuse, Recycle.” At the core, sustainability is focused on meeting the needs of the present without compromising the ability of future generations to meet their needs.

As the dialogue surrounding sustainability — and specifically, attention to sustainability practices in farming — has increased, the California Avocado Commission has worked to identify our industry’s sustainability practices. In doing so, our industry will be better prepared to respond to increasing inquiries from buyers (retailers and foodservice operators) concerning California’s sustainability practices such as child labor use, fertilizer application, greenhouse gas emissions, and labor rights, to name a few. CAC led studies to identify the hundreds of laws California avocado growers must comply with in areas such as worker health, wages, safety, and environmental protections. In early 2020, CAC also conducted two sustainability listening sessions with growers.

Ultimately, based on these efforts, we determined it was time to begin to tell the California avocado industry’s sustainability story. To showcase California avocado growers’ sustainability practices CAC has launched a webpage (californiaavocado.com/avocado101/california-avocado-sustainability/) on CAC’s consumer website, CaliforniaAvocado.com. The “California Avocado



cado Sustainability” page, which can be located under the “Avocado 101” tab, provides website visitors information about the four pillars of California avocado sustainability: 1) Environmentally Friendly Farming; 2) Worker Well-Being; 3) Healthy Communities; and 4) Economic Viability.

How do we define sustainability in California avocado production? Well, we believe a sustainable California avocado production industry uses environmentally friendly farming practices, ensures worker well-being, contributes to healthy communities, and maintains economic viability.

We know California avocado growers are good stewards of the land and contributing members of their communities. The webpage explains that California avocado growers:

- Farm in compliance with robust federal and state requirements
- Follow Good Agricultural Practices and the Food Safety Modernization Act
- Do not use tilling in California avocado production
- Help generate healthy soils

through regenerative agriculture practices

In the worker well-being section, the Commission highlights several California laws and regulations that set the state apart both from other states and other countries, showcasing that workers in the California avocado industry are treated well. The healthy communities section features both the environmental benefits of having avocado groves in a community as well as the contributions of California growers who participate in making their communities better.

Economic viability also is a key part of sustainability. Clearly, if California avocado growers can’t survive financially then the business cannot be sustained. This pillar of the sustainability initiative shines a spotlight on the economic value of the California avocado industry and encourages purchasers to support their communities and choose locally grown produce when available.

One of the best ways to communicate sustainability information and make it more relatable to key purchasers is by sharing California avocado grower stories. We encourage you to take a look at the sustainability webpages, and if you have a story you would be willing to share about your environmentally friendly growing practices, the well-being of your employees or your involvement in your community, please send me an email at kmelban@avocado.org. 🍷

California Avocado Commission Marketing Research and Data Utilization

The California Avocado Commission and its agencies utilize a wide variety of research, data and tracking tools to monitor marketing performance and to aid in decision making. As referenced on Page 4 of the Message from the President, the following pages highlight many of these tools. The chart is organized by those tools used to validate marketing efforts, research and data that informs marketing decisions on a regular basis as well as studies and tools used infrequently or only as needed for special projects.

Methods/Data/Reports	Validating Marketing Efforts
UC Davis – CAC Program Review	UC Davis – Ag Economic/Program Effectiveness Review (every 5 years)
California Avocado Tracking Study	Large sample quantitative research of consumer awareness, attitudes and perceptions about avocados; compares California avocados to avocados of other origins and has data for California, regions and the total U.S. Usually conducted annually because it provides data for business plan KPIs
IRI Retail Scan Data	Retail scanner-based sales data for avocados used on a regular basis and for ad hoc reporting by key retailer; used to showcase performance highlights and identify opportunities
Tiered Account Report	Using retail scanner-based sales data, AMRIC FOB data and observations from CAC Retail Marketing Directors and handlers, this report identifies those accounts most likely to deliver better returns for California avocado growers. These are the key targets for distribution and for California avocado marketing support. Analysis performed annually
Advertising Creative Analysis (Instapanel)	The objective for this research is to gather a blend of quantitative and qualitative feedback from avocado consumers to better understand the resonance of creative video concepts as well as impact on perception and shifts in intended behavior. In 2021 testing included the :06, :15 and :30 second video spots; the learnings from this research will help optimize development of creative and inspire new creative for the next campaign iteration
Advertising Media Evaluation (Used for both planning and validating marketing efforts)	<ul style="list-style-type: none"> • Nielsen MRI – audience insights, demographics, media usage, psychographics • Mediahub Scout – consumer attitudes, media usage, technology habits • SRDS – general media information • eMarketer – digital marketing insights & trends • Comscore – digital planning tool • Google Trends – general industry trends • Media campaign insertion order & billing: <ul style="list-style-type: none"> ○ Mediaocean Prisma ○ Mediaocean MBOX • Media verification and ad serving: <ul style="list-style-type: none"> ○ Google Double Click Manager (DCM) – digital ad server and performance tracker ○ MailChimp: This is the service we use to send out our CAC monthly newsletter emails, it also has tools that we use to analyze data like email open rates. ○ Integral Ad Science – brand safety tools that track geo, fraud, viewability, etc. • Media competitive: <ul style="list-style-type: none"> ○ Kantar Strategy – competitive media spend and information ○ Pathmatics – digital media competitive

Methods/Data/Reports	Validating Marketing Efforts
<p>Social Media/Website Evaluation</p>	<ul style="list-style-type: none"> • Native Social Platform Data: We leverage data directly from social platforms (Instagram, Pinterest, Twitter, Facebook, YouTube) to measure the impact of content. This includes impressions, reach, engagement rates and link clicks. Used to adjust our content strategy to ensure we are creating effective and compelling work that brings audiences in and drives brand affinity • SproutSocial: This is our social content management tool which we use to effectively reply and engage with our community, schedule and publish content, and do social listening to understand what the audience is interested in and how consumers are engaging with our social content • SproutSocial also allows CAC to monitor key conversations that audiences are discussing, which helps us build ownable work to address consumer questions (ex. avocado hand conversation turned into CAC creating content around how to properly cut an avocado) • Quintly: This tool is used to pull competitive data from social channels, which allows us to see where our competitors are growing and peak moments of conversation. This gives us a better understanding of what our competitors' communication tactics and areas of focus are, which allows us to plan for burst moments to engage consumers and drive affinity and attention toward California avocados • Brandwatch (formerly Crimson Hexagon): This tool allows us to monitor social conversations across multiple platforms based on specific key words. We use this tool to gauge sentiment of specific topics (ex. when COVID hit, we used this tool to understand how consumers were feeling about produce/grocery shopping now and used these findings to inform language for CAC's response on the website to ensure consumers understood our safety precautions and standards.) • Bit.ly – link shortener with tracking • Brightedge – organic keyword tracking tool • Crimson Hexagon/Brandwatch – social media measurement and competitive analysis tool • Data Studio – Google tool used to visualize the data points from Google Analytics and Google Search Console • Facebook/Twitter/Pinterest Ad Managers – building, launching, measuring and optimizing performance of ads across social media platforms • Google AdWords – building, launching, measuring and optimizing performance of Google ads • Google Analytics – analytical tool to measure website performance • Google Page Speed Checker – page speed optimization tool • Google Search Console – content optimizer for websites • Google Trends – track keyword search volumes • Keyword Planner – use for research purposes • Search Ads 360 – monitor data and performance of Google ads and Bing ads • SEMRush – organic keyword tracking tool • The SEO Framework – plugin for CAC's website that measures and helps optimize content for Search Engine Optimization • Userlytics – we will use this soon to perform some user testing to get insights on site user experience • Media partners provide detailed campaign results via their unique custom tools

Methods/Data/Reports	Validating Marketing Efforts
Consumer Public Relations Tracking and Evaluation	<ul style="list-style-type: none"> • Cision – Platform used to track brand mentions and monitor media coverage in real-time across local, regional and national media outlets in both print and online format • Release Distributions (BusinessWire & NAPS) – In addition to our targeted media outreach, we utilize distribution services like BusinessWire and NAPS for a wider reach for our press release and mat release executions to reach a greater target of consumers and media; both services provide analytics and impressions following the distribution of each release
Trade Advertising Report	Summary results for advertising campaign by publication by impressions and Click Through Rates
LinkedIn Report	Quarterly results for LinkedIn by impressions, sharing, followers and engagement rate
Retail and Foodservice Trade Public Relations and Experiential Tracking and Evaluation	<ul style="list-style-type: none"> • Print and online results tracked by third-party monitoring services and manually for publications that are not covered by those services <ul style="list-style-type: none"> ○ Similarweb is utilized for website viewers and visitors ○ Cision is utilized for circulation • TV results: Viewership provided by advocate and/or customer • Social media activations: Follower or subscriber numbers provided by the digital platform owner • In-person and virtual event results: Attendees present/participating
(Retail) California Avocado Promotion Review	Exploratory analysis of promotional sales and ad activity for Tiered Account retailers that measure additional monetary benefits to carrying California avocado and California avocado callouts in feature ads; specific program results also reviewed based on customer-supplied information
(Retail) Avocado Promotion Reports	These reports complement the AvoScore cards with additional insight into the promotional sales trends of our retailer partners and Tier 1 accounts, including sales lift, feature ad sales, discounted sales, and non-promoted sales trends
Research/Reports	On-going, Supporting Marketing Decision-Making
(Retail) State of the Industry	An analysis of retail scanner-based sales data for the avocado category; comparisons are made for the California season and California region since sales data are not available by avocado origin; this analysis looks at sales, pricing and other retail measures over time
(Retail) Shopper Panel Studies (Examples below)	Studies that analyze avocado shopper segmentation, purchase behaviors and demographics to support the categorization and definition of the California avocado target shopper/consumer
<ul style="list-style-type: none"> • Avocado Purchase Volume by Shopper Demographic Group 	Study that analyzed shopper demographics for the California region vs. outside California to help understand the California avocado shopper
<ul style="list-style-type: none"> • California Avocado Shopper Purchase Trends 	Study that utilized IRI/Nielsen panel data to analyze how shopper behavior differs between the California region and rest of country. Also analyzed shopper behavior variances between the California season and non-season
(Retail) Market Basket Studies	Evaluates what is purchased along with avocados/California avocados; used to encourage retail support and promotion
(Retail) Avocado Business Reviews	A customized analysis of category performance for our retailer partners using scanner-based sales data. Reviews retail pricing, promotions, and other sales performance measures to support our retail partners and grow sales of California avocados

Research/Reports	On-going, Supporting Marketing Decision-Making
(Retail) Data Tracking Reports (Examples Below)	These reports provide an analysis of retailer performance that keeps the Commission abreast of avocado sales trends in the retail marketplace (by retailer, by market) using scanner-based sales data. These reports help measure sales performance and promotional metrics on an on-going basis
<ul style="list-style-type: none"> Monthly Retailer Reports 	Uses scanner-based retail sales to keep up to date with the retail sales performance of our each of our tracked Tier 1 accounts and ancillary retailer partners
<ul style="list-style-type: none"> AvoScore Cards 	Tracking reports that utilize scanner-based retail sales to engage with and support our retail partners during the California season. These reports utilize sales trend data, opportunity analysis, PLU trends and additional metrics
(Retail) Qualitative and Quantitative shopper research (Examples Below)	Research studies that follow the shopper (consumer) path-to-purchase for California avocados. These studies measure how shoppers interact with and purchase avocados from a shopping experience perspective
<ul style="list-style-type: none"> Proactive Super Shoppers Study 	Online survey conducted using the National Consumer Panel to set a quantitative baseline that measures the extent that super avocado shoppers proactively make in-season California avocado purchases
<ul style="list-style-type: none"> Avocado Ripeness Study 	Moderated online-discussion and questionnaire that focused on the key behaviors, motivations, purchase drivers and barriers behind shopper preference for avocado ripeness and other factors, including preference for California avocados
(Foodservice) DATASSENTIAL	<ul style="list-style-type: none"> SNAP! - information about avocado penetration, growth, affinity, menu applications, key segments, trends, and related insights to inform program strategy development and communications as well as non-beverage menu applications for menu items containing the word "California" Operator Omnibus - Eight custom questions asked in Datassential's OMNIBUS monthly study of 400 operators. Insights from the study provide data around awareness of California avocados, purchasing preferences, frequency, and verify the value of adding California avocados to the menu SCORES – Measures six key metrics among active consumer base to identify for chains the value our menu concept are to their operation. SCORES will identify if the concept works or requires work and includes how likely consumers would purchase the menu item at the price listed (i.e., purchase intent) and the uniqueness of the dish to the price point
Consumer Public Relations Planning	<ul style="list-style-type: none"> MuckRack – This all-in-one platform helps build media relationships and collaborate with journalists to help identify key media targets while also allowing us to see what media are covering to perfectly tailor media pitches towards each contact CreatorIQ – This platform is used to source potential Brand Advocate partners who have followings across various platforms such as Instagram, Facebook and Pinterest, look into their audience demographics and other back-end insights of their profiles TikTok Creator Marketplace – Similar to CreatorIQ, we use this platform to source partners who are specifically on TikTok, looking into their audience demographics and back-end insights of their content and profiles

Research/Reports	Occasional/Ad Hoc Supporting Marketing Decision-making
California Avocado Holiday Reports	Utilized scanner-based sales data to measure the sales trends for avocados during key avocado holidays to support decision-making and encourage the promotion of California avocados
California Avocado Opportunity Leakage Reports	Utilized the National Consumer panel to identify opportunities for our Tier 1 accounts to capture additional avocado purchases from their customers by stemming the “leakage” of their shoppers’ avocado purchases to other outlets, thus potentially increasing demand at our Tier 1 accounts.
(Foodservice) MENU MATTERS	Survey in 2018 to identify patron’s baseline perception of the California brand and avocados; and again in 2020 to identify if COVID-19 may have affected perception of “local”, “California grown” and “U.S. Grown”
Other research and data	<ul style="list-style-type: none"> • Nielsen – quantitative research measuring consumer opinions about California avocado advertising among those confirmed to have actually viewed the ads in the real world • Gigwalk or other third-party service that reports on real world merchandising conditions • Retailer satisfaction qualitative survey • Consumer satisfaction quantitative survey • Trade media qualitative survey • Focus groups and other qualitative research • Other diagnostic studies used very infrequently for specific needs

By Tim Linden

Size Portfolio Made for Challenging Season

The California avocado season was quickly coming to a close as this was being written in mid-September with several handlers indicating they would be mostly out of fruit from the Golden State by the time the calendar turned to October.

The consensus seems to be that growers received relatively good returns from the fruit they had, but increased labor and water costs as well as a size profile that skewed smaller for most groves created a challenging year for many.

"Returns were pretty good most of the year and they were very good at the end of the season," said Gary Caloroso, regional business development director for Giumarra. "But after factoring in increased costs for water and labor, profitability for many growers might not have looked that good."

Rob Wedin, executive vice president of fresh sales for Calavo, concurred. "Overall prices were pretty good but if you didn't have the larger fruit, you were probably disappointed."

As a case in point, Wedin used mid-September pricing as an example. On this particular day, he said the f.o.b price on 48s was in the upper \$60s while 60-size fruit was less than \$50 per carton and the price for smaller fruit dropped off quickly. He said the culprit in this case was simply a function of supply and demand. Mexico had sent a significant volume of 70s and smaller fruit to the market the previous couple of weeks creating a sufficient supply of small fruit

and a shortage of larger fruit.

As Calavo's shipments were winding down, Wedin projected that the total California crop would be in the 260-million-pound range.

While he noted that it was much too early to put an accurate number on the size of California's 2022 avocado harvest, Wedin was confident to guess that it would be larger than this year with some very early promising signs that it could be a good crop. In the Santa Paula area in which he lives and works, he said estimators talk of the crop as being from two distinct regions: east of Santa Paula, and west of the town. "They are saying the crop west of Santa Paula has the potential to be huge," he said, noting that groves east of the city look to have less fruit on the trees.

Anecdotally, Wedin said the company's growers in North San Diego County have indicated that next year's crop should be bigger than this year.

Caloroso also put a number of caveats on his comments. "We are thinking that the crop will be larger than this year but nothing dramatic," he said. "It really depends on the weather."

It was lack of rain that created the smaller size profile for the 2021 crop and handlers say a good amount of rain can help the 2022 crop significantly. "We need a lot of rain," said Caloroso, emphasizing the importance that factor will have on the profitability of growers in 2022.

Another important factor is the size of the avocado crop that will be

imported into the United States from Mexico over the next year. By mid-September, Mexico's grower association had not yet released an official estimate. Giumarra's sources south of the border have indicated a slight increase, but again nothing dramatic.

On the other hand, Wedin has heard that Mexico might have a crop 10% larger than this season. After little growth in U.S. sales in 2021, he does not think a 10% increase from Mexico will be difficult to absorb. He argued that a solid and consistent volume increase from Mexico could make for great promotional opportunities and a significant uptick in sales.

Caloroso added that the foodservice arena should also see an uptick in avocado purchases in 2022 as more restaurants open and consumers slide back to their pre-COVID dining out habits.

The bottom line is that September of one year is not an excellent vantage point to speculate on what's going to happen the following spring. While the California Avocado Commission has to make a pre-season guess for budgetary purposes, marketers are content to wait a bit longer to see how environmental factors influence the following year's production. Wedin did note that unlike Labor Day of 2020 when temperatures in Ventura County registered as high as 116 degrees, 2021 has seen no such devastating heat wave. "We have had days in the 90s, but it has been pretty mild for the most part," he said, which is music to the ears of most growers. 🥑



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