

From the **Grove**

Spring 2019

The Latest News from the California Avocado Industry



**CHAIRMAN LAMB MEETS
WITH SECRETARY PERDUE**

Read more on page 12

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Grower Profile

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From the Grove

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Message from CAC Leadership

A Brighter Future

Since 2003, California Hass avocado growers have paid an assessment of 2.5 cents per pound to the Hass Avocado Board (HAB) when their bins arrive at the packinghouse door. Handlers collect an assessment for the California Avocado Commission as well, which in recent years has been 2.3 percent of the first wholesale value of the fruit. If you began growing avocados after 2003, you might not be aware of how our industry ended up with two organizations involved in the promotion of avocados in the U.S. market, or how they interrelate.

Nearly two decades ago, faced with the prospect of an ever-increasing volume of imported avocados, the California Avocado Commission crafted federal legislation that became known as the Hass Avocado Promotion, Research and Information Act (Act), 7 USCA §7801 et seq. With much help from Representative Ken Calvert of Riverside, the bill was passed by the U.S. Congress, becoming law on October 28, 2000.

Prior to that time, the development of the U.S. market for avocados rested almost entirely in the hands of the domestic growers. The Commission had been successful at building demand since 1978, and it was clear that marketing and promotion would play a key role in the future development of the U.S. market to ensure that demand

kept pace with a burgeoning supply. There was no mechanism, however, to prevent imports from getting a “free ride” on expenditures by the Commission. One of the driving purposes of the legislation was to correct this inequity. By its terms, the Act was created to: 1) *strengthen the position of the Hass avocado industry in the domestic marketplace; and 2) maintain, develop, and*

“...the legislation that enabled the Hass Avocado Board deserves another look, with an eye towards making the federal assessment dollars more efficient for growers and importers alike.”

expand markets and uses for Hass avocados in the domestic marketplace. Congress said that the need was (in part) to preserve and strengthen the economic viability of the domestic Hass avocado industry.

Think of the legislation as Congress’ instructions to the Executive Branch, specifically the U.S. Department of Agriculture (USDA) as an Executive Branch agency. To implement the will of Congress, the next step was promulgation of a regulation—the Hass Avocado Promotion, Research and In-



John Lamb

formation Order (Order), 7 CFR Part 1219, by USDA, which occurred on September 6, 2002. Shortly thereafter, the Hass Avocado Board was established. Together, the Act and the Order govern the operation of the Hass Avocado Board. Once HAB began collecting the federal assessment, the Commission lowered the state assessment so that California growers would pay no more for marketing than they had prior to the creation of HAB.

The Act and Order provide for the Commission to receive 85 percent of the assessments collected by HAB on Hass avocados grown in California. The Act and Order also allow importers to form “importer associations” and receive 85 percent of the assessments paid on Hass avocados imported by the members of such associations. To date, Mexico, Peru and Chile have formed importer associations which receive rebates based on the volume of Hass avocados imported into the United States.

HAB retains the remaining 15 percent of assessments paid by domestic growers and importers for administration and to implement programs per the terms of the Order. Broadly



Tom Bellamore

speaking, HAB's programs center on nutrition research, nutrition-related marketing communications, collection and dissemination of industry statistics, consumer and retail research, and collection of retail data. It is noteworthy that the marketing and promotion activities of HAB are limited by design. The Commission and the importer associations believe that building demand is best left to the associations formed for this purpose.

Collectively, the Commission and the importer associations have been instrumental in increasing U.S. per capita demand for avocados from around 1.6 pounds in the 1990s to about 8 pounds, presently. Growth is projected to increase at 10 percent annually provided market development work by the associations continues. Currently, of the roughly \$61 million in federal assessments collected by HAB, some \$52 million is rebated to the associations under the cited provisions, all of which must be used for U.S. market development. The remaining \$9.2 million is the 15 percent retained by HAB.

When HAB was first organized, the total volume of Hass avocados (both domestic and imported) sold in the U.S. was 682 million pounds. The federal assessment at the time amounted to roughly \$17 million; after the 85 percent

rebate to CAC and the importer associations, the 15 percent retained by HAB amounted to around \$2.6 million. The burgeoning volume of Hass avocado imports into the U.S., reaching 2.5 billion pounds in 2018, has propelled the retention amount to \$9.2 million, without end in sight. The 15 percent funds are literally overflowing HAB's coffers, replenishing at a greater amount each year. The rate of this replenishment was virtually unforeseeable nearly 20 years ago when the legislation was crafted.

At its February 2019 meeting, the CAC board discussed the possibility of raising the rebate from 85 to 95 percent, thus allowing CAC and the importer associations to receive more of their own assessment dollars to promote their respective brands. The idea is not a novel one. In February 2008, the Commission board took up the same proposal and voted in its favor. The change was never realized, however, largely because of political impediments at the time. The current round of deliberations on the subject was robust. Many of the Commission board members spoke of the good work HAB has been doing, particularly in the area of nutrition research, where the 15 percent funds provide a direct benefit to the avocado category and fruit of all origins. While concern was expressed that the change could reduce HAB's 15 percent budget, projections that were circulated around the board table showed the impact to be relatively short-lived. As import volumes continue to grow, HAB's budget steadily rises. Even a 5 percent year-over-year market expansion—slower growth than we are presently realizing—would position HAB with about a \$4 million retention in 2023. The discussion ended with the majority of the CAC board voting to pursue an increase in the rebate to 95 percent.

Preliminary discussions with the importer associations have indicated

strong support for the change. Based on the aggregate volume of Hass avocados in the U.S. market last year, a change to a 95 percent rebate would result in an additional \$6 million being returned to CAC and the importer associations—money which would be spent directly on market-level promotions aimed at moving volume. For California, the difference amounts to \$750,000 on a crop size like last year's, no small chunk of change. With California's market share entering single digits as the market expands, the additional funds become a hedge against losing relevancy among our key customers. The California brand would be buoyed by the infusion of additional federal funds at a time when it is needed most.

California growers have faced very tough, competitive conditions since Mexico first entered the market in 1997. HAB has served its core purpose, collecting and disbursing funds for market development work by CAC and the importer associations, and the vision that led to its creation has been realized beyond the wildest dreams of those of us who labored over the legislative language.

Collectively the efforts of CAC and the importer associations have created an extremely powerful marketing machine that has fueled unprecedented demand. The robust U.S. avocado market that has resulted has kept the California brand strong despite the many challenges faced by growers. Now, after nearly 20 years, the legislation that enabled the Hass Avocado Board deserves another look, with an eye towards making the federal assessment dollars more efficient for growers and importers alike. In the ensuing months, CAC will be working with the importer associations to carry out the board's directive. After all things are considered, we firmly believe that doing so will position California avocados for a brighter future. 🥑

Online Avocado Decision Support Tools Available

The online California Avocado Decision Support Tools System (DST) is once again available. The system is designed to help California avocado growers make decisions concerning fertilization and irrigation to help them maximize yield.

The DSTs can be accessed through CaliforniaAvocadoGrowers.com or CaliforniaAvocadoGrowersDST.com. Growers will need their CAC grower ID number to create an account. You can find your grower ID number on official California Avocado Commission (CAC) mailings or may contact CAC at 949-341-1955 for assistance. If you created an account while the system was active last summer, your login credentials are still valid.

The DST site houses the California Avocado Grower System (CAGS), which currently has two tools available for use:

Yield Potential Calculator. Developed based on years of plant tissue sampling research conducted by the University of California, this tool will generate a report indicating how much reduction from maximum yield a nutrient deficiency or excess is causing and a report ranking how critical each nutrient deficiency or excess is.

Irrigation Calculator. Using California Irrigation Management Information System (CIMIS) data and specific grove information, this program generates irrigation system-specific run times by week.

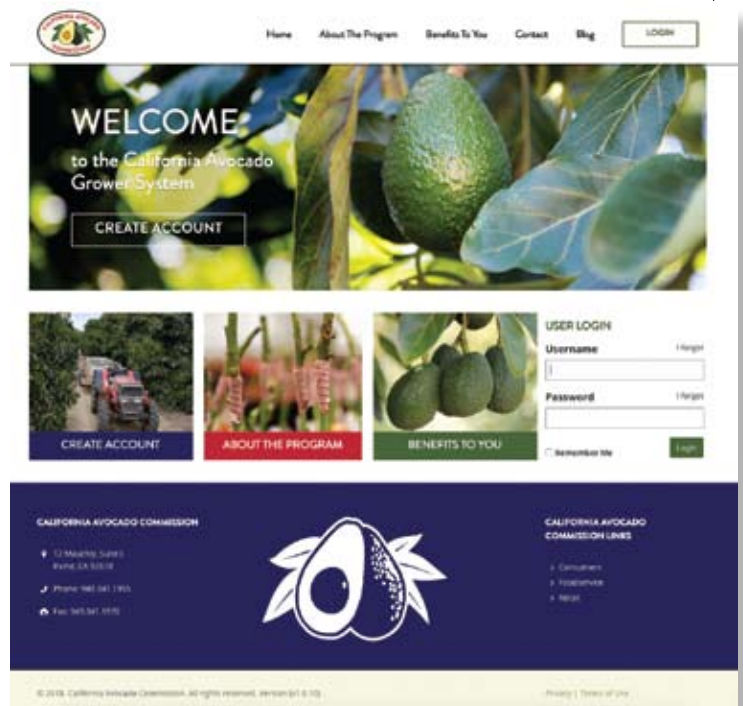
To set up your account, you will need to enter grove identification information. Because you will enter leaf analysis information for each grove, you should define your groves as whatever unit from which you collect your leaf samples. For example, if you collect samples from blocks within your grove, each block should be defined as an individual grove.

Yield Potential Calculator

To utilize this tool, select the grove you would like to run the calculator on and complete the following information under the Inputs tab:

- Grove yield lbs/acre
- Off or on yield for the grove
- Scion and rootstock varieties

Next, enter the leaf tissue analysis results, including the date of the sample. If the results do not have a value for one of the nutrients, just leave it blank — do not enter a '0' as this will lead to an error. Finally, click on the Reports tab to see the yield impact potential results and a ranking of the nutrients based on how critical they are to deficiency or excess of yield.



Irrigation Calculator

To start this process, select a grove from your profile and then choose which weather data you would like to use. You can choose California Irrigation Management Information System (CIMIS) data from a nearby station or use spatial CIMIS data for your specific location. If you choose the spatial option, you will need to enter your grove's latitude and longitude.

Next, enter the age of your grove and its tree spacing. Finally, enter your irrigation system information, including types of emitters, typical irrigation set run times, number of emitters per tree, emitter output and the system's distribution uniformity.

When you click the Weekly Inputs tab, you will see the calculated run times for that week and the calculated available soil moisture. The Reports tab will provide you with a cumulative seasonal irrigation summary. 🥑

Reports for both tools can be downloaded as PDF or Excel files. For more complete information about the DSTs, read "Avocado Decision Support Tools Now Available" in the Summer 2018 issue of From the Grove.



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Marketing Communication Alignment Critical in a Tight Crop Year

Alignment between growers, handlers and the California Avocado Commission (CAC) marketing team has always been a key factor in achieving positive grower returns. In a light volume year, such alignment is critical to: ensure an orderly flow of California avocado supply, encourage optimal market conditions, maintain customer relations, boost consumer interest, and maximize the harvest window and grower returns.

With a smaller 2019 California avocado crop on the horizon, the Commission had to make tough decisions about which marketing programs to keep, which to add and which to let go in order to optimize marketing expenditures and impact. The Commission's marketing team began pre-season planning by conducting in-depth sales data and research analyses to identify which customers and consumers to target and then set about building the California avocado story.

Working within a necessarily tight budget due to the smaller crop, the Commission developed a marketing support plan focused on California markets using outdoor, audio, digital (including Hulu TV) and social media platforms. Customized retail programs will be developed with participating customers, along with plans for menu ideation sessions and marketing support for targeted foodservice chains.

The Marketing Program Book highlights recent research indicating that Super Avocado Shoppers (the 25 percent of consumers who purchase 75 percent of U.S. avocados) are most aware of California avocados and tend to rate the California fruit higher than fruit from other origins on key attributes. It also showcases CAC's advertising and retail marketing program and support materials (such as recipe booklets and bins) and features a section illustrating how the Commis-

sion's foodservice marketing benefits retailers.

Information exchange between CAC and AMRIC handlers, coupled with communication between handlers and growers, is critical to ensure an orderly supply flow and to encourage optimal market conditions. Once pre-season crop forecasts were complete, the Commission engaged in a series of conference calls with AMRIC avocado handlers to review the California avocado harvest forecast by month and week, and gather insights from the handlers. It was confirmed that 2019 California avocado distribution would be focused within the Golden State and to select out-of-state customers, including



The Marketing Program Book showcases the benefits of carrying California avocados, the Commission's retail program and information about key sales opportunities such as the American Summer Holidays.

AVOCADO SHOPPERS LOVE CALIFORNIA AVOCADOS

- 68% say it is important the avocados they buy are grown in the U.S.¹
- 76% try to buy produce that is locally grown, when possible²
- Rate CALIFORNIA highest for freshest, best tasting and most premium quality avocados³



Source: California Avocado Tracking Study 2017, western region. ¹ Percent who say it is very or somewhat important. ² Percent who agree strongly or somewhat. ³ Among avocado shoppers aware of two or more growing areas.

The Marketing Program Book helps communicate shoppers' preference for California avocados.

limited high-value export opportunities. This strategy is designed to ensure California avocado marketing support aligns with where the fruit is distributed. Accurate market information provides growers the flexibility to harvest at the optimum times for their own situation and encourages targeted customers to make a timely supply transition to the California origin.

The Commission and AMRIC handlers discussed targeted retail and foodservice accounts, sharing information from the Marketing Program Book along with foodservice plans. In some cases, handlers suggested adding an account that might improve grower value. In other cases, they suggested not targeting specific accounts whose volume or size requirements might be difficult to meet

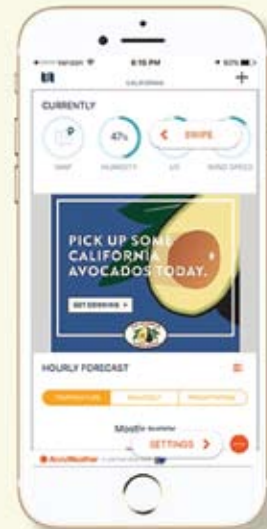
handlers, the Commission and customers should minimize some of the challenges presented by a short crop. 🥑

this year. These in-depth webcasts with the handler teams supplying CAC's targeted accounts helped to align marketing program planning, timing and communication.

The Commission's Retail Marketing Directors (RMDs) have begun meeting with targeted accounts to determine appropriate timing for their transition to California avocados. The RMDs share CAC's Marketing Program Book during the meetings, presenting the Commission's marketing program and initiating promotion agreements for the 2019 season.

This pre-season alignment between growers,

GEO-TARGETING DRIVES CONSUMERS TO YOUR STORES



By showcasing the Commission's geo-targeting tools, CAC can demonstrate the power of customized promotions that help consumers locate retailers and foodservice operators who carry their favorite California fruit in season.

Media Presence That Drives Value in a Short Crop Year

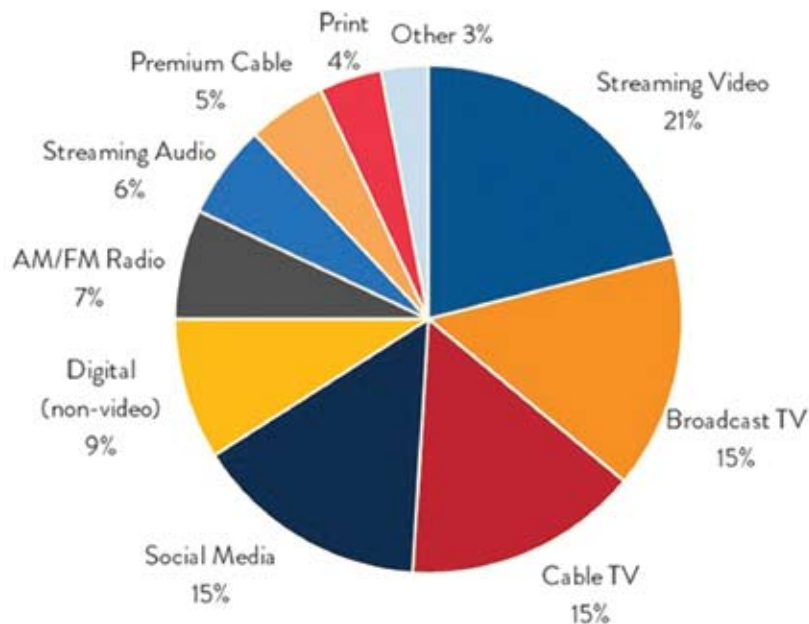
By Jan DeLyser
Vice President, Marketing

New media opportunities in social and digital channels have created opportunities to connect with consumers who are Premium Californians* and Super Avocado Shoppers** (the Commission's target consumer) and who have demonstrated a preference for California avocados when available. The California Avocado Commission (CAC) has been transitioning its media spend from traditional to new media over the past six years. The efficiencies and effective-

ness could not be better timed as the California avocado market share has been reduced in the growing avocado category with increasing import volumes and this year's short California crop.

The Commission's marketing team employs a dedicated strategic approach to planning and program evaluation each year beginning with trends analysis and an assessment of the effectiveness of the prior year's programs. In addition, the media team reviews media partners and opportunities with an

PREMIUM CALIFORNIAN DAILY MEDIA USAGE



- Overall, digital media channels make up the majority (51%), followed by TV (35%)
- Streaming video (YouTube, Netflix, Hulu, etc.) has the largest share of time
- Outdoor media consumption can only be measured by driving habits. Premium Californians report driving an average of 141 miles in a week

Source: 2017 MRI/Scout

eye to their reach and target audiences. CAC's Marketing Committee and Board of Directors also provide input on timing and crop volume that is vetted with the AMRIC handlers who provide input on specific retail and foodservice customers.

The Commission's marketing programs, both consumer and trade, are designed to ensure that California avocados remain relevant to the target audience in an increasingly competitive marketplace. The approach has expanded the merchandising reach from retail and foodservice produce decision makers to their marketing and social media departments. The power of connecting the California avocado fans and followers with those of our key retail and foodservice accounts' audiences exponentially increases the value of the CAC marketing investment.

With the reduced budget, given the reduced crop volume, the 2019 media spend is programmed to kick off in April and run heavily through July with some reach into August. Based on a review of last year, the 2019 plan includes the digital and custom content partners who were top performers in 2018 and new partners who align with CAC's targeted outreach.

The media buy includes Spotify with California-themed sponsored sessions, audio and overlay digital banner ads. The Commission will connect with locals in California via large format wild posting outdoor advertising in peak season. The postings will be located in high-traffic areas in Los Angeles, Irvine, San Diego and San Francisco.

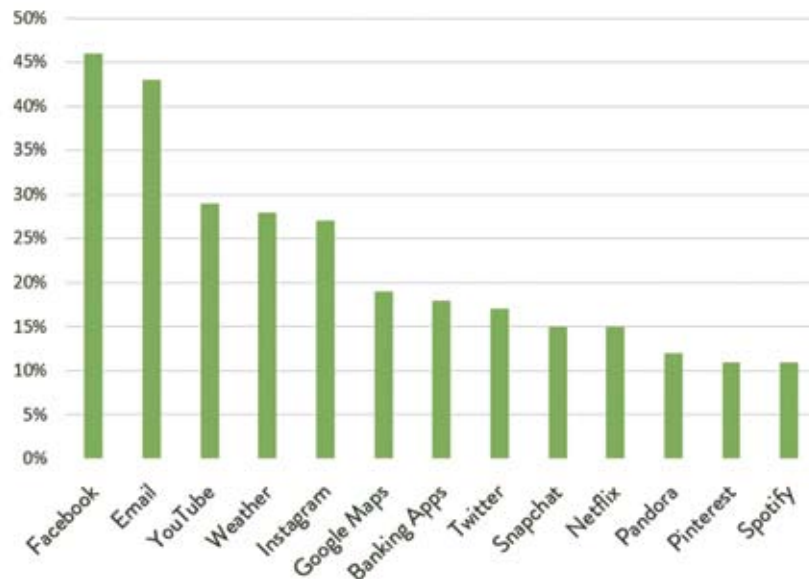
CAC will continue to work with digital partners who generate custom content through their channels. Tastemade will generate California avocado custom video programming with three "snackable" social videos. Tasty will distribute two Tasty videos featuring custom California avocado recipes across Tasty and BuzzFeed channels. Bustle's custom content will feature original California avocado-themed photography and a custom illustrated infographic. And Hello Society will leverage local foodie influencers for inspirational, California-centric content on Instagram.

CAC will partner with Hulu to reach Premium Californians as they watch streaming video on Hulu's TV-like environment. The Commission will reach YouTube users with pre-roll video as they watch foodie content on the Channel Factory's platform. The Commission will surround targeted Super Users and Premium Californian consumers on Gum Gum with unique in-image and in-screen foodie and avocado creative content.

CAC will continue to use Viant and its superior target-

PREMIUM CALIFORNIAN SOCIAL MEDIA USAGE

Top Mobile Apps Used 1+ Times a Day



Source: 2017 MRI/Scout

ing capabilities to engage with consumers who shop at CAC's target retailers with pre-roll video and a custom store locator overlay. Additionally, PlacelQ will showcase mobile display banners across popular apps on the mobile devices of consumers in grocery stores.

Finally, the Commission will continue to connect with fans on its robust social channels by sharing relevant, engaging content on Facebook, Pinterest, Twitter, Snapchat and Instagram. 🥑

**Premium Californians are a specialized target of consumers with specific core beliefs. They are environmentally conscious, pay more for high-quality items and seek out name-brand foods versus generic; sophisticated, knowledgeable and influential about food; believe that integrity and honesty are important qualities; seek adventure and stay "true to self". CAC's media target for this group is Ages: 18-54, Median Age-35, Female skew-54 percent, Median household Income-\$88K, Married-54 percent, Kids in household-57 percent, Bachelor's Degree and Above-40 percent.*

***Super Avocado Shoppers are the 25 percent of consumers who buy the most avocados at retail. They account for 75 percent of avocado sales, and therefore can make the most difference in terms of both volume and dollar sales of California avocados.*

By Ken Melban
Vice President of Industry Affairs

Updates Concerning Legislation, Funding and Food Safety Training

- Commission Representatives Travel to Washington D.C.
- Central Coast Ag Order 4.0
- 2018 Farm Bill Becomes Law
- Commission Secures MAP Funding
- Produce Safety Alliance Trainings

Commission Representatives Travel to Washington D.C.

In February, John Lamb, newly elected California Avocado Commission chairman, and Ken Melban, Commission vice president of industry affairs, traveled to Washington, D.C. The purpose of the trip was to introduce Chairman Lamb to congressional members and United States Department of Agriculture (USDA) representatives who the Commission works with closely. Key issues discussed were immigration, China market access and the Farm Bill. We also had a meeting with USDA Secretary Sonny Perdue and discussed the recent Commission-led congressional letter asking the USDA to “accelerate efforts to gain market access to China for California Hass avocados.” Secretary Perdue assured us that the USDA has made California avocados a priority in the trade negotiations.

While we were only on the ground for a mere 48 hours, substantive meetings were held with seven California congressmembers, high-level USDA officials, Senate staff members and at the People’s Republic of China Embassy. It was a great opportunity for our contacts in Washington, D.C., to hear from Chairman Lamb and gain a better understanding, directly from a grower, of



Ken Melban, Congressman Ken Calvert and CAC Chairman John Lamb.

the challenges that he and all California avocado growers face.

Commission Provides Comments on Central Coast Ag Order 4.0

Recently the California Avocado Commission submitted comments in response to the Central Coast Regional Water Quality Control Board’s draft Ag Order 4.0. The purpose of Ag Order 4.0 is to:

Protect and restore beneficial uses and achieve water quality objectives

specified in the Basin Plan for commercial irrigated agricultural areas in the Central Coast Region by:

- a. Minimizing nitrate discharges to groundwater
- b. Minimizing nutrient discharges to surface water
- c. Minimizing toxicity in surface water from pesticide discharges
- d. Protecting and restoring riparian and wetland habitat
- e. Minimizing sediment discharges to surface water

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There is a company that wants to work with you and ensure that you get the best returns possible for your avocados..

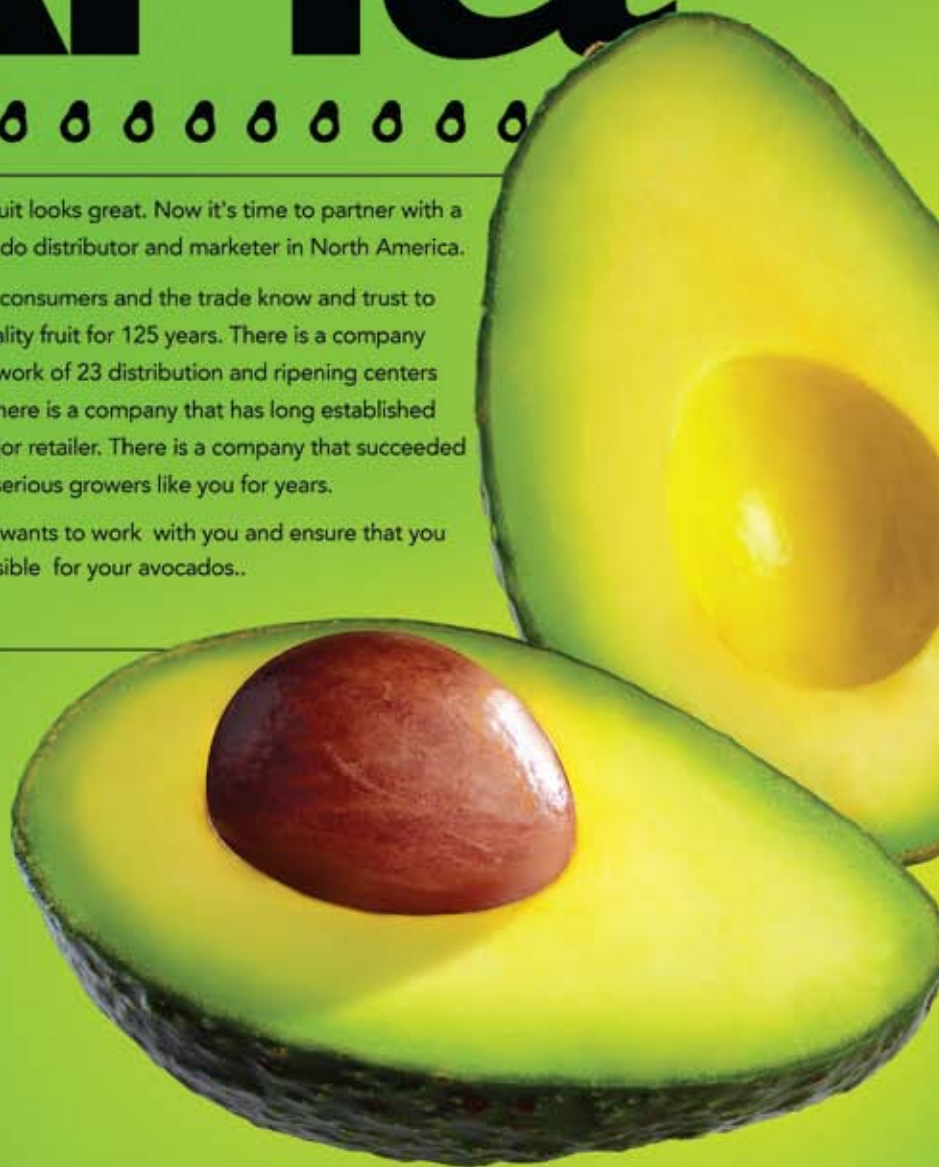
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CAC meets with Republic of China Ag Attachés.

The Commission's comments were developed in large part by Dr. Tim Spann, Commission research program director, and focused on the scientifically-based low risk of California avocado production resulting in nitrogen discharge. An excerpt from the cover letter reads, "The following comments highlight the stewardship of avocado growers with respect to nitrogen and phosphorous fertilizer use as demonstrated by scientific research. We are seeking an exemption for California avocado growers to the nutrient reporting requirements proposed in the draft Ag Order 4.0 based on the low risk for nitrogen discharge from California avocado production."

The Central Coast Region extends from Santa Clara County south to northern Ventura County, and includes land in the following counties: Santa

Clara (south of Morgan Hill); Santa Cruz; San Benito; Monterey; San Luis Obispo; and Santa Barbara. The Commission identified nearly 13,000 acres of avocado production within the Central Coast Region's jurisdiction, or about 25 percent of California's total avocado acreage.

It is anticipated decisions in the Central Coast Region will likely become precedential for other regions of the Water Quality Control Board that also would impact California avocado farmers. Commission staff will continue to advocate with the Central Coast Board on behalf of California avocado growers as its draft Ag Order 4.0 is finalized. The Commission's comments (and all others) may be found here: https://www.waterboards.ca.gov/centralcoast/water_issues/programs/ag_waivers/ag_order4_public_comments.html.

2018 Farm Bill Becomes Law

The 2018 Farm Bill, worth \$867 billion, was signed into law on December 20, 2018. The Farm Bill provides funding for programs that are critical to California avocado industry members. The 2018 Farm Bill maintains disaster assistance funding for the USDA's Farm Service Agency (FSA) programs, which includes Federal Crop Insurance and the Tree Assistance Program (TAP). The FSA was very responsive to avocado industry members impacted by the Thomas Fire and many avocado growers were able to receive FSA disaster assistance funding. In addition, for 2018 about 36,000 acres of California avocados were covered under Federal Crop Insurance, representing almost 75 percent of the California avocado industry.

The USDA's Animal and Plant Health Inspection Service (APHIS) funding is continued through the 2018 Farm Bill. APHIS is responsible for preventing the introduction or spread of plant pests and diseases that threaten U.S. agriculture and the environment. APHIS provides funding to strengthen the nation's infrastructure for pest detection and surveillance, identification and threat mitigation. The Commission must work through APHIS to gain access to new markets, such as China. APHIS also provides critical phytosanitary inspection services for the detection and prevention of invasive pests.

Other areas of importance include:

- Specialty Crop Block Grants – provides \$85 million per year, which represents a significant increase in total funding for the program over the five-year lifespan
- Specialty Crop Research Initiative – allows all specialty crops to compete for the full \$80 million per year for specialty crop research
- Pest and Disease Research - the

2018 level of funding at \$75 million per year will be maintained through 2023

Commission Secures MAP Funding

Through the 2018 Farm Bill, \$255 million per year for funding for the USDA's Foreign Agricultural Service (FAS) programs has been allocated. The FAS programs include the Market Access Program (MAP), the Foreign Market Development (FMD) program, the Emerging Markets Program (EMP) and the Technical Assistance for Specialty Crops (TASC) program.

The Commission has been awarded \$200,000 for 2019 to conduct marketing and promotions in South Korea. This is the second year the Commission has received MAP funds, with funding for 2018 totaling \$123,000 for promotions in Japan.

Produce Safety Alliance Trainings

In February, the California Avocado Commission, along with packers,

hosted two Produce Safety Alliance (PSA) trainings for California avocado growers. Both trainings were at capacity and fulfilled the Food and Drug Administration's Produce Safety Rule's mandatory one-time food safety training, which is part of the Food Safety Modernization Act (FSMA). The trainings were conducted by Dr. Trevor Suslow, vice president of food safety for the Produce Marketing Association. Dr. Suslow is a highly respected leader in agricultural food safety practices and was formerly director of the University of California-Davis Postharvest Technology Center. While at the University of California-Davis, Dr. Suslow worked with California avocado packers to identify potential food safety risks and implement mitigation steps. If a grower is inspected, under the rule they must be able to demonstrate completion of the one-time PSA training. This is the second year the Commission has hosted the PSA trainings to help California avocado growers meet the requirements of FSMA. 🥑



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

Consumer Advertising to Launch in April

Elsewhere, this issue of *From the Grove* explains how the California Avocado Commission (CAC) is using very targetable media to reach Premium Californians and Super Avocado Users in California, detailing the media that will be used this year. Additional information regarding when the advertising will take place, what this year's advertising will look like and where it will be seen or heard is provided here.

California avocado advertising support will kick off in April and continue through the July 4th holiday to support anticipated peak California avocado supply. Merchandising programs with participating retailers, as well as foodservice programs will be used before, during and after the major media advertising to ensure marketing support throughout the season.

The advertising creative will continue the *Made of California* campaign. Each media vehicle has different requirements for the ads and videos they run, so there are literally dozens of ads designed for the campaign. Here are two examples: **below** is an example of content that was created on Bustle, a popular digital women's lifestyle destination; **above right** is an example of pre-roll video with a custom store locator feature that is being used to let consumers know where they can get fresh California avocados.



In addition, the Commission developed a series of grower videos that showcase the care that goes into growing California avocados. These videos, along with custom content from digital and social partners, will be targeted to the consumers who demonstrate a preference for purchasing California avocados when available.



So how can a California avocado grower see or hear this year's advertising campaign? One of the easiest ways is to follow California avocados on social media channels such as Facebook at Facebook.com/CaliforniaAvocados and @CA_Avocados on Twitter, Pinterest and Instagram. Another way is to visit one of the locations where California avocado outdoor advertising will be. Outdoor "wild posting" ads will be located in high traffic locations, with most at street level for consumers to engage with by taking selfies. In Los Angeles, ads will be placed on the corner of Melrose and Sweetzer Avenue beginning in mid-April and running through early May. San Francisco will have outdoor ads at the corner of Grant Avenue and Pine Street, Union Street and Buchanan, and 2040 Union Street from mid-April through early June.

During that same time frame in San Diego, the popular "fence barricade" on 1st Avenue and East Harbor Drive (**pictured top right**) that has been used in the past will post from mid-April through mid-June. New this year is a very visible outdoor board located on the side of the Irvine Spectrum facing the freeway, scheduled to post from mid-April through early May.

Digital media, with digital custom content partners Tastemade, Tasty, Bustle and Hello Society is a big part of the advertising plan. Unlike traditional media such as magazine advertising, it is not possible to specifically pinpoint how a grower can see these California avocado ads. They are delivered to the target consumers as they engage with digital media, so it varies by consumer. This also is true with digital



streaming services like Hulu and audio advertising; with traditional television and radio an advertiser purchases the day and time an ad will run, whereas with digital streaming the ad runs when the targeted consumers are using the service.

California avocado ads also will be served to consumers who are in or near a supermarket or restaurant that is carrying the fruit and who have their mobile phone location service turned on. This geo-targeted marketing is another example of how CAC's marketing campaign will reach the right consumers in the right place at the right time, informing them of the availability of California avocados and encouraging purchase throughout the season. 🥑



This image shows one of the frames from a video used early on to build anticipation for the California avocado season.

Optimize Productivity by Pruning for Maximum Light

By Tim Spann, PhD
Research Program Director

Most growers are faced with a very light crop for the 2019 season. Although income may be low this year, the light crop presents an opportunity for pruning. The first thing to understand is that there is no single best way to prune avocados. However, there are at least three objectives to consider when pruning:

1. Maximize fruiting potential
2. Control tree size for ease of harvest
3. Correct tree structural issues

How you achieve these objectives is up to you and will vary from grower to grower and grove to grove.

Before beginning to prune, it's important to remember a couple of things about the avocado tree. First, branches bearing fruit right now have a low likelihood of flowering and producing more fruit next year. Second, flowers develop on summer flush growth — a branch that grows in summer 2019 has the potential to produce flowers and fruit in 2020 for harvest in 2021 — thus, you are trying to maximize summer flush growth with pruning done now.

You are always trying to balance three types of branches in the avocado tree:

- Those currently producing fruit
- Those that will flower and produce next year's crop
- Those that will grow this year and flower next year to produce a crop two years from now

Maximizing Fruiting Potential

The primary reason for growing avocado trees is fruit production, and all cultural activities should be focused on maximizing fruit production. Pruning is no exception. Numerous pruning trials over the years have shown that maximum yields are achieved from very large (30-feet tall or larger) trees



Figure 1. Examples of different tree structural issues, including scaffold limbs too low to the ground (A), limbs crossing through the center of the canopy (B), and crossing limbs (C).



Figure 2. A large tree (left) that lost all lower branches causing productivity to be on the canopy periphery very high off the ground. Trees in this state need to be rejuvenated either through traditional stumping or over a period of a several years by removing one limb at a time (right).

widely spaced. But the economics of producing avocados in the 21st century dictate that we must do things differently.

There is one key objective to any pruning program and that's light penetration. Poor light penetration into an avocado tree canopy causes the interior and lower branches to die off and pushes fruit production to the exterior of the canopy. Why have a 25-foot tall tree, that's 20-foot wide, if fruit is only being produced on a few feet of the canopy periphery?

Flower production and fruiting will occur where there is light. The key to maintaining productive trees of smaller stature and more closely spaced than was the historical norm is to ensure light penetration throughout the canopy.

When you approach a tree to begin pruning ask yourself these questions:

- Where do I have fruit production on this tree?
- Where do I have flowering potential for fruit production next year?
- Which branches are shading other branches within the canopy?
- How is the tree you're about to prune affecting or being affected by neighboring trees?

It's difficult to answer these questions in isolation from one another, so we'll tackle them collectively. Looking for where there is current fruit production or lack thereof will help you know where you can expect fruit production next year. Fruit suppresses the development of flower buds on a branch. A heavily fruiting branch this year likely had a small summer flush last year and has a low probability of flowering and producing fruit for next year. Therefore, you can start to see where your potential fruiting branches are for next year by seeing where the fruit isn't this year.

Now that you've identified those branches that have the potential to flower and produce fruit for next year, look at where they are located in the canopy. Are they heavily shaded by other branches or will they become heavily shaded as other branches grow? You need some shading to prevent sunburn on the fruit, but too much shade will result in lower fruit set and potentially smaller fruit size.

Next, consider where your summer flush will be coming from this year. Summer flush growth is where next year's flower buds will be produced. You can help direct where this growth occurs by making strategic pruning cuts to expose



Figure 3. A 4-year-old Hass tree on Toro Canyon rootstock before pruning (left) and after pruning (right). Note how the width of the tree has been adjusted (lower right of each image) and the center has been opened to allow light penetration. This was achieved with two pruning cuts (see Figure 4).

shaded areas to sunlight and encourage new growth. By making strategic pruning cuts that allow light into the canopy interior, you are maintaining shoot growth and flowering potential, thus making the most of the tree's "real estate."

And while you're considering shading, look to the neighboring trees and determine how the tree you're pruning is influencing or being influenced by those adjacent trees. A very tall limb casting a shadow is probably a good candidate for removal.

Control Tree Size for Ease of Harvest

The general rule of thumb in any orchard is that tree height should not exceed 80 percent of the row spacing. For example, for rows spaced 20-feet apart the trees should not exceed 16 feet: $20 \times 0.80 = 16$. This spacing-to-height relationship ensures that direct sunlight can reach the lowest limbs on the tree as the sun moves across the sky, assuming your rows are oriented north-south.

This rule of thumb goes out the window for growing trees on slopes where rows may not go north-south or the entire hillside may not face due south. In those cases, it's more im-

portant to consider your management objectives. For many growers today, a primary objective is to reduce or eliminate the use of ladders. Thus, a tree height of not more than about 15 feet is ideal for harvesting from the ground using picking poles.

Correcting Tree Structural Issues

Avocado trees are typically not trained like peaches, apples or most other tree crops. Often, trees are planted and they are left alone until they begin to crowd — then pruning becomes a necessity. Usually, at this point some corrective action will be needed to fix issues with basic tree structure. This can include, but isn't limited to:

- Scaffold limbs originating too low to the ground
- Competing central leaders (if a central leader is your objective)
- Crossing limbs or branches crossing through the center of the tree

Pruning cuts to correct these types of structural issues should be made before any other cuts are made.



Figure 4. The interior of the 4-year-old tree shown in Figure 3 (top). Note how the interior shoots are already beginning to die-off due to shading and there is minimal production in the center of the tree. Also note the limb that curves through the center of the tree from left to right. A scaffold limb arising at ground level (bottom) has grown horizontally trying to find light. Removal of the limb crossing through the center of the tree and the low scaffold limb achieved the results shown in Figure 3.

Putting it all Together

So, you've studied your tree and corrected any structural issues, now what? Consider how to achieve everything you want to achieve with the fewest cuts possible. Is there one tall branch shooting straight up? This is a good candidate to remove because it helps you manage tree height and reduces shading within the tree and on adjacent trees. Similarly, look for branches protruding out of the side of the canopy that have a good chance of breaking or dragging on the ground if heavily loaded with fruit. Remember, a couple of larger cuts are quicker and more economical than many small cuts.

It may not be possible to get to where you want to be in one season, but there's always next year. What's important is that you have a clear objective in mind when you begin pruning and work toward that objective over time. 🍌



Figure 5. Large branches (>1-inch diameter) should always be pruned using the 3-cut method. Begin by making an under-cut about one-third of the way through the branch from the underside of the branch (top photo, white arrow). Next, make a cut from the top of the branch about 1 to 2 inches beyond (toward the end of the branch) the under-cut (top photo, yellow arrow). As the top cut is made, gravity will pull the branch down, breaking it between the two cuts (center photo). Finish by removing the remaining stub with a clean cut at the branch collar. Following the 3-cut method ensures that the final cut can be made cleanly with no bark tear out.

2019 Pre-Season California Avocado Crop Estimate

Each year in early December the California Avocado Commission (CAC) conducts a survey of California handlers to formulate the pre-season California avocado estimate for the following year. On this page are the results of those surveys, which includes the 2019 California Avocado Pre-Season Crop Estimate and weekly harvest projections for the calendar year (January 1 through December 31).

To help California avocado growers make informed harvesting decisions, we have provided the California Crop Weekly Harvest Projections versus Actual Harvest/Shipments through week ending 3/3/19. At the time of this writing, rain and market conditions continued to keep actual harvest numbers behind projections, however industry meetings held in February indicated that the California season is anticipated to get underway as we clear this first quarter of 2019.

Discussions indicate the volume of the crop that is currently behind harvest projections for the first quarter will shift into the second quarter, increasing weekly harvest projections by one million pounds or more during the April through June time period. The Commission is poised to support this fruit with targeted marketing programs during the peak California season, and continues to stress the importance of growers communicating with their handlers and grove managers on a regular basis to determine the best harvest strategy.

In addition to this pre-season estimate, CAC will conduct the annual grower crop survey and acreage inventory in spring 2019, with a mid-season crop estimate update avail-

able mid-May 2019. Crop estimates, projections and acreage summaries can be found on CaliforniaAvocadoGrowers.com/Industry. 🍷

2019 California Crop Harvest Projection					Dec 2018 Handler Survey Hass Distribution
Month	Hass	Lamb	Other	Total	
Jan	2,240,200	-	265,900	2,506,100	1.3%
Feb	6,130,200	-	221,200	6,351,400	3.7%
Mar	15,920,700	-	285,200	16,205,900	9.5%
Apr	30,716,600	700	289,100	31,006,400	18.4%
May	33,648,100	28,800	181,900	33,858,800	20.1%
Jun	30,464,100	551,400	171,100	31,186,600	18.2%
Jul	25,689,600	3,214,700	198,800	29,103,100	15.4%
Aug	16,663,100	1,929,600	113,800	18,706,500	10.0%
Sep	4,718,900	235,400	43,400	4,997,700	2.8%
Oct	808,500	39,400	2,000	849,900	0.5%
Nov	-	-	61,000	61,000	0.0%
Dec	-	-	166,600	166,600	0.0%
Total	167,000,000	6,000,000	2,000,000	175,000,000	100%

2019 California Crop Weekly Harvest Projection Weekly Crop Movement vs. Distribution Projections All Varieties				
Week Ending (CAC Week)	4-Year Historical Forecast	AMRIC Handler Forecast	Industry Adjusted	
	2019 Pre-Season Crop Estimate	Dec 2018 Update	AMRIC Harvest	AMRIC Shipments
Jan 6 - (10)	71,093	65,200	-	14,249
Jan 13 - (11)	429,349	391,500	93,307	27,150
Jan 20 - (12)	733,951	667,100	41,961	41,200
Jan 27 - (13)	1,529,966	1,382,300	332,623	92,431
Feb 3 - (14)	1,549,775	1,565,100	233,836	174,276
Feb 10 - (15)	1,427,131	1,442,400	133,856	158,608
Feb 17 - (16)	1,476,625	1,492,300	226,626	252,788
Feb 24 - (17)	1,832,114	1,851,600	420,995	383,031
Mar 3 - (18)	2,758,217	2,249,100	716,519	628,068
Mar 18 - (19)	3,376,290	2,751,900	-	-
Mar 17 - (20)	4,280,515	3,483,000	-	-
Mar 24 - (21)	4,232,102	3,441,600	-	-
Mar 31 - (22)	5,271,164	4,280,300	-	-
Apr 7 - (23)	5,750,819	6,477,300	-	-
Apr 14 - (24)	6,555,329	7,377,700	-	-
Apr 21 - (25)	7,092,633	7,978,800	-	-
Apr 28 - (26)	8,157,305	9,172,600	-	-
May 5 - (27)	8,386,056	7,233,000	-	-
May 12 - (28)	7,694,000	6,633,400	-	-
May 19 - (29)	7,355,372	6,342,900	-	-
May 26 - (30)	8,180,321	7,054,300	-	-
Jun 2 - (31)	7,648,747	6,595,200	-	-
Jun 9 - (32)	6,794,936	7,455,800	-	-
Jun 16 - (33)	7,174,220	7,870,600	-	-
Jun 23 - (34)	7,439,590	8,158,000	-	-
Jun 30 - (35)	7,044,822	7,702,200	-	-
Jul 7 - (36)	7,183,374	7,833,900	-	-
Jul 14 - (37)	6,864,306	7,442,800	-	-
Jul 21 - (38)	7,056,509	7,646,200	-	-
Jul 28 - (39)	5,684,434	6,180,200	-	-
Aug 4 - (40)	4,904,787	5,099,800	-	-
Aug 11 - (41)	4,180,595	4,347,200	-	-
Aug 18 - (42)	3,655,708	3,803,700	-	-
Aug 25 - (43)	2,905,312	3,023,600	-	-
Sep 1 - (44)	2,336,529	2,432,200	-	-
Sep 8 - (45)	1,527,122	1,665,800	-	-
Sep 15 - (46)	1,095,437	1,198,300	-	-
Sep 22 - (47)	1,071,316	1,178,100	-	-
Sep 29 - (48)	868,897	955,500	-	-
Oct 6 - (49)	440,852	371,600	-	-
Oct 13 - (50)	264,855	220,900	-	-
Oct 20 - (51)	121,110	101,600	-	-
Oct 27 - (52)	119,054	98,800	-	-
Nov 3 - (1)	69,753	57,000	-	-
Nov 10 - (2)	5,131	5,000	-	-
Nov 17 - (3)	2,566	2,500	-	-
Nov 24 - (4)	27,189	26,700	-	-
Dec 1 - (5)	27,129	26,800	-	-
Dec 8 - (6)	18,486	8,400	-	-
Dec 15 - (7)	50,515	59,100	-	-
Dec 22 - (8)	148,063	56,300	-	-
Dec 29 - (9)	128,529	42,800	-	-
Season-to-Date	11,808,222	11,106,600	2,199,723	1,771,802
% of Crop	7%	6%	1%	1%
Crop Size	175,000,000	175,000,000	Left to Harvest	Left to Ship
Crop Variance	(9,608,499)	(8,906,877)	172,800,277	173,228,198

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Grower Profile



Stress Leads Family to the Avocado

By Tim Linden

While grower Leo McGuire Jr.'s path to the avocado was straight and narrow, his family's took a much more circuitous route, which included coal mines, mules, the aerospace industry and a chicken farm.

Leo McGuire Sr. was born in Pennsylvania in 1918, but moved to Los Angeles with his mom during the Great Depression after the family mine was forced to close. He graduated from Hollywood High and went to work for Lockheed before quitting to enlist in the Army Air Corps. After the war was over, he returned to Southern California and worked at the secretive Lockheed Skunk Works facility in Burbank, which developed fighter jets and other covert planes in the company's Advanced Development Projects. Leo Sr. loved the work but it was very stressful and he developed an ulcer, which eventually led to early retirement and the introduction to farming.

In the meantime, Leo's mom, Mary Theresa McGuire, had moved to Hemet in Riverside County, where she had a farm with livestock, including chickens, donkeys and horses. In the 1940s, the matriarch of the family sold the Hemet farm and moved to Vista with her animals in tow. Among those animals were mules, which Mary Theresa had an affinity for as a result of growing up near the family mine in Pennsylvania. Leo Jr. remembers his grandmother often talking about leading fresh mules deep into the mine each day and taking those that had been working all day back out.

And this is where the mules and the aerospace industry and the chicken farm merge to create a more than 60-year love affair with the avocado. In Vista, Mary Theresa loved her mules and bred them, but she didn't know what to do with the

avocados that grew on her ranch. Her son, Leo Sr. loved the aerospace industry but it would soon lead to early retirement. Leo Sr. also loved spending time on his mother's Vista Ranch tending to the avocados. It was a nice break from his stressful work environment. In 1954, Leo bought his first avocado grove in Fallbrook, retired from the aerospace industry and moved down there with his wife and daughter a year later. He became a full-fledged avocado grower.

A few years later, he and his best friend, flower grower Mark Urner, bought the local fertilizer company out of bankruptcy, renamed it L&M Fertilizer, after the initials in their first names, and were well on their way to being successful businessmen. It also was about this time that Leo McGuire Jr. arrived on the scene.

Though he came into this world while his parents were living in Fallbrook, Pasadena was his birthplace. "I was born in Pasadena because the doctor only came to Fallbrook on Tuesdays and my mom went into labor on a Thursday, three months before her due date." She promptly went back up to the Los Angeles area so her city doctor could be involved in the delivery.

It wasn't too long before L&M Fertilizer became the family's main source of income. In the early days, it was a "hangout joint" for local farmers, but only open a couple of days a week in the morning. Over time, it became a thriving business and one that would become very important in the career of Leo Jr. as he moved through high school and headed to college. Mr. Urner, who passed away when Leo Jr. was in high school, held the license allowing the company to sell and recommend fertilizer to growers. Leo Sr. was able to secure a temporary license, but that was not a long-term solution.

Leo Jr. went to Cal Poly San Luis Obispo and graduated in 1980 with a degree in Agricultural Business Management with a concentration in crop protection in order to get his pest control advisor license and be the license holder for the company. A year after Leo Jr. graduated, the company began construction on a new facility, and in 1982 L&M Temecula was opened with a state-of-the-art liquid fertilizer plant.

In the 1980s, Leo Jr. took complete control of the company and added a line of power equipment tools to diversify. Until he sold the company in 2015, it always was his full-time day job. “We sold everything from John Deere tractors to Stihl chainsaws,” he said. “We used to joke that L&M has everything you need to grow avocados, from the shovel to plant them to the chainsaw to remove them.”

He said increasing government regulations caused him to sell the store to a multi-national chain of equipment stores. “We were getting killed by regulations. When your main product is Roundup®, it’s not easy to survive.”

Leo Jr. said the fear of pesticide sales being outlawed caused him to get out of the business. He has since started working with Calavo as a fieldman, interacting with growers, forecasting production and scheduling picking crews.

And, of course, he also has been an avocado grower in his own right for the past 30 years. In the late 80s, Leo Jr. did follow in the footsteps of his grandmother and father and bought his own avocado grove. “In 1989, I bought a 20-acre grove from Farm Credit. It was kind of a mess. The water had been turned off for three months during the previous owner’s bankruptcy. I figured I could clean the grove up and turn around and sell it in a couple of years with a nice profit. I enjoyed my time on the grove so much, it always became ‘maybe next year, I’ll put it on the market.’”

Thirty years later, he is still waiting for that next year, and is currently redeveloping the property with new trees as the previous ones have moved well past their prime. He’s learned a thing or two about avocado production in that time period. He has what he calls “Leo’s Laws” dealing with avocado growing. On top of that list is the water situation. “Until you have figured out your irrigation, nothing will help improve production. Once you have your water right, try to keep your potassium levels optimal (1.75+) and your nitrogen just below optimal (1.8 to 2.0).”

He is reluctant to tell any other grower exactly what it means to “figure out your irrigation” as every grove is different. But he does have Leo’s Laws that guide him. “Moist, not wet, to avoid root rot. Let them dry out and get air. And then you have to use enough water to get rid of the salts.”

He said irrigation is critical and noted that water – and the cost of it – is the biggest challenge for Southern California avocado growers. Being in Temecula and having access to a couple of different water sources through his water provider,



is a godsend. “Our costs are about \$900 per acre foot. I know others are paying \$1600...that’s a challenge.”

He remembers when his dad got upset when the water rate climbed to \$30 per acre foot many years ago. “When I started with my grove, I think it was \$375 per acre foot. It’s gone up about 10 percent per year for the last decade.”

And while the water price in his grove is somewhat manageable, McGuire does point out that it is chlorinated water – the same water sold to homeowners as drinking water. He said that isn’t great for the trees. In fact, as he spoke to *From the Grove*, it was raining hard on his grove which was another godsend. The trees love the rain and the natural leeching. “You can see them just jump.”

He said another one of Leo’s Laws is tied into the significant rain the San Diego area has received this year. “Two inches of rain followed by a day of sun, produces an extra ounce of fruit.”

With that in mind and noting this year’s natural irrigation, McGuire believes that the current crop estimate of close to 175 million pounds will be reached. “I think we will get that fruit out of the trees,” he said confidently.

With the sale of his fertilizer company, Leo McGuire Jr. has had more time to devote to his own grove and to the industry at large and he has taken advantage of that. He ran for a seat on the California Avocado Commission and also volunteered to be a director for the California Avocado Society. “CAS is a great organization rich in history of helping growers look at better ways to grow our trees,” he said.

He also has gotten very involved in CAC’s Production Research Committee and has many experimental trees as part of his acreage. He remembers his Dad being a great experimenter with different varieties and he is following suit. 🍷

Irrigation Management in California Avocado Groves

I recently gave a talk on Phytophthora root rot management at the California Avocado Society seminar series. During that talk, I stressed the importance of proper irrigation management for managing Phytophthora. Inevitably, the question came up at each seminar location: “What is proper irrigation management?” There is no one-size-fits-all recipe for irrigation management; however, there are a series of principles that you can follow to figure out the proper irrigation management for your grove.

How much water does an avocado tree need?

To understand how much water your avocado trees need, you need to know the evapotranspiration (ET) rate — the total water consumption based on evaporation and transpiration through the plant — for your location. You can calculate this in multiple ways. Many weather stations will provide you with an estimate of ET for your location. You also can use the California Irrigation Management Information System (CIMIS; www.cimis.water.ca.gov), which has a network of weather stations around the state — as well as a spatial network based on satellite data

— to estimate ET for the areas between stations.

For the purposes of this article I will use CIMIS station number 198, located in Santa Paula in Ventura County. For 2018, CIMIS station 198 recorded a total ET of 53.99 inches. For uniformity and comparison from site to site, CIMIS stations use a grass field as their reference plant, so the 53.99 inches of ET reference (ET_o) is based on the water that was transpired through the grass as well as what was lost from the surface due to evaporation.

Avocados use less water than grass, so to correct for this difference a crop coefficient is applied — usually 0.85 for mature avocado trees. Thus, the ET for the crop (ET_c) is the ET_o (53.99) multiplied by the crop coefficient (0.85), which in this example equals 45.89 inches or about 3.8 acre-feet. Young avocado groves will have proportionally less water use than mature groves.

When using ET_c to determine your trees’ irrigation needs it’s important to remember that ET changes based on the weather conditions. Referring back to the Santa Paula example, monthly ET ranged from 2.48 inches in December to 6.87 inches in July. This variation needs to be taken into account when

designing your irrigation system and your system should be designed to supply enough water to meet the maximum ET you expect to experience at your location when your trees are mature.

When should you irrigate your trees?

ET only tells you part of the story — how much water your trees are using. But how do you know when to apply water to meet their needs? The answer can be found under your feet, in the soil.

Every soil has a certain water holding capacity, which can be measured using soil moisture sensors. For a comprehensive review of soil moisture sensors please see “Using Soil Moisture Sensors to Improve Irrigation Efficiency” in the Fall 2015 issue of *From the Grove*. Briefly, soil moisture sensors tell you how much water is in the soil. This will either be measured as the percentage of the total volume of water held at saturation (volumetric water content) or as soil tension (a measure of how “difficult” it is for plant roots to extract moisture from the soil). For the purposes of discussion in this article, I will use soil tension, which is measured by tensiometers, the most common soil

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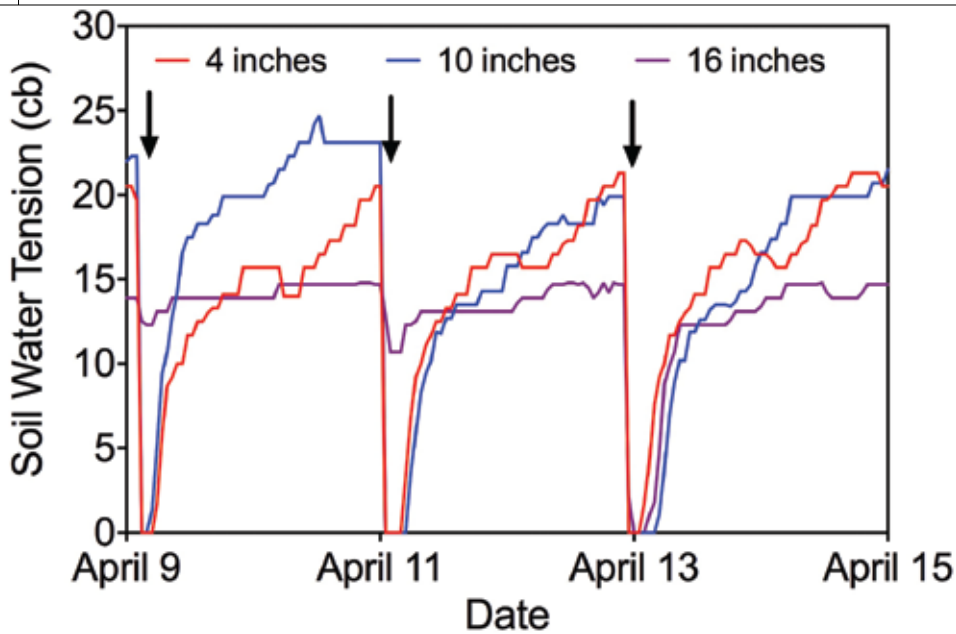


Figure 1. Soil water tension readings from a block at Pine Tree Ranch, Santa Paula, for a week during April 2018. Note how the 4- and 10-inch sensor readings drop to 0 cb after each irrigation (arrows), then the soil quickly drains and reaches field capacity (about 10 cb). However, the 16-inch sensor only dropped to 0 cb after the April 13 irrigation. This indicates that the prior two irrigations were not long enough to fully wet the soil profile. Also notice how the 16-inch sensor tends to stay at about 14 to 15 cb between irrigations, indicating that there is little root activity at that depth. Most of the water is being taken up at shallower depths as indicated by the drying (increasing soil water tension values at 4- and 10-inches) between irrigations.

moisture sensor available.

When a soil is saturated, a tensiometer will read 0 centibars (cb) — your tensiometers should never read 0 cb except for a brief period after irrigation or a saturating rain (Figure 1). As the soil becomes drier and the plant roots have to work harder to extract moisture the readings will increase. A dry soil will likely be in the 60 cb range for many of the soils that we grow avocados on. In general, you should try to manage your irrigation such that your tensiometers read between about 10 to 20 cb right after irrigation (when the soil is at field capacity; Figure 2) and don't exceed 60 to 80 cb before the next irrigation.

How long it takes for your tensiometers to move from wet to dry de-

pends on the soil texture, tree size and canopy health, temperature and relative humidity, and whether or not your grove is well mulched. Coarse textured soils (sand) will dry out more quickly than fine textured soils (clay). If you're new to using tensiometers, or you're using them in a new location for the first time, it is important to look at them often (every 2-3 days). By reading your tensiometers often, you will begin to understand the dynamics at play within your grove and how quickly your soils dry out under different conditions.

Figure 3 shows the general relationship between soil water depletion (horizontal axis) and tensiometer readings (vertical axis) for various soil types and is a good starting point for calculating when to irrigate your trees. Soil water depletion is the percentage of water in the soil between saturation and the permanent wilting point. You don't want your trees to experience saturated

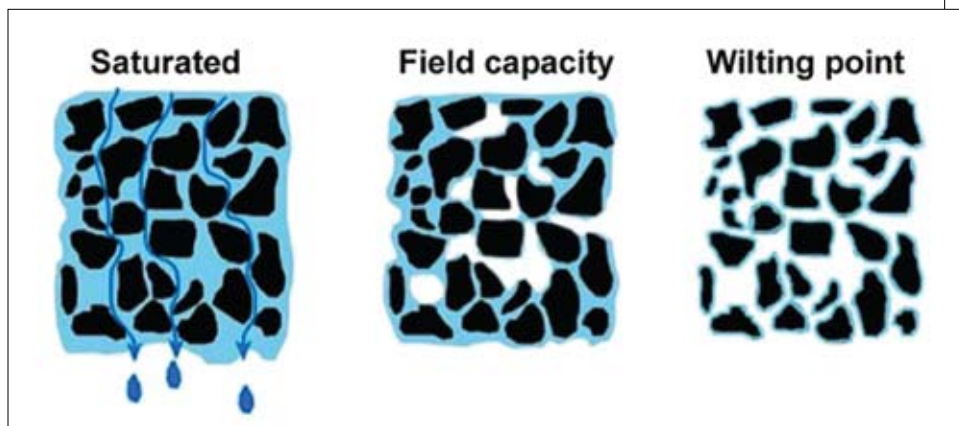


Figure 2. An illustration of the three phases of soil moisture — saturated, field capacity and the permanent wilting point. At saturation (0 cb), all of the soil pores are filled with water, but the water is held weakly and the large pores will empty by gravity. At field capacity (about 10-20 cb), the large pores have drained and filled with air, but the smaller pores remain water filled and no more drainage will occur by gravity. At permanent wilting point (>100 cb, will vary by soil type), the water remaining in the soil is held very tightly to the soil particles by adsorptive forces and the plant roots are unable to overcome these forces to extract more water.

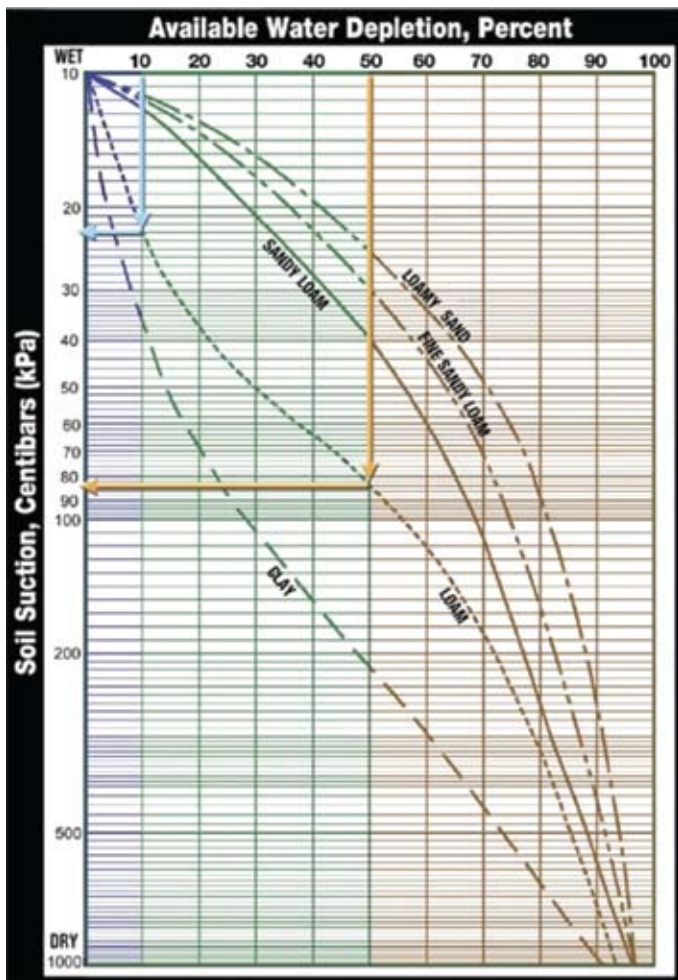


Figure 3. A graph showing the relationship between available water depletion (horizontal axis) and soil suction (tensiometer reading; vertical axis) for different soil types. The greater the available water depletion, the dryer the soil (left to right on the graph). As soil dries, the soil suction increases (top to bottom on the graph). Figure courtesy of Irrrometer, www.irrometer.com.

conditions (0-10 percent depletion) or very dry conditions where it is difficult for the tree to extract water (>50 percent depletion).

How many soil moisture sensors do you need?

Determining how many soil moisture sensors you need is quite easy and is directly correlated to variability. If you have a well-designed irrigation system with good distribution uniformity (≥ 85), your grove is flat with one uniform soil type, and your trees are a uni-

form size and age, you need two sensors. You need to have at least one pair of sensors in each soil type in your grove and in a representative block for each different aspect (north, south, east, west). For groves on hills, it's also a good idea to have sensors at the top and bottom of slopes to be sure your system is not overwatering the downhill trees and underwatering the uphill trees. Lastly, you will want a pair of sensors in blocks of different age trees since young trees have different water requirements than mature trees.

A pair of sensors is composed of two separate sensors placed at a shallow and deeper depth. I like to see sensors placed at about 4 inches and 12 to 16 inches. You can add additional sensors in between if you want, but they're not critical. The shallow sensor will tell you when to turn on your irrigation. It also lets you know when, during your irrigation set, the water has begun moving into the soil profile. The deeper sensor tells you when you have fully wetted the soil profile. When your deeper sensor reaches your target reading (e.g., 10 cb) you can turn your system off. If you are doing a leaching irrigation to move salts below the root zone, leaching begins when your deeper sensor reaches your target reading.

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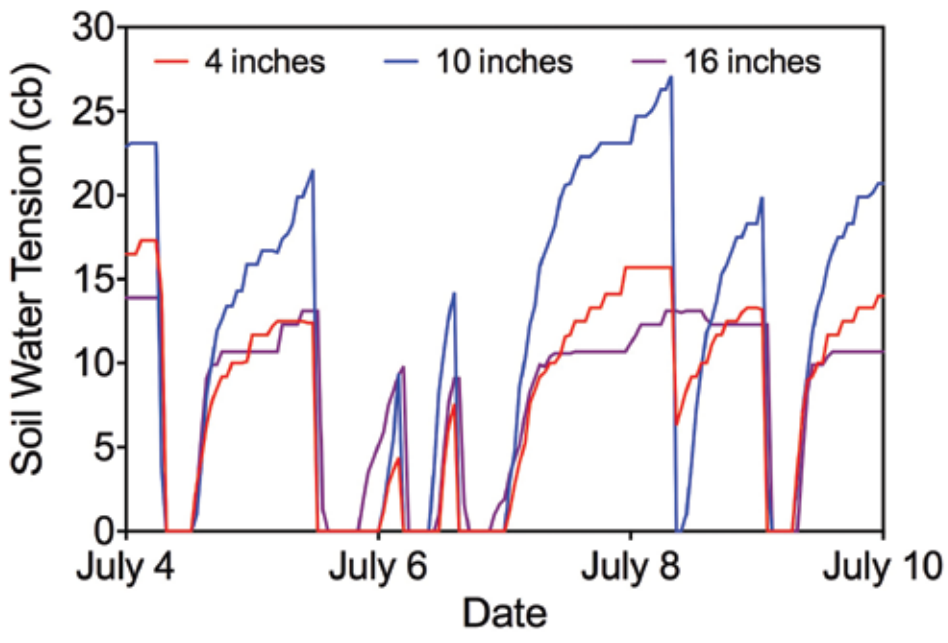


Figure 4. Soil water tension readings from a block at Pine Tree Ranch, Santa Paula, for a week during July 2018. Note the sustained irrigation that was made on July 5 (all sensors at 0 cb) prior to July 6 heat wave. Notice how in the days after the heat wave, the 4-inch sensor readings are relatively flat between irrigations. This shows that there was a partial die-off of surface roots due to the excessive heat. However, soil drying at the 10-inch depth indicates that those roots were still active and helped the trees recover following the heat wave.

Watching your soil moisture sensors on a regular basis and plotting the readings on a graph can tell you a lot about the health of your trees' root systems. In Figure 4, you can see how following the July 6, 2018 heat wave there was little root activity at 4-inches in the days following the heat wave, as indicated by the relatively stable soil tension readings. This was likely because the shallow roots died from the excessive heat.

Fundamentals of good irrigation system design

Your irrigation system should be designed to uniformly apply water over a given block. To achieve this, you should consult with a qualified irrigation design specialist when you are laying out your grove. When you are deciding how to lay out your irrigation blocks, con-

sider your different soil types. Each soil type will behave differently so irrigation blocks should not contain a mix of soil types if at all possible. Also consider what direction a block faces if you're growing on slopes. Southern and western exposures will receive more sunlight, generally be warmer, and require more frequent irrigation than northern and eastern exposures. The same principle applies for a wind-exposed versus a wind-sheltered slope.

Utilize pressure-compensating drippers or microsprinklers to ensure uniform water distribution, especially on slopes. The Irrigation Technology and Research Center (www.itrc.org) at Cal Poly San Luis Obispo has independently tested many of the available pressure compensating drippers and microsprinklers on the market. The majority of products tested do not perform

as well as manufacturers report. Be sure to use emitters that have been independently tested to perform under the conditions of your system.

How can you improve the irrigation of an existing block?

For existing blocks that may not follow the guidelines above, you can compensate for soil type and/or exposure by making adjustments to your system. First, you will need to install soil moisture sensors in the various areas of the block — different soil types, top of slope and bottom of slope, different exposures. After installing the sensors, follow the Goldilocks principle — assess which parts of your block are being overwatered, which are being underwatered and which are just right.

In the overwatered areas you can change out the microsprinklers for lower volume ones. If there are entire lines that are being overwatered, you can install valves to turn those lines off and only irrigate them every other irrigation or at some other interval. In underwatered areas, the microsprinklers can be upsized to get more water to these areas. Consider making adjustments to your underwatered areas first. The changes made to apply more water to these areas may cause a reduction in flow to your overwatered areas and correct or reduce the overwatering.

Growing avocados starts with good irrigation management. Correcting irrigation issues can go a long way to helping mitigate root rot and makes nutrient management in your grove easier. Get the irrigation right and your job as an avocado grower will be much easier and enjoyable. 🍷

APPLY DIKAP AND MAINSTAY SI AT BLOOM

Supporting bloom with calcium, potassium, and phosphorus can be beneficial for fruit set and early fruit development.

Contact your AgRx Field Rep for more information.





Behind the scenes at a photo shoot of RDN and other CAC recipes: food stylist Kim Kissling adjusts a California avocado recipe about to be photographed by Noel Barnhurst, with CAC's Angela Fraser.

CAC Nutrition Programs Feature Registered Dietitian Nutritionists

Consumers rank Registered Dietitian Nutritionists (RDNs) as one of the most trusted sources for information on which foods to eat and which to avoid. According to the *2018 Food and Health Survey Report* by Food Insight, 65 percent of younger adults trust a registered dietitian. This feeling is even stronger among older Americans (ages 65+) at 76 percent. This trust is why for years the California Avocado Commission (CAC) has worked with RDNs who serve as experts and advocates for California avocados. Their nutrition expertise and communication skills, coupled with their passion for California avocados, both educate consumers about avocado nutrition and provide differentiation of the California avocado brand.

In 2019, with a reduced crop size and smaller budget, CAC's marketing programs have been adjusted and are focused to maximize value. The RDN program has been scaled back to two California-based RDNs with a strong following of local fans: Manuel Villacorta, MS, RDN, and Liz Shaw, MS, RDN,

CLT. These brand advocates will encourage avocado consumption as well as preference for California avocados over other origins. They will develop content that is easy to share with consumers on social media and digital channels, make appearances on television and host live events. Shaw and Villacorta both have a large cadre of fans who follow them, so their own outreach expands the reach of CAC communications.

This year, the RDNs developed four California avocado recipes that tap into consumer culinary trends and nutrition concerns: *Mashed Cauliflower with California Avocado*, *California Avocado Loaded Sweet Potatoes*, *Wild Rice Pilaf with California Avocado* and *California-Style Stuffed Bell Peppers*. The recipes have been tested and analyzed for nutrition information and then photographed. These recipes will be included in content that will be placed on CAC's website, blog, throughout various consumer channels and shared with retail dietitians during California avocado season.

As spokespersons for California avocados, Shaw and Vil-

lacorta will contribute to CAC's blog, produce four videos, post on social media and add their avocado nutrition expertise throughout the season. The season opening content is themed "Cook Like a Californian." It includes information about how to choose and use California avocados, how to ripen them and how to prepare the *Wild Rice Pilaf with California Avocado* recipe. Later in the season, they will show how California avocados fit in with "plant-forward eating" as well as vegan and vegetarian diets, which are topics of high consumer interest. Avocado nutrition facts will be included in all of their outreach.

Another tool the RDNs contribute to is called *The Superfood Spotlight*. These California avocado nutrition information sheets are printed and distributed to retail dietitians to share with their clients, and are available on CaliforniaAvocado.com. California avocados are a heart-healthy superfood. In fact, avocados, along with blueberries, beets and exotic berries, like açai and golden berries, rank in the top superfoods that consumers will favor as the healthiest in 2019, according to a survey of more than 1,300 RDNs conducted by Pollack Communications and *Today's Dietitian*. 🥑



Wild Rice Pilaf with California Avocado, created by RDN Manuel Villacorta.



California Avocado Cilantro Coulis, created by RDN Liz Shaw.

Liz Shaw, MS, RDN, CLT is a Registered Dietitian Nutritionist and Certified Personal Trainer in San Diego. She serves as a nutrition expert for many national publications, such as *Shape*, *Women's Health*, *Men's Health*, *Muscle and Performance*, *Fit Pregnancy*, *Parents*, and others. Liz also serves as a brand spokesperson via speaking engagements, appearances on television segments and through her strong social media presence. Her personal blogs include *Shaw's Simple Swaps* and *Bumps to Baby*.

Manuel Villacorta, MS, RDN is a nationally recognized, award-winning Registered Dietitian Nutritionist with more than 18 years of experience. He is the author of four health/nutrition books. A national media spokesperson for the Academy of Nutrition and Dietetics from 2010-2013, he also is a health blog contributor for *The Huffington Post*. Manuel, a resident of San Francisco, is the owner of MV Nutrition and is the recipient of five "Best Bay Area Nutritionist" awards from the *San Francisco Chronicle*, ABC7 News, and Citysearch.

Website Redesign Puts More Tools at the Fingertips of Trade and Media

Since its launch in 1996, the CaliforniaAvocado.com website has become an increasingly important means of engaging with consumers, retail and food-service representatives and members of the media. To ensure the website provides value to all of these audiences, the California Avocado Commission (CAC) looks at website development trends and monitors data from its own website to ensure content remains relevant, interesting and easy to access.

In prior years, the Commission prioritized website updates around areas of highest consumer interest followed by content updates in the trade and media areas. In late 2018, CAC turned its focus to the trade and media portions of the website, analyzing, planning and selecting content in an effort to showcase new elements and make content more accessible for these audiences. Content updates have been completed and the project has now entered the development phase. (A summary of updates for the consumer portion of the website is available in the Fall 2018 issue of *From the Grove*.)

The retail portion of the site was reorganized in a manner that places the information retailers request the most front and center. Retailers can easily order complimentary point-of-sale materials, access CAC-created resources to grow their business, obtain information for supermarket dietitians and craft their own promotions using CAC's downloadable logos, images, recipes and social media tools. In addition, the Commission constructed a new information page concerning the avocado stages of ripeness, and deleted dated information.

CAC's website updates help provide retailers, foodservice operators and media with relevant and engaging content that encourages them to buy, merchandise and/or promote California avocados in season.



Likewise, the Foodservice portion of the website received significant improvements as well – prioritizing content like new recipes, featured recipes, handling information, California avocado seasonality information and press releases to get the chain operators, key foodservice decision makers, menu developers and trade publications to the content they are looking for as quickly as possible.

To ensure members of the media have user-friendly access to the information they seek, the updated press section layout provides a catalogue of Commission press releases by category, showcases CAC contact information in the right-hand navigation and provides a library of downloadable images. To keep the section looking fresh, an automatic archival system was installed to remove older press releases from the landing page.

The newly designed, user-friendly media sector puts key brand messages and assets at the fingertips of the media and encourages timely press coverage about California avocados. The Commission has observed occasions when within 10 minutes of posting a new press release to the website's media section, some online media outlets have distributed the news via their online sites or newsletters.

Prior to the redesign, the retail portion of the website garnered nearly 7,700 page views in 2018, with most of them during the California avocado season from April through early August. On average, visitors spent 1:37 on a page. Foodservice visitors spent just over a minute on a page with more than 2,400 page views recorded. Media members spent an average of 2:13 on a page and visited the site throughout the year, with increased traffic during times of high interest in California avocado news. In 2019, the Commission will monitor metrics in these areas to ensure effectiveness.

Visits to these sections of the website are considerably lower than to the consumer-directed sections because they are targeted to a much narrower audience. But the impact of these targeted audiences merchandising California avocados, including a California

item on a restaurant chain menu or writing a positive article about the fruit, have a significant impact. As Jan DeLyster, CAC vice president marketing, notes, "Retailers and foodservice operators are key gatekeepers of California avocado distribution, so it is critical to provide them with the information and tools they need to support the crop. Likewise the media are gatekeepers of information that can help promote California avocados." 🥑



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WEST PAK
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By Carol Lovatt, PhD
Professor of Plant Physiology, Emeritus
UC Riverside

Application Instructions for ProGibb LV Plus® Plant Growth Regulator

Last spring, gibberellic acid (GA₃) was approved for use on avocado — including use in certified organic orchards — to increase fruit size and yield. The only material registered for this purpose is ProGibb LV Plus®, a low volatile organic compound (LVOC) formulation, manufactured by Valent BioSciences Corporation. It's important to note that the older formulation — sold under the name ProGibb® and other generic GA₃ products — cannot be used on avocado.

Because spring is the ideal time to apply ProGibb LV Plus®, we are sharing application instructions for the product courtesy of Professor Carol J. Lovatt of the University of California, Riverside.

Application Timing

ProGibb LV Plus® is applied as a foliar spray at the cauliflower stage of avocado inflorescence development (Figure 1). The applications should be

made when 50 percent of the trees in the block have 50 percent of their bloom at the cauliflower stage. This means that 25 percent of the bloom will be at an earlier stage of inflorescence development and 25 percent will be approaching full bloom (open flowers).

If you are unable to make the application at this time, being slightly late in applying the treatment affords better efficacy than being too early (Figure 2). It is worth noting that applications made at full bloom are typically not effective.

Spray Volume and Dilution Rate

The sprays should be applied like a pesticide spray to give full canopy coverage, especially of the developing inflorescences, but should not be sprayed to run-off. The maximum allowable dose is 25 g GA₃ (active ingredient) per acre. Research indicates that lower and high-

er doses are less effective.

As concerns spray volume, for ground applications Dr. Lovatt's research team used the same amount of GA₃ (25 g ai/acre), but a spray volume of 200 to 250 gallons of water per acre, depending on tree size, to achieve good coverage without causing the material to run off the tree and with minimum spray volume left in the tank after application. For the aerial (helicopter) application, the greatest efficacy was achieved with ProGibb LV Plus® (12.5 fluid ounces, 25 g ai) in 75 gallons of water/acre.

Use of spray volumes greater than the label rate of 100 gallons of water per acre for ground application is the decision of the agricultural commissioner for each county. Growers should consult with their county agricultural commissioner if they wish to apply ProGibb LV Plus® (25 g ai) in more than 100 gallons of water per acre as a ground spray.



Figure 1. Cauliflower stage of inflorescence development.

Recommended dilution rates are as follows:

- Ground application — use 12.5 fluid ounces of ProGibb LV Plus® (25 grams active ingredient [g ai]) in 100 gallons of water/acre.
- Aerial (helicopter) application — use 12.5 fluid ounces (25 g ai) in 75 gallons of water/acre.

Spray Solution pH

The final pH of the spray solution used in Dr. Lovatt's research was between pH 5.5 to 6.0. ProGibb LV Plus® is stable at pH 4.0 to 8.5, thus the pH of the water used should be

adjusted accordingly. To prevent breakdown of the material, prolonged exposure of GA₃ to a pH > 8.5 should be avoided.

Wetting Agent

Dr. Lovatt's research team used the organosilicone surfactant Silwett L-77® or Widespread Max® at a final concentration of 0.05 percent as a wetting agent. Similar pure organosilicone type surfactants also are acceptable as wetting agents.

For more complete information concerning ProGibb LV Plus®, read "ProGibb LV Plus® Plant Growth Regulation to Increase Fruit Size and Yield of Avocados" in the Summer 2018 issue of *From the Grove*. 🥑



Figure 2. Inflorescence development slightly beyond cauliflower stage, but still okay for gibberellic acid treatment.

By Tim Linden

Stronger Market Expected in Spring/Summer

Awetter than usual winter, and continued rain in the forecast, is making it much easier for California avocado growers to hold onto their fruit and wait for the stronger marketing opportunity that typically comes in the late spring into summer time period.

A survey during February of several handlers of California fruit indicated that while there was some fruit in the market, and it would continue to slowly increase, it will probably be well into April before the weekly numbers jump. May, June and July appear to be the sweet spot for this year's crop. Rob Wedin, vice president of fresh sales and marketing for Calavo, said the significant rainfall has had a "calming effect" on growers as it makes any decision to hold the fruit for a better market easier to make. He added that rain makes the trees healthier, which makes them better suited to carry the fruit into the summer.

Gary Clevenger, chief operating officer for Freska Produce International, made a similar observation. "We hear it's going to rain through May. That's good for the trees and good for the growers," he said. "They can let the fruit sit on the trees and size up."

Dana Thomas, president of Index Fresh, said the market typically rises along with the temperature in spring and summer and he expects most of the California fruit to be marketed during that time frame. "We think Cinco de Mayo, Mother's Day, Memorial Day and on through the 4th of July will be an excellent time to market California fruit.

Those are strong marketing opportunities and it will allow most of the fruit to be sold before Peru starts shipping heavily into the U.S."

He expects the California fruit to differentiate itself from other sources of supply during its season and to receive a premium for its output. Though returns might not be as large as the small size of the crop (175 million pounds) would historically predict, Thomas still believes "it will be a strong pricing year for California fruit."

The f.o.b. market in late February was in the \$25-\$30 range depending upon fruit size. That market price resulted in a lot of promotions but not a great incentive to pick your fruit if you are a California grower. Wedin said the light crop means most growers will only go through their groves once, meaning they will want to time the picking for both optimal sizing of the fruit and a good marketing window.

He noted that Mexico is expected to send an average of more than 50 million pounds of avocados to the United States each week through March. At that point, there should be a reduction in Mexican supplies, which could lead to a stronger marketing situation. In February, it was too early to pinpoint when Peruvian avocados would first enter the U.S. market but the consensus was that it would be sometime in May. Both Wedin and Clevenger said reports are that Peru has a lighter crop this year, though its shipments to the United States could very well be about the same as last year, which was about 181 million pounds.

Donny Lucy of Del Rey Avocado

Co. said: "We started harvesting California fruit in a light way at the end of January and that will continue through February. There hasn't been much volume and we don't think there will be until late March. We expect to sell most of the crop in April, May and June and then it will start to trail off in July."

The packer is also known for its representation of the Morro Bay avocado that typically comes off in September and October, but he said supplies of that fruit will be very light again this year. Morro Bay was hit with a hard freeze a year ago with its effects still being felt.

Clevenger indicated that the silver lining in this year's situation is that there could very well be an excellent crop in the making for the 2020 season. The trees are not overly-burdened with 2019 fruit and the steady rain is surely helping the blooms that are currently on the trees, which will play a huge role in determining the size of next year's crop.

Another positive aspect of avocado marketing is that consumers are continuing their love affair with the fruit. In January, a record number of avocados were sold with back-to-back weeks topping 70 million pounds of avocados in the U.S. marketplace. While the f.o.b. market price is less than what growers would like to see, Wedin of Calavo said the market price held firm while those record-breaking shipments were being made. And even though multiple weeks of 50-plus million pounds are in the forecast, Lucy of Del Rey expects the market to strengthen in March and April. 🥑

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