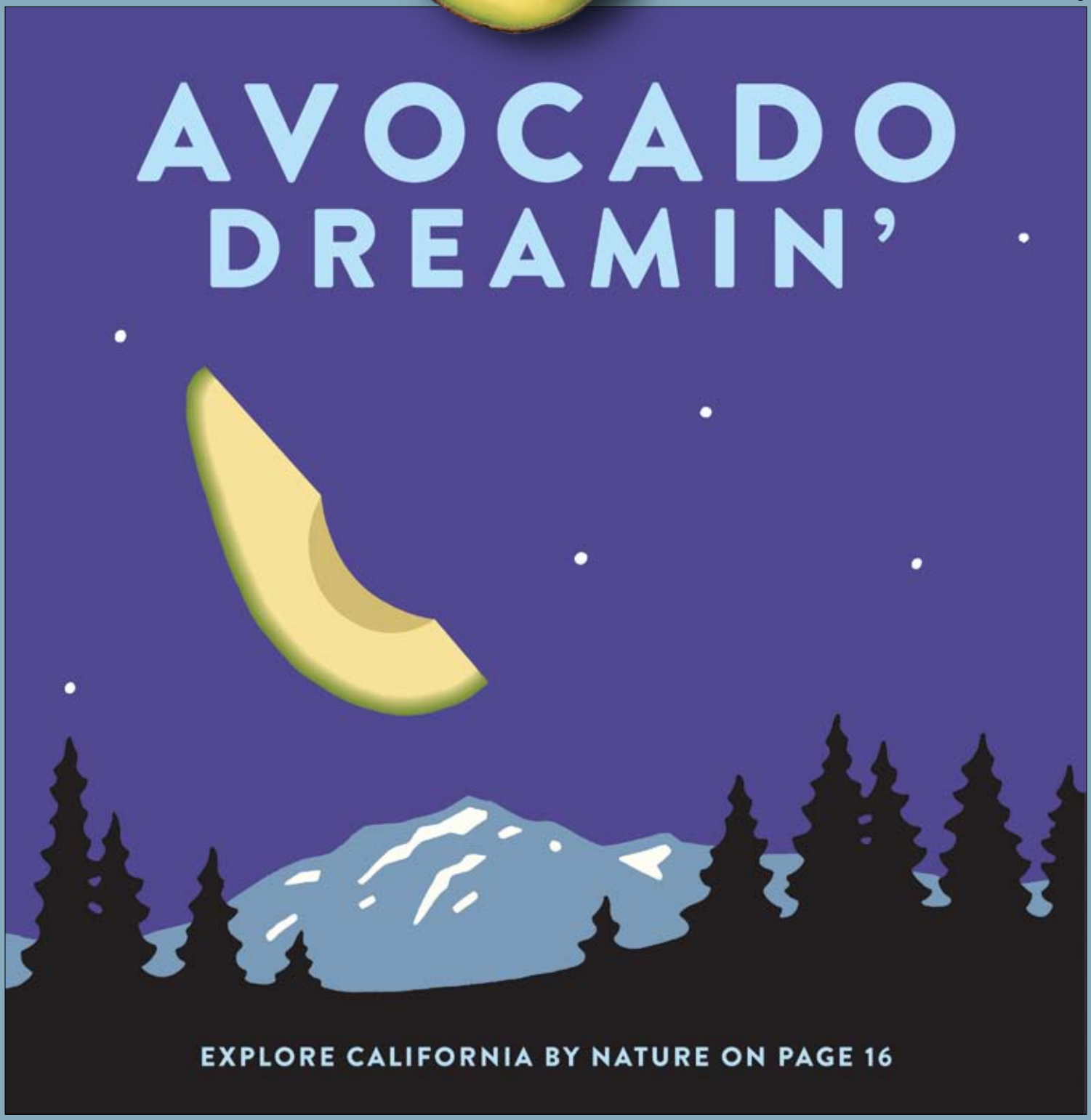
Spring 2016

From the Grove

The Latest News from the California Avocado Industry



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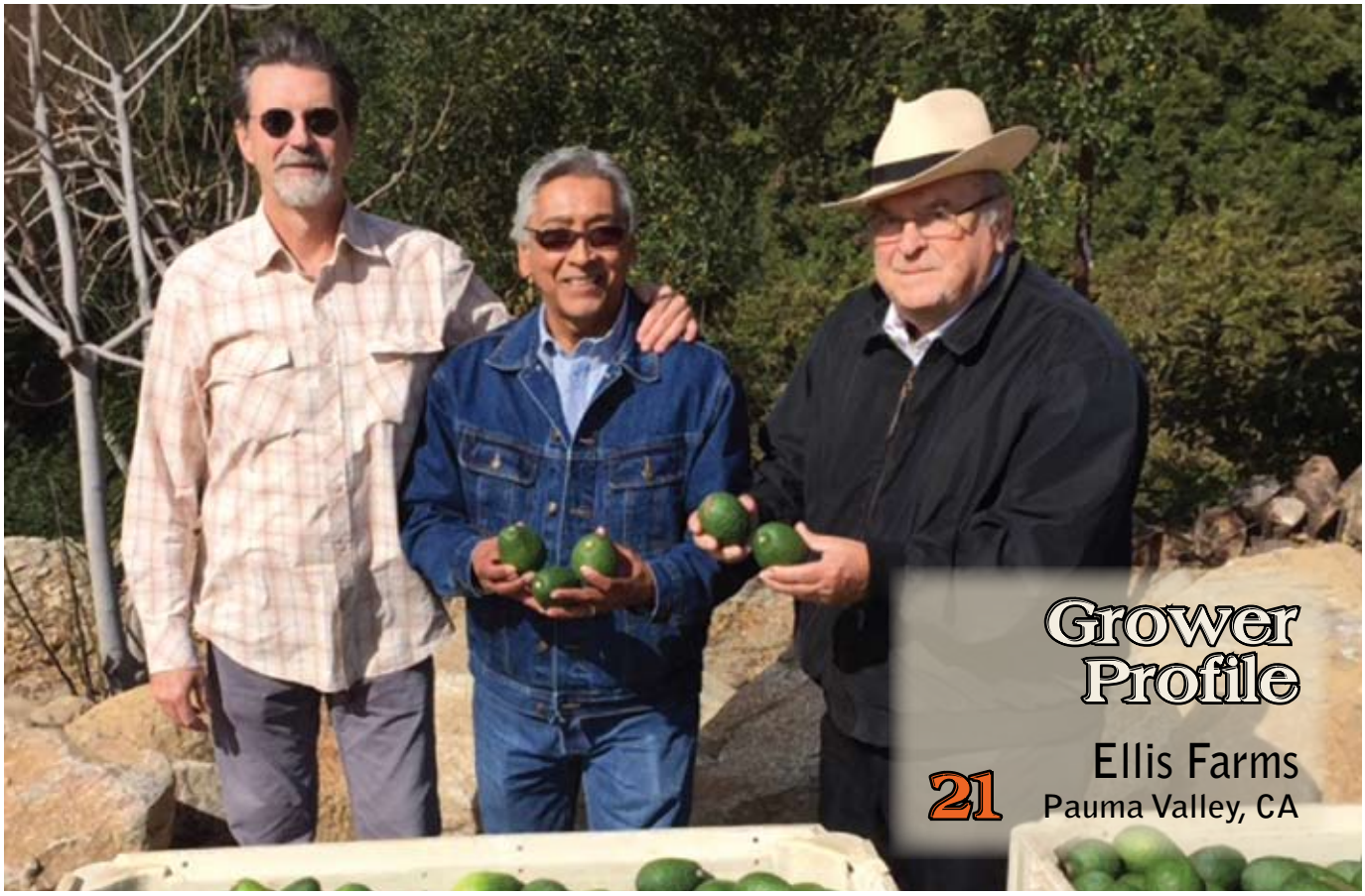

From the Grove

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President
Tom Bellamore
CA Avocado Commission

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

Ad Sales
Tom Fielding
Office: 626.794.6823
Cell: 626.437.4619
tomfielding1@mac.com

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

April Aymami
Industry Affairs Manager
949.754.0738
aaymami@avocado.org

California Avocado Commission
www.californiaavocadogrowers.com

In This Issue

Spring 2016

Departments

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Message from the President

The Early Season Market

Tom Bellamore

California avocado growers have been vocal about their disappointment in the early season market in the U.S. this year, and understandably so as f.o.b. prices weakened under the pressure of an enormous volume of imported fruit. After two years of smaller crops, hopes were pinned high that this year's anticipated 400 million pound harvest would command a favorable price, and some growers planned a picking strategy to remove a percentage of their fruit following the first release dates. Mother Nature cooperated and winter rains, where previously there had been none, accelerated maturity in some groves and brightened prospects. Fruit quality, for the most part, looked exceptional, and the season had all the markings of success to an optimistic farmer. Then came the tidal wave.

By the time February 29 arrived, the volume of imported avocados that entered the U.S. in the first two months of 2016 totaled close to 400 million pounds—the expected amount of the total California harvest for the entire year. All bets were on the Super Bowl as weekly arrivals continued to build along with the pre-game hype. In one week alone, ending January 24, a record 60 million pounds of imported fruit crossed into the U.S. The California harvest, by comparison, was 2.1 million pounds that week, of which 570,000 pounds found its way into a very crowded market.

There is little doubt that the California fruit sold in January eclipsed the import offerings in terms of quality. Large corporate retailers and big box chains complained to the Commission during that period about how poorly some of the imported fruit was cutting. CAC's marketing staff had been out laying the groundwork for the 2016 California season, and many retailers were eagerly awaiting the availability of high quality, locally grown avocados. In fact, Jan DeLyser and her team of Retail Merchandising Directors called on a total of 28 retail accounts in all parts of the country in the opening weeks of the year, representing some 15,000 stores, giving trade customers a good sense of how the California crop was shaping up and when it would move to market. Retail promotions will begin to get underway, for the most part, in mid-March. On the foodservice side, 85 chains have been contacted, and 26 promotions are scheduled. Interest among the trade is high, to say the least.

So why doesn't this early interest translate into respectable field prices during January and February? Unfortunately, there are a number of contributing reasons, the first of which is critical mass. The volume of California fruit harvested during January and February represents only two percent of the total volume of Hass avocados available to the trade during that period. Less than 20 million pounds of California fruit came onto the market in that eight week timeframe, and less than a million pounds a week trickled in through January 17. This is *not* promotable volume, and getting the attention of major retailers with those numbers is all but impossible. Consider that one mid-sized, regional supermarket chain based in California sells, on average, over 100,000 pounds of avocados per week, year round. Corporate chains barely take notice of the supply we put into the market in January, because our quantity is insufficient to meet their demand. Quality helps set us apart, but it alone cannot carry the banner, there must be volume to back it up. In some instances, innovative packers were able to match California fruit with certain specialty retailers in January and February to achieve a better price for growers, but the imported volume still hung like a heavy cloud over the market.

Some growers chastised the Commission for allowing (really?) Avocados from Mexico (AFM) to own the Super Bowl. After all, guacamole on game day was a California creation back before imported fruit first landed on U.S. shores. Where had our nationalism gone?, they asked. We watched the Super Bowl commercials, too, and thought that AFM's $6 million spend for 30 seconds raised avocado awareness without making a strong brand play. By the way, that's the equivalent of CAC's entire consumer advertising budget for the year. AFM, with close to $50 million at their disposal, could easily have taken a hard-hitting approach aimed at flattening California, but they didn't. They chose a relatively generic message instead. Raising awareness of avocados with only a passing mention of brand is called a category strategy, and it is fundamental when attempting to expand the market at 10 percent annu-

ally, growth which far outpaces that of most other produce items. As for our nationalism, we'll save it for Memorial Day, Fourth of July, and Labor Day, thank you, when California avocados can patriotically claim to be the local favorite in good supply. The bulk of CAC's promotional spending will occur in this window.

The next contributing factor that kept downward pressure on prices was sizing. Sizing is always a challenge and it doesn't seem that long ago we were swimming in 60s and 70s at the front of the California season. Thus far this year, the size profile of imported fruit has been askew—it has tended to run larger. Consequently, the field price of smaller fruit equaled or outperformed that of larger fruit for many weeks. The inverted prices have been maddening to growers and marketers alike, and 40s, on the tree now, seem to be getting bigger and less valuable, pound for pound. When 60 million pounds of avocados arrive in a week with a size profile that doesn't easily match the demands of trade customers, every sales desk is scrambling. Price suffers.

Perhaps the biggest part of the price equation that makes achieving a premium for California fruit elusive has to do with people, and the fact that no one party has control of "the deal." Growers are quick to point to CAC and say that not enough has been done to shore up field prices. Similarly, there is much finger-pointing at packers who handle substantial volumes of imported fruit. And more than one stone has been tossed at retailers, who are often cast as opportunists who manipulate margins, at will, to further their bottom line. The simple truth is that the U.S. avocado "deal" is remarkably complex and it performs, thankfully, like no other produce deal in the world. The Commission uses its limited marketing resources to *influence* consumers and trade customers who are predisposed to the attributes embodied in California avocados. If we had sole (or any) control of the seller-buyer transaction, we would be pitching the premium nature of our product until the cows came home. But we do not. We can only inform the conversation and set the stage for the wrangling that occurs when the trade customer calls the packer's sales desk.

Then there is the salesperson. When inventories mount and demand is weak for those sizes that are readily available, every lug becomes a challenge. Big box retailers and corporate buyers put the squeeze on the packers, and play one off against another. If the sales call terminates without a sale, there is always another phone number to ring. Despite all of this, there is a growing appreciation for the unique characteristics of the California portion of the "deal." With market share hovering around 15 percent, California avocados are not only fresh and local, they are scarce, and marketing journals are filled with case studies of consumers paying more for items that are in short supply or difficult to acquire. The key is to discourage substitution, and you must do so by differentiating California avocados from imported fruit based on real and perceived quality.

Next come the retailers. Each one has a different corporate strategy: low price leaders, specialty stores, fresh is best, discount wholesalers, and high-end, quality-oriented trendsetters, each with something different in mind when it comes to the avocados they stock. Increasingly, retailers are catering to their customers' needs in social media because they are aware that millennials, for example, may be making last minute decisions about meal preparation. This is

one reason why the Commission has shifted more attention to the digital realm and online promotion, where marketing resources generally go further. More importantly, these differences are at the heart of the Commission's tiered account approach with retail and foodservice customers. Our ability to secure a "premium" price for California avocados rests, in large part, on prioritizing accounts and customizing promotions with those who are most loyal to California. The ideal account is one with a customer base able and willing to pay for fresh, local, high-quality avocados from California, and we must focus our attention here. There is room for profitability on both sides of the equation—buying and selling—if we align our product with these ideal accounts.

There is at least one more player in the deal, the grower. Growers often comment about how they are price-takers with little or any clout when it comes to selling their fruit. At the Commission, we know from experience that this is not true. There are many growers who actively engage with one or more packinghouses to devise a solid harvest strategy and maximize their returns. These individuals generally remain quiet about their successes and they are not all large acreage growers. Those who have returns consistently above the industry average invest considerable time with packinghouse personnel, from the field to the sales desk, to make it happen. Not everyone may have the time or will power to operate this way, and that is understandable. What all growers have in common, however, is substantial investment, a stake in California, a desirable product that consumers want, and, oftentimes, more bargaining power than you might think.

Making our industry strong takes all of us pulling together in the same direction. The Commission will continue its leadership role, but maximizing returns will elude us unless there is industry alignment behind our premium positioning strategy. Among growers and packers, there must be a commitment to quality, solidarity behind the California brand, and an unwavering belief that our avocados have no equal. Each of us must be unwilling to compromise when the pressure mounts to undersell our product, because we inherently know it is worth more. That responsibility is shared, falling equally on every shoulder in the industry.

Growers Affirm Continuation of Commission Operations

The California Avocado Commission (CAC) received notification from the California Department of Food and Agriculture that the recently completed 2015-16 referendum of California avocado growers has confirmed continuation of Commission operations. By law, for CAC operations to continue a vote is required every five years and a majority of producers voting must vote in favor of continuation. The voting results showed that 84 percent of voting producers support continuation of CAC for another five years, well above the simple majority requirement.

The Commission remains at the forefront of developing marketing programs to build demand for the California avocado brand, advocating for the California avocado industry and funding research to ensure a sustainable future for the industry.

"The California avocado industry has supported the Commission for nearly four decades," said Tom Bellamore, CAC president. "With this referendum vote we rededicate our commitment to foster a vibrant industry through the premium California avocado brand, innovative marketing and continual industry advances."

California Avocado Commission

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

Chairman's Report

The Best Laid Plans... Haven't Materialized

Doug O'Hara

The California avocado season has definitely started differently than I had imagined. As I began putting together my harvest strategies last November, I forecasted a size pick in January to help alleviate unnecessary stress on the trees. At the time, it appeared we might have some good prices because of increased California avocado demand so I was comfortable harvesting at this time. Another concern was the impending, dreaded El Niño and the anticipated havoc it could bring to Southern California agriculture. I planned for large crews who would pick the fruit quickly in order to avoid any delays due to rain or muddy groves. What a great strategy! It gave me a longer season to get the entire crop off my groves and catch the high end of the market. Regretfully, we all know none of this came to fruition.

It seems to be the challenge of almost every California avocado season. It is getting harder and harder to predict external factors that affect our price, total volumes, ability to pick, etc. We get upset when the packers aren't quoting prices we deserve, or we see imported fruit in our grocery stores, instead of our fruit. Unfortunately many of these factors are out of our control. For example, in the period leading up to the Super Bowl there were over 55 million pounds per week of Mexican fruit available to consumers, in comparison to 2-3 million pounds of California fruit. How can I blame packers or retailers for selling imported fruit? Demand for avocados exceeds what California growers can provide. This is reality and the situation is expected to get worse as the volume of imported fruit continues to increase. But I believe there is hope and there are factors we can control.

We must continue to support the California Avocado Commission (CAC) and its marketing team. We are becoming a minor player in the global avocado industry so it's important we maintain a strong marketing presence, constantly push our California brand and remain unique. Our competitors can outspend the California industry many times over so it is important that we target how and where money is spent. Jan DeLyser and her entire team have done an outstanding job meeting these goals in conjunction with our new advertising agency, and I believe we will continue to be a strong, unique presence in the marketplace.

Our assessments continue to help Jan and the marketing team reach these goals, but it also is imperative we provide enough fruit to supply our consumers' demands. The bottom line is this — without enough California fruit to supply retailers, it is impossible to compete globally. With costs endlessly rising, water under mandatory allocations (in most areas), labor more difficult to find and wages increasing, we are at a critical point. Over the last few years, a large percentage of acreage has gone out of production. We must maximize the production of existing acreage, so here are a few recommendations:

- **Irrigate correctly**. There is nothing worse than an under-irrigated avocado tree. Yes, water is expensive but to get the best results the correct irrigation must be applied.
- **Fertilize correctly**. The trees need to be fed the correct nutrients in order to grow and produce consistent crops. Growers should use the various resources available to help them manage this efficiently.
- **Prune!** Pruning is very important in helping increase the amount and size of fruit. It also can help reduce alternate bearing and help produce a more consistent crop.
- **Pick early and often in large crop years**. I know it is painful to pick fruit in a weak market but if you pick several times during the year your average returns should be good. This also will reduce the amount of stress on your trees and help with the next year's crop.

Are the above an answer to our prayers? No, just simple farming practices to help keep our industry strong and viable. As growers we must stop worrying about importers and handlers and instead focus on our accomplishments. I fully believe this starts with supporting all aspects of CAC. The rest will fall into place and lead to our continued success.

The Complexities of International Trade

By Ken Melban
Vice President of Industry Affairs

At the time of this writing, the U.S. avocado market is facing instability and – in some instances – devaluation. An inventory of 70 million pounds coupled with a higher percentage of larger fruit has led to below normal pricing. California growers, hoping to enter a more favorable post-Super Bowl market with the strength of the California brand, were understandably disappointed with prices. This disappointment has led to frustration among the industry, causing some to ask, "Why doesn't the California Avocado Commission stop, or at least reduce, the import of avocados into the U.S. market?" And, "Why doesn't the Commission gain trade access to more markets?"

While those may seem like straight-forward propositions, in reality they are not. Both propositions have major limitations and are complicated by a number of factors. After hearing from a few industry members it seemed prudent to provide an overview of U.S. trade policy, an explanation of the process to gain trade access to new countries, and the complexities involved.

U.S. Trade Policy

The United States has a long history of being pro-free-trade. This history transcends political parties — both Republican and Democratic administrations have adopted major free trade policies. There is a reason for that, particularly when it comes to agriculture. Consider a state that grows program crops: corn, cotton, soybeans, wheat or feed grains. In total, these crops probably cover three-fourths of the United States. It has almost guaranteed the congressional members from those states support free trade because those commodities are heavily export dependent. Now, consider the pressure on the U.S. Department of Agriculture (USDA) to open export markets for those major U.S. commodities. How can the USDA best open these export markets? By promoting free trade abroad and opening the U.S. market to foreign goods. In this pro-free-trade environment, there are three main issues that can *legally* keep an avocado-producing country from shipping to the United States: the threat of introducing unsafe food or invasive pests and anti-dumping laws.

Food Safety Concerns

The Food and Drug Administration (FDA) is responsible for ensuring the safety of all produce sold in this country. Accordingly, the FDA does random testing of produce for bacterial contamination. If a shipment of fresh produce tested positive for bacterial contamination (e.g. *E. coli* or *Listeria monocytogenes*), the FDA would detain that shipment. Depending on the outcome of the FDA investigation, the shipment would be destroyed or reconditioned. While significant market disruption could occur from an incident of product with bacterial contamination, it would not necessarily halt trade of that product. If multiple instances occurred and/or FDA found a systemic problem, then FDA could issue an import alert concerning the company or a country-wide alert.

Understanding Sanitary and Phytosanitary Measures

In 1995, the World Trade Organization established the Agreement on the Application of Sanitary and Phytosanitary Measures (the "SPS Agreement"). The SPS Agreement was designed to ensure that food is safe for consumers, and to prevent the spread of pests or diseases among animals and plants. Each participating country (developed and developing) has the authority to establish phytosanitary requirements and *only each respective foreign government can give the phytosanitary clearance*. Although SPS requirements are "based" on science, arguably there are instances where countries use them as an excuse to protect domestic producers or as an unfair trade barrier. This is the political side of global trade.

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The USDA's Animal and Plant Health Inspection Service (APHIS) is the lead agency responsible for ensuring that all imported agricultural products shipped to the United States from abroad are free of pests and agricultural diseases. Additionally, APHIS works with interested domestic producers to gain trade access abroad.

Before the United States enters into a trade agreement with another country, a thorough Import Risk Analysis (IRA) must be completed. For produce, the IRA is primarily a pest risk assessment. The IRA is a process in which both countries identify pests that are present in the export county but not in the importing country, and together must agree that these pests may pose a risk to the importing country. Once the IRA is completed, agreement on quarantine protocols and SPS requirements between countries must be reached to mitigate the possible introduction of identified invasive pests. Upon finalizing an agreement, trade of the product can begin per the requirements of the protocol. This process can take years.

Anti-Dumping Laws

Beyond SPS measures, once a nation has access to a market, another avenue to bar imports is the anti-dumping laws. "Flooding the market," by itself, has no remedy. Supplying a market at an artificially low price – i.e., at a price below the cost of production or the price of that commodity in the home market – is "dumping." No avocado-producing country has yet to "dump" fruit in the U.S. market (even though it may feel like that).

U.S. antidumping law provisions are intended to prevent price discrimination between national markets or below-cost pricing in the United States. Antidumping claims in this country involve separate investigations by the Department of Commerce and the U.S. International Trade Commission (ITC).

The Commerce Department is responsible for deciding if dumping has occurred, and if so, to determine the dumping margin (typically the amount by which the foreign market price exceeds the price it is being sold for in the U.S. market). It's the function of the ITC to determine whether a U.S. industry has suffered substantial damage or is threatened with material injury by reason of the dumped imports.

If both the Department of Commerce and the ITC confirm dumping and resulting damages, an anti-dumping order is issued and anti-dumping duties are imposed on the imported goods. The duty will equal the dumping margin, which again, is typically the amount by which the foreign market price exceeds the cost in the U.S. market.

Commission's Record on Addressing Phytosanitary Concerns

In 1914, the importation of fresh avocados from Mexico was prohibited because U.S. plant health officials identified avocado seed weevils in Mexican orchards as pests of quarantine significance. In the early 1970s, Mexico requested approval to export avocados from the state of Michoacán, and, later in 1975, from the state of Sinaloa. APHIS rejected both of these requests based on phytosanitary concerns.

In the early 1990s, three different work plans were submitted to APHIS by Mexico for avocados grown in Michoacán to be imported to the United States. Immediately the Commission became heavily involved in the IRA process, and worked to ensure APHIS properly identified all potential invasive pests. In July 1993, APHIS approved the entry of Mexican avocados into Alaska under certain conditions.

On January 1, 1994, the North American Free Trade Agreement (NAFTA) was ratified among Canada, Mexico and the United States. Then, in just over six months, on July 5, 1994, the Mexican government formally requested that APHIS further amend its import regulations to allow importations of Hass avocados into the northeastern United States. The Commission continued to challenge USDA's "scientific conclusions" for the pest risk assessment, causing significant delays.

Ultimately, in 1997, Mexico was granted access for the importation of Hass avocados from the Mexican state of Michoacán into 19 northeastern states and the District of Columbia from November through February, provided they meet certain safeguards specified by APHIS. Although Mexican avocados had gained access to parts of this country, if it weren't for the efforts of the Commission access would have been granted for the entire United States.

Finally, in 2007, Michoacán was given access to all 50 states, a full 10 years later than requested. Now, it appears all of Mexico will likely gain access by the end of 2016 or in 2017 — again, another full decade after Mexico's original request. Because of the Commission's efforts to safeguard the California industry from invasive pests, it took USDA 20 years to figure out a legally defensible way to address the Commission's concerns. The Commission understands utilization of SPS measures to appropriately delay access, but is also aware of the pro-free trade climate of the U.S.

Commission's Trade Access Efforts

China. In 2005 the Commission, working through APHIS, submitted a trade application for avocados to China. The application was sent to China's General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ). As part of the IRA, the Commission provided APHIS with detailed and timely information that was then provided to AQSIQ. Unfortunately, because of the politics between the United States and China, progress has been slow. Although the import of California avocados is not a major concern to China because China does not commercially produce avocados, signifi-

cant delays have resulted. China has displayed a *quid pro quo* approach. In 2013, APHIS was told that China would not move on any of the U.S. market access requests until the Chinese see progress on their requests for access to the U.S. market for apples, citrus, and/or grapes.

Fortunately, recent progress has been made on some of these key commodities for China and it appears AQSIQ will make a technical visit to the California avocado industry this spring. Obviously, China does not represent the "norm" in gaining market access, but even in the best case it takes a few years to gain trade access to another nation.

Japan. California avocados have market access to Japan but have a three percent tariff imposed. The Commission worked with the Foreign Agricultural Service to ensure that under the recently signed Trans-Pacific Partnership (TPP), Japan's three percent tariff on California avocados will be immediately eliminated upon ratification by the participating countries.

New Zealand. The Commission also is working on an application for trade access to New Zealand. There is concern regarding sun blotch and it appears that California groves would have to be certified free of sun blotch for fruit to be exported. We will continue to work through the application approval process and identify what sanitary requirements would be required.

New Market Opportunities

During January a story ran about the sky-rocketing price of avocados in Australia, with avocados selling for AU$5.99 each or two for AU$10. Some California growers hear that and ask, "Why aren't we shipping to Australia?" While that immediate interest is understandable, it must be tempered with a dose of reality. First, the Australian market conditions reported in the story were a great aberration from the norm. The story went on to say, "Melbourne Market wholesaler Greg Scopelleti, whose family owns an avocado farm in the Sunraysia region of Victoria, says prices are at a 20-year high. He said the price of a box of up to 23 avocados had been as much as AU$120. At their cheapest, when avocados are plentiful, they can be as little as AU$20 a box, a regular price is AU$30 to AU$40. 'It hasn't happened like this for 20 years,' Scopelleti said."

The Commission has limited resources, and, as with any organization, we must consider where the best return on investment will occur. If the Commission were to pursue market access for Australia, it would require significant Commission resources. Once secured, what will the price be for avocados in Australia? If it's in the AU$30 to AU$40 price range, which is normal, transportation costs make that a break-even proposition at best.

It's also important to consider that export market opportunities typically last a few weeks or months. Japan is a good example. They usually buy California avocados from March to June. The U.S. market, however, generally provides comparatively good returns all season.

Recently APHIS contacted the Commission indicating it has received requests for U.S. avocado from India and Thailand. We have no information concerning who is making these requests. The requests could possibly be from in-country importers who see potential for avocado sales where none exist today. In these instances, the Commission will explore the opportunity with handlers to determine if they are interested in those markets and whether they have importers in that country. If we pursue new markets, it is critical the industry is prepared to supply those markets. In addition, in many of these new markets (e.g. China, India) a tremendous amount of market development activities will be necessary to increase consumer awareness of the product and its versatility. All these considerations must be factored into the decision.

The Hass Avocado Board (HAB) is a great example of the need for having funds available to build consumer awareness. The Commission drafted federal legislation to create HAB soon after Mexico was granted access to the United States because we knew a tremendous increase in volume was going to occur. This year alone more than $40 million will be collected from imported avocados and spent on market development in the United States. That spending has resulted in an average of 10 percent annual growth in U.S. consumption for the past decade. What would that growth look like without HAB? We can't know for sure, but it would most likely be significantly lower – perhaps two percent at best.

One Final Note

For as many growers who say the Commission should pursue new offshore markets, there are an equal number of growers who believe all California avocados should be sold right here. At the Commission, we believe our core market is in California and the neighboring states. Our close proximity to those markets and the fact that no other country can tout they are "local" or grown in the United States strengthens our resolve to build local demand.

In addition, another benefit in selling close to home is the lower shipping cost. Considering that California has the highest production costs among avocado producing countries, reduced shipping costs can help. But, we also have to consider years when we have a surplus crop. In those years, it may be beneficial to have other markets available for the peak periods during our season.

Hopefully, by the time this magazine publishes prices for California fruit will be more favorable. One thing is for certain, your Commission staff will continue to fight to get you the best markets the world has to offer.

#BigGameAdd:

Instant Replay

On February 7, 2016, the California Avocado Commission (CAC) turned the tables on Big Game advertisers by taking its Big Game "adds" to social media. The goal of the campaign was to engage the Big Game advertisers and other influencers on social media to increase reach of our tweets during the game.

"With California avocado season beginning and peak availability expected from March to September, a big media spend around the football championship did not make sense for CAC," said Jan DeLyser, vice president of marketing for the Commission. "Social media gave us the opportunity to be part of the Big Game buzz and build excitement for California avocado season."

Using the hashtag #BigGameAdd on the social media channel Twitter, CAC tweeted custom recipe videos combining advertised Big Game food and beverage items with California avocados. Each and every Big Game advertiser whose food could combine well with California avocados was a target.

CAC made custom recipe videos using advertised food and beverage products including candy, ketchup, beer and cola, and even avocados from Mexico.

The recipes ranged in style from popular concoctions, like **Nachos with California Avocado Big Game Guacamole,** to the unexpected – **California Avocado Chocolate and Candy Bar Cookies**. This was fun for the CAC social media audience, and it also showed the versatility of the fruit.

Phil Lempert, known as "The Supermarket Guru," remarked in a Forbes.com article, "CAC was brilliant and showed us the future of food marketing and connecting to shoppers – especially those elusive Millennials and Gen Z'ers. Every time a food or beverage ad aired during the Big Game, regardless of the brand or type of food or beverage, they posted a video on Twitter showing how California avocados would pair with it."

This campaign was groundbreaking for California avocados. The brand saw an 876 percent increase in impressions, with a potential reach of more than 2.7 million people – more than 200 times its base Twitter audience. In addition to the massively increased reach, the engagement rate on owned posts nearly doubled from average. To top it off, the campaign generated a 535 percent increase in brand mentions on Twitter. The #BigGameAdd resulted in one of California avocados' biggest days on social media ever.

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

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

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

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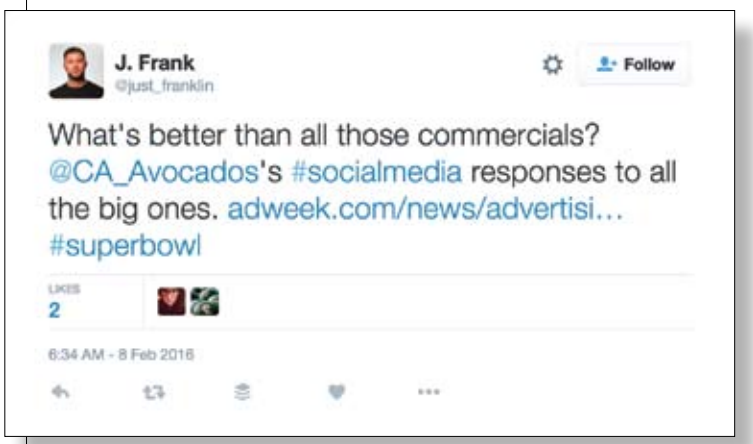


This type of agility allowed the Commission to respond to social media conversations in real-time, and generate an even greater impact for the campaign. Lempert noted, "This is a best practice for food brands, and food retailers. The lesson learned is that the way to drive impulse purchases have changed – the how, where and why; and that by being proactive in real time with unique fun ideas you can build sales with just the touch of a button on your mobile device."

Not only did the #BigGameAdd celebration put California avocado season top of mind for consumers, but the delicious concoctions serve as inspiration for many California avocado-packed dishes to come.

This campaign had reach that extended beyond the Big Game advertisers whose products were used in the CAC-developed recipes. Popular comedy duo and Big Game hit, Key and Peele, tweeted at CAC through SquareSpace's Twitter handle. These provoking responses from advertisers outside of the food category allowed us to reach an even bigger and broader audience without significantly increasing the media spend.

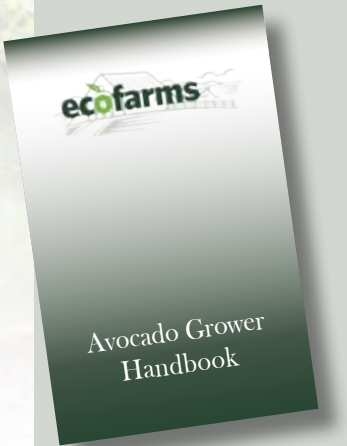
Execution resonated excellently with CAC's loyal audience, new fans and trade press alike, leading to major industry publications including *AndNowUKnow, Perishable News, The Packer* and *The Produce News* praising the innovative campaign.

The campaign caused a stir both within the produce industry and beyond. Equally as important to the success of the campaign as the initial tweets themselves, CAC set up a live monitoring room during the game and responded in real-time to responses from brands and influencers.

Handling California Avocados

Organic and Conventional Since 1974

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



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

ecofarms

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

California by Nature

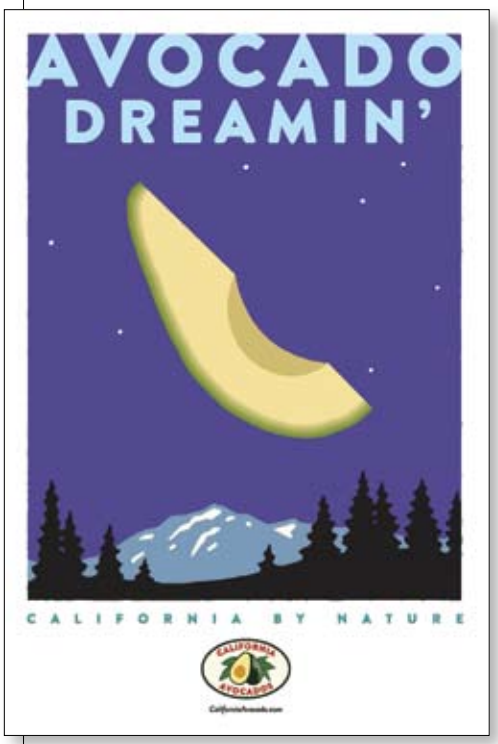
The California Avocado Commission (CAC) is kicking off the 2016 California avocado season with a new consumer advertising campaign. The new campaign follows on the heels of the successful 2008 – 2015 California avocado grower campaign, which placed an emphasis on the hand-grown nature of California avocados.

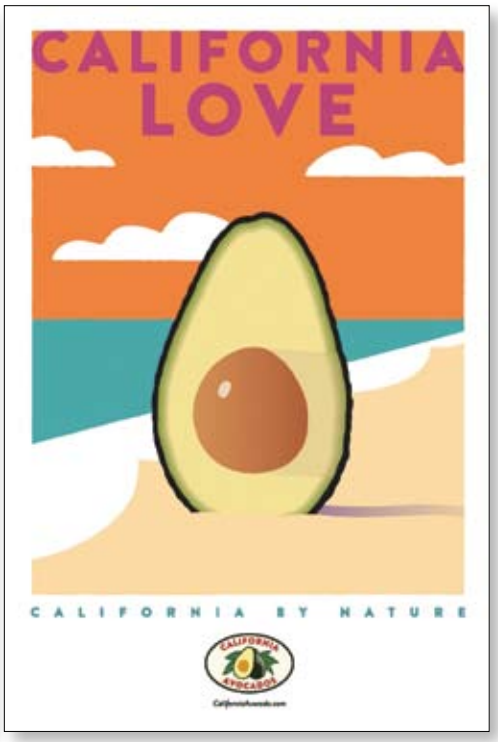
The seven-year campaign connected the fruit with the people and places behind each California avocado in a rational way that resonated with the Commission's target consumer. The new campaign takes this idea one step further by establishing the idea that California avocados aren't just made *in* California, but made *of* California. It's a celebration of everything that is endemic to the Golden State, from a climate that's unlike any other to its diverse people, ideas and interests. Inspired by those native to California and transplants alike, CAC set out to position the California avocado as the perfect symbol of the California lifestyle.

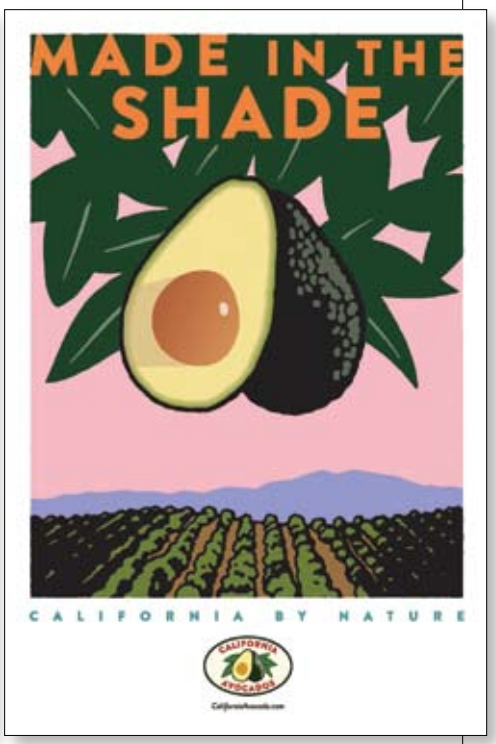
TARGET AUDIENCE

The Made of California campaign aims to engage with current California avocado consumers and broaden the target audience to include a younger generation. That said, the primary audience of this campaign is the group CAC has identified as "Premium Californians." This group is broken into two sectors: those who buy local for rational reasons and those who are indifferent about whether their fruit is locally grown. Knowing the former will continue to purchase California avocados, CAC recognized an opportunity to influence the latter and identified the key to driving their purchases: providing an emotional reason to choose California avocados.

Research conducted by MullenLowe, the Commission's advertising agency of record since August 2015, showed that Premium Californians are emotionally invested in art and culture. They are adventurous, informed and care about their communities. To tap into the emotions and interests of







Premium Californians, CAC's new media strategy is a hyper-targeted, creative and interactive approach.

TARGET MARKETS

As in years past, MullenLowe explored markets in California as well as the rest of the country to identify key target areas. Using a category and brand opportunity index, they identified Los Angeles, San Francisco, San Diego and Sacramento as primary markets with Phoenix, Portland, Salt Lake City, Denver and Seattle as secondary markets.

THE WORK

CAC called on Michael Schwab, the California-based artist and designer of the Hand Grown in California logo, to create a series of compelling print ads that will form a connection between California avocados and California culture. Schwab's graphic arts are well known for being simple and iconic, including the Hand Grown in California logo. Working closely with CAC, Schwab expanded on the world he captured in his original logo design. Set in the pages of local California lifestyle publications such as *LA Magazine, Sactown Magazine, San Diego Magazine and San Francisco Magazine*, these ads will evoke the natural beauty of the state, from the beaches in the south to the mountains in the north and all the picturesque avocado groves in between. The essence of this communication is expressed in a new theme line, "California by Nature," which is shown in the ads above.

CAC also recognized that murals are part of California's cultural fiber and serve as beloved staples to art-minded Premium Californians. So, in addition to print ads, four murals will be painted in Los Angeles, Sacramento, San Diego and San Francisco. Undoubtedly, these colorful murals will be photographed and shared across Premium Californians' social media channels, extending the campaign's reach and serving as another vehicle to keep California avocados top of mind.

To broaden its reach, the Made of California campaign will have an online component with targeted digital ads, custom content on websites and visually stimulating, delicious recipes shared on social media platforms such as Facebook, Twitter, Instagram and Pinterest.

CAC also will sponsor and attend events such as dineLA and the Chipotle Cultivate Festivals in Phoenix and Kansas City. CAC's presence at these events will allow attendees to engage with the California avocado brand in a personal and positive way.

In addition, CAC will continue to support retailers with targeted radio spots, targeted mobile ads and store locators that drive consumers to the nearest point of purchase for California avocados. In-store radio ads will encourage shoppers to purchase the locally-grown fruit.

The new campaign aims to firmly root the California avocado as a cultural icon and paves the way for increased social engagement with California avocado fans. Doing so helps build brand awareness and emotional appeal, which encourages consumers to place a premium on California's favorite locally grown fruit.

By Tim Spann
Research Program Director

Little & Often

Key to Maximizing Fertilizer Use in Avocado

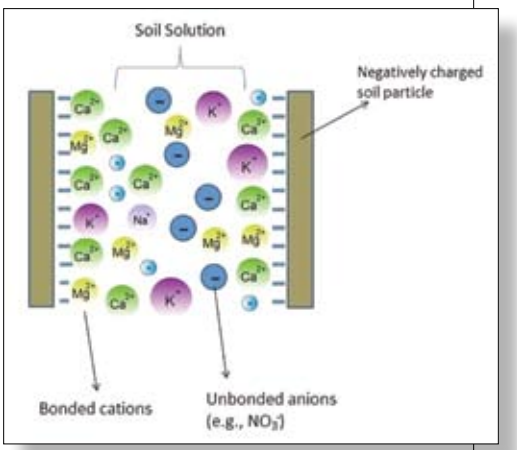
In the last issue of *From the Grove*, I wrote about the 14 essential mineral nutrients for plants and how they affect the health and overall performance of the trees in your grove. Now I am focusing my attention on application methods and how to maximize the bang for your buck. In order to optimize fertilization practices, you can learn a lot by looking at the avocado tree itself.

Avocado Ecology and Biology

The Mexican and Guatemalan races of avocado, hybrids of which make up the California industry, are native to what are commonly referred to as tropical highlands (up to about 8,000 feet elevation). Ecologically speaking, this climate is referred to as a montane forest (mountain forest). In the tropics and subtropics, this is typically a broadleaf forest that gains a large portion of its moisture from clouds and fog (cloud forest). These forests have an abundance of vegetation from low growing mosses and ferns to mid-canopy species and towering trees. Despite their elevation, these forests have a fairly warm mean annual temperature (60°F) due to their latitude.

Under these conditions (warm and moist), organic matter decomposes quickly. Leaves and limbs fall from trees, are quickly broken down by fungi and insects on the forest floor and the nutrients released are taken up by the surrounding plants. That is to say, there is a constant small supply of nutrients available to the plants growing in this environment. When these factors are combined — high moisture, warm temperatures, continuous supply of nutrients — we begin to understand a little more about why avocados grow the way they do.

Avocados are characterized as having a shallow root system with the majority of roots in the top 18-24 inches of soil. Their roots also lack root hairs — outgrowths of individual root cells that aid in nutrient uptake. Since water and nutrients are abundant in the surface layers of the soil in their native environment, the avocado has not evolved a deep root system to mine the soil for water, nor has it developed root hairs to increase the root surface area and better scavenge for nutrients. In addition, the rapidly degrading organic matter layer on the soil surface in the cloud forest is very well aerated — it feels spongy when walked on — and, as such, avocados are not well-adapted to heavy, poorly drained soils. Therefore, we should try to emulate these conditions as much as possible in a grove setting to maximize the tree's growth and yield.



An illustration of soil cation exchange capacity (CEC) showing positively charged cations bonded to negatively charged soil particles. Negatively charged anions are not bound and remain in the soil solution.

Little and Often

Little and often is the key to avocado fertilization — the key to all good fertilization programs actually. It is important to remember that the plant itself is not a reservoir of

nutrients; that role is played by soil. So when fertilizer is applied, three things can happen to the nutrients: 1) they are taken up by the plant and utilized for growth and development; 2) they are retained in the soil by various bonding forces; or 3) they are leached out of the root zone and become unavailable to the plant and may become an environmental problem. Our goal —through horticultural management of a grove — is to maximize number 1, eliminate number 3, and utilize number 2 as efficiently as possible.

Let's begin by examining the second option on the list above, nutrient retention in the soil. In general, a soil's ability to retain nutrients is referred to as the cation exchange capacity (CEC) of a soil. A cation is a positively charged atom or molecule. Thus, the CEC is a measure of the capacity of a given soil to retain positively charged molecules, such as calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K^{+}), ammonium (NH_4^{+}) and sodium (Na^{+}). CEC can be affected, for good or bad, by factors such as soil pH, clay content and organic matter. CEC generally moves in accordance with pH – as pH increases, CEC increases and vice versa. Cations held in the soil are available for exchange with the soil water and can then be taken up by plants (or leached away).

Similar to CEC, but not often thought of, is anion exchange capacity (AEC). Anions are negatively charged atoms or molecules and include important nutrients such as phosphorus ($H_2PO_4^{-}$), sulfur (SO_4^{2-}), nitrate (NO_3^{-}) and chloride (Cl^{-}). AEC generally moves in opposition to pH: as pH increases, AEC decreases and vice versa.

It is important to know your soil's CEC in order to have an estimate of its nutrient-holding capacity. If you fertilize infrequently with large concentrations of fertilizer, you are relying on the soil's CEC to retain the nutrients and release them into the soil solution with each irrigation. However, if your soil has a lower CEC than you think (or it has changed due to pH changes since your last soil test) or if a heavy rain event happens (or an irrigation line breaks), you could leach most of those nutrients from the soil before they can be utilized by the plant.

Roots absorb only dissolved nutrients in direct contact with live cells. Depending on the nutrient, this process may be passive (no energy is expended by the plant) or active (the plant uses energy to take the nutrient in). Regardless, the nutrients must be available to the plant when it needs them. So when do plants need nutrients? Constantly. As long as a plant

is growing (roots, stems, leaves, fruit) nutrients are required to support that growth. In some instances the plant can move nutrients from one organ to another — only mobile nutrients can be moved — but this is a "robbing Peter to pay Paul" scenario. For example, during bloom and early fruit set — a period of high nutrient demand — it is common to see leaf yellowing on shoots with heavy bloom. The tree has moved mobile nutrients (e.g., nitrogen) from the leaves to support a very demanding process. This tells us that not all periods of growth are equal when it comes to nutrient demand. Bloom and shoot flushes are periods of high nutrient demand, for example.

Given the potential risks surrounding heavily relying on soil CEC to meter your fertilizer supply and the uneven demand of the tree throughout the year, we start to see that more frequent applications of small amounts (little and often) of fertilizer are best. This also mimics what happens in the natural environment where avocados are constantly taking in nutrients as they are released from decomposing organic matter. Since the tree is constantly taking up water (and nutrients along with it) it is ideal for there to be a constant supply of nutrients available in the soil water.

A fertilizer program that relies on three large applications a year to supply all the nutrients the tree needs is generally inefficient. Since the tree can't take all that nutrition in at one time it must be retained in the soil, and inevitably some is lost to leaching. By increasing the number of fertilizer applications per year — as often as every irrigation for a liquid fertilizer program — the actual amount of fertilizer applied can be reduced. This is because the fertilizer use efficiency increases due to the reduction of fertilizer lost to leaching, i.e., a higher percentage of what is applied ends up in the tree. In extreme cases in some crops, moving to a little and often fertilizer program can reduce fertilizer use by up to 75 percent with no reduction in yield.

For those who use a dry granular fertilizer program, you can still supply nutrients in small, metered doses by using slow release fertilizers. Slow release fertilizers are composed of small prills coated in a membrane that slowly allows the fertilizer to be released. Good quality slow release fertilizers can mimic a little and often liquid fertilizer program. However, slow release fertilizers are not well suited to drip irrigation situations since the prills need to be moistened to release the fertilizer.

Grower Profile

From Ornamentals to Avocados:

The Journey of One Grower

By Tim Linden

Having made their name in the towering palm business for the past 40 years, including an amazing installation at the new World Trade Center site in New York City, Ellis Farms has turned its attention to the majestic avocado tree.

In January, the father-son duo of Joe and Reuben Ellis and their all-important ranch manager, Ernesto Veloz, harvested their first 14 bins of fruit, averaging an impressive 12 pounds of avocados per tree on stock that was only planted about 18 months earlier. "We were very happy with the yield," said Veloz. "We have been told that other high density plantings in this area are only getting about 11 pounds per tree after the fifth year. We are just learning, but next year we think we will double the amount of pounds per tree."

"Just learning" is a euphemism that is seemingly accurate in this situation. But while they are new to avocado production, the Ellis Farm trio has done their homework… just as they did when they got into the palm business in the early 1970s.

Reuben Ellis, who is a university professor at the Woodbury University in Burbank by day, explains that his father always loved the Anza-Borrego Desert and was constantly looking for land there. "My dad finally had the opportunity to buy a nice piece of property in Borrego Springs that was formerly a grape vineyard owned by the DiGeorgio Corpo-

Reuben Ellis, Ernesto Veloz and Joe Ellis make up the Ellis Farms brain trust.

ration."

And thus began Ellis Farms. Over the next few years, Joe Ellis cleared the land, tested the soil and water and determined that its nitrogen-rich content was perfect for the production of ornamental palm trees. He began with extensive plantings of Washingtonia robusta, also known as the Mexican Fan Palm, and quickly expanded to other varieties of palms and desert trees. Eventually, he grew his operation developing acreage in the Pauma Valley, which is located between Borrego Springs and the coast. In 2006, Ellis Farms began a major expansion to the Desert Center area of Riverside County, which had a perfect micro-climate for the production of the Queen palms. In total, the company grew to 550 acres, and had clients all over the country.

Brokaw Nursery's Dusa rootstock was planted in a high-density pattern on about 7.5 acres in Pauma Valley.

Ellis Farms' Ornamental palm installation at the winter garden atrium in the World Financial Center in Manhattan.

In fact, Ellis Farms is most proud of its indoor palm grouping at the new World Financial Center in Lower Manhattan's Battery Park. Carefully selected trees were placed for a year under a 50-foot shade canopy on the Borrego Springs farm to acclimate them to the lower light conditions of indoor planting in an eastern city. Eventually the trees were transported across country and found their place as the centerpiece to the center's stunning Winter Garden, a vaulted, steel-ribbed atrium.

But Reuben said a handful of years ago, during the height of the recession, Ellis Farms decided to transition out of the ornamental palm business and to a different crop. "We had a good long run in that business and are proud to have contributed to the green infrastructure of the country. But my father was always interested in food production," he added.

A likely candidate for production in Pauma Valley was avocados as other growers were apparently having success with that crop. Veloz, who was an inspector for the City of Oceanside for 38 years and longtime friend of Joe, was asked to help him transition into commercial avocado production.

The Ellis Farms brain trust began doing its homework, talking to grower friends, and most importantly, Dan Grant, a fieldman for Brokaw Nursery. It was in those discussions that the new avocado grower determined they would plant Dusa rootstock in a high-density pattern on about 7.5 acres in Pauma Valley to begin their entry into avocado production. Veloz said the Dusa rootstock was chosen because of its resistance to root rot, a habitual problem for avocado growers.

"We planted our first 1,168 trees – 518 trees per acre – on approximately two acres," said Veloz, noting that the trees went in the ground in mid-2014. In April of 2015, 2,400 more trees were added and the final 200 trees were planted in August of 2015. Those 3,768 trees now occupy just about 7.5 acres. Each row is on a two-foot berm, according

to Veloz, to improve the drainage situation, and again, reduce the chance for root rot.

Ellis said the high density planting configuration is six foot by 15 foot centers. "We call it the Brokaw method. I'm not sure others use that term, but that is who introduced it to us," he said.

All of the plantings are on drip irrigation. Veloz said the Dusa stock is also drought tolerant and he estimates that he is using 40 percent less water than the average avocado grower. "We are committed to water conservation," said Reuben. "We always have been. That goes back to when we grew palm trees. We always specialized in drought tolerant varieties."

Veloz continued, "We irrigate three times a week but only if necessary. We never overwater the trees."

Though again, they emphasize they are only in the early stages of their own education, the Ellis Farms leaders say they are very much open to sharing any information they have with other growers in the area, and in fact, are planning an open house so other growers can see what they have done.

Ellis Farms chronicled every step of their transition to avocados, photographing and taking notes concerning everything they did.

With their high density planting, the company is anticipating reaching the lofty level of harvesting 20,000 pounds per acre. They've done the math and that will pencil out to a nice revenue stream.

When asked what challenges they have faced as a beginner grower, Veloz credited other growers, its packer and Brokaw Nursery with preparing it for all eventualities. "Nothing has thrown us for a loop yet," he said.

Their first crop was top quality, he noted, adding that their packer, Mission Produce, and specifically fieldman Albert Munoz, was a great help in determining the optimum time to harvest those 1,200 trees. "We picked in January because the avocados were ready. They were shipped to Korea," Veloz said.

Reuben Ellis said the company is currently looking for the right buyer for its 155-acre Desert Center property. When that sale is final, planting more avocados trees will definitely garner some discussion time, he said.

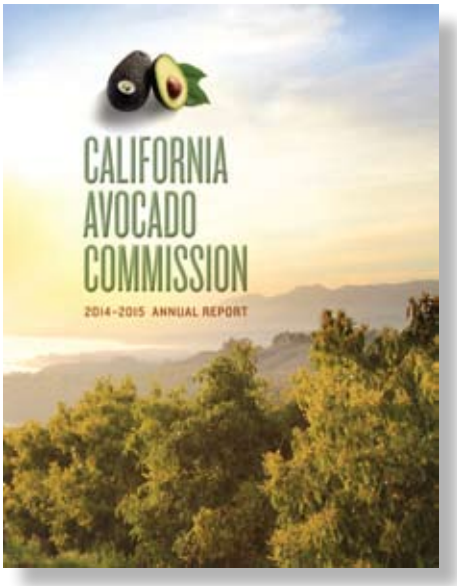
By April Aymami
Industry Affairs Manager

2014-15 CAC Annual Report Now Online

In an effort to maximize efficiencies, in 2014 the California Avocado Commission (CAC) moved to producing its Annual Report as a strictly digital publication. CAC is pleased to announce that the *2014-15 Annual Report* has been completed and is now available to the industry through the California avocado grower website, www.CaliforniaAvocadoGrowers.com.

The CAC *2014-15 Annual Report* covers a wide array of Commission-funded activities as well as industry statistics and financials. Below is just a highlight of what this year's report contains:

- A recap of the California avocado season and the Big Game day promotions that launched the season
- A timeline summarizing the Commission's research and advocacy efforts to stem the spread of the polyphagous shot hole borer (PSHB) and Kuroshio shot hole borer (KSHB)
- Recent developments in CAC-funded PSHB, KSHB and fusarium dieback research
- A review of the Commission's critical drought management initiatives



- Summaries of independent research studies tracking avocado category growth and consumer preferences
- A synopsis of the Commission's tiered marketing approach and the successes of its tier one retail and foodservice outreach and marketing efforts
- A second-year review of the California avocado label initiative
- Highlights from the Commission's trail-blazing retail communications campaign
- Statistics summarizing the impact and reach of CAC's retail and consumer advertising and public relations initiatives, including social media impressions
- Audited Financial Statements (2014-15)
- Ten-year Industry Statistical Data

The *2014-15 Annual Report* can be viewed online as a digital flipbook or downloaded as a pdf here: http://californiaavocadogrowers.com/commission/accountability-reports/annual-report.

If you would like to receive a printed version, the Commission will print a copy in-house and mail it to you. A hard copy of the *2014-15 Annual Report* can be requested via email, phone, fax or regular mail or by returning the tear away postcard included on this page.

Email: cac.iaf@avocado.org
Phone: 949.341.1955
Fax: 949.341.1970
Mail: California Avocado Commission
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Trade Advertising:

An Integral Part of the Commission Effort

Harvesting of California's sizable 2016 crop is under way and consumers are being enticed by new creative material designed to link avocado consumption with summer holidays and natural images of a California lifestyle.

Equally important to the success of the season is the work the California Avocado Commission (CAC) does under its trade advertising banner to support and encourage promotions by the produce industry professionals in the foodservice and retail sectors. "CAC's retail and foodservice trade ad campaigns benefit California avocado growers by communicating the value of California avocados and their availability to the gatekeepers who decide which origin of avocados to buy," said Jan DeLyser, CAC vice president of marketing.

CAC also has ambitious trade marketing programs in the works to maximize promotions of California avocados in both restaurants and grocery stores. These programs ensure consumers have the opportunity to enjoy avocados from the Golden State when trying new recipes or making their regular grocery shopping trips. These trade-specific advertising campaigns work in concert with CAC's trade public relations efforts, leveraging the ads to gain maximum editorial coverage throughout the season.

Foodservice Advertising

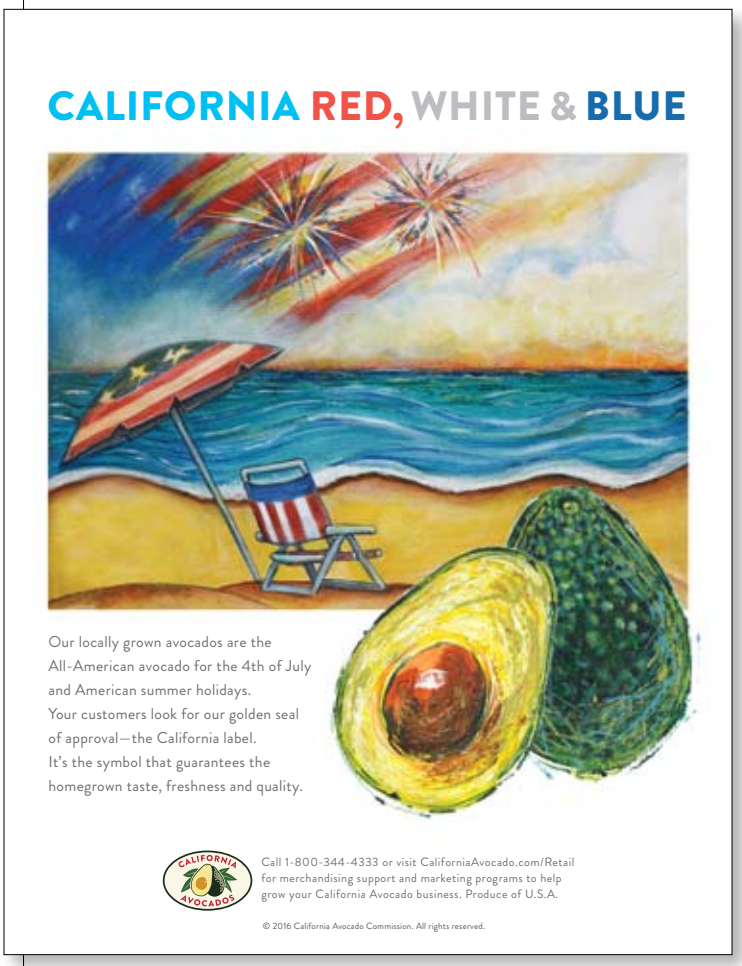
In the foodservice arena, ads began appearing in the trade publications in February and will run through August, mirroring the lion's share of this year's shipments. Both print and digital advertising are being utilized in a handful of publications including: *Restaurant Business, Foodservice Director, Plate,* and *Flavor & the Menu.*

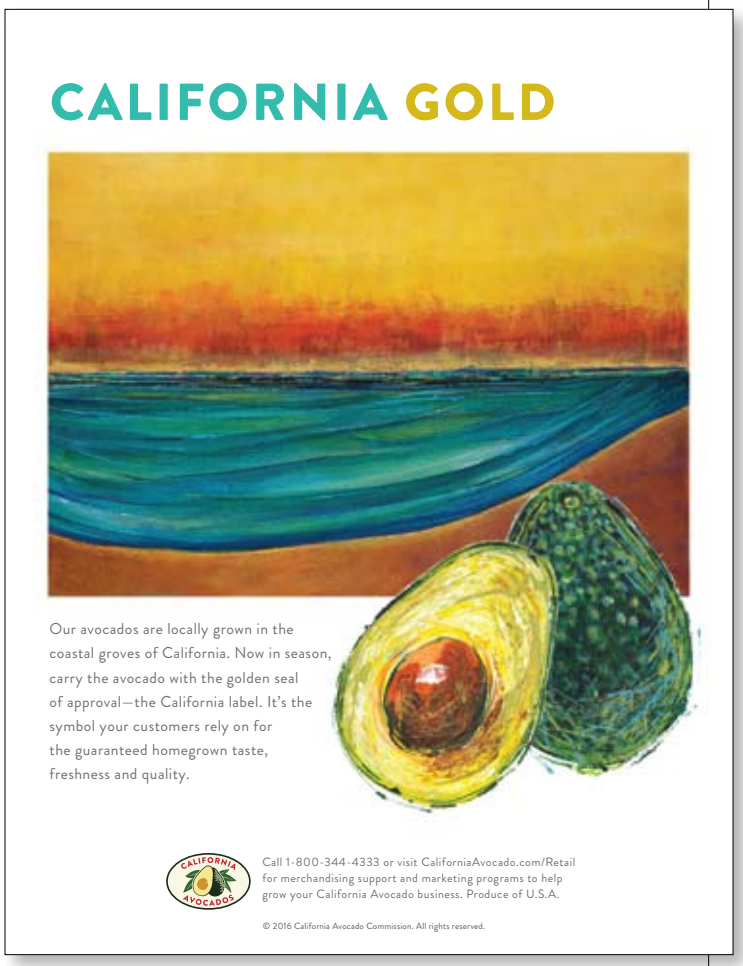
The ads feature actual menu items from several operators, (Cheeky's in Palm Springs, El Pollo Loco and Cal Dining at University of California, Berkeley) to show other operators how California avocados can provide value to their menu offerings. The goal, of course, is to recruit operators (be they independent, chain, or an institutional feeder) to participate in the macro trend of increasing the use of avocados in foodservice operations.

Every few years, the CAC foodservice team develops fresh and innovative trade advertising to ensure California avocados are top-of-mind to this important business sector. This year's foodservice campaign was sparked by CAC's new creative direction (see article on Page 16).

DeLyser said these ads build awareness among foodservice operators by touting the menu versatility of fresh California avocados in season. "These ads form a communications cornerstone for the entire foodservice program," she noted.

The 2016 foodservice ad campaign will feature 16 ads in publications with a total circulation of more than 900,000 resulting in almost 1.4 million impressions.





Retail Advertising

The CAC retail trade campaign will run throughout the California avocado season. The campaign is designed to create maximum exposure with premium ad placement and frequency to leverage editorial exposure. The campaign will have an extensive reach as CAC will use both print and digital placement in numerous publications. Print ads will run in *The Packer, The Produce News, The Shelby Report, Produce Business, The Fresh Digest, Progressive Grocer* and *The Snack* magazine.

The ad placements will include coveted front cover positioning with half-page ads, as well as strip ads, spadia (a separately printed sheet folded around the newspaper or magazine so it is the first thing the reader sees) and cover tips (ads glued to the cover of a publication).

Online digital support for the campaign will run in *The Packer* newsletters, *The Produce News* newsletters and website banner ads, *Progressive Grocer* banner ads, *AndNowUKnow* trailers and email ads, *Smart Brief* newsletters and *Fresh Plaza* banner ads. The digital ads will further promote awareness of the premium position of California avocados and support the print ads.

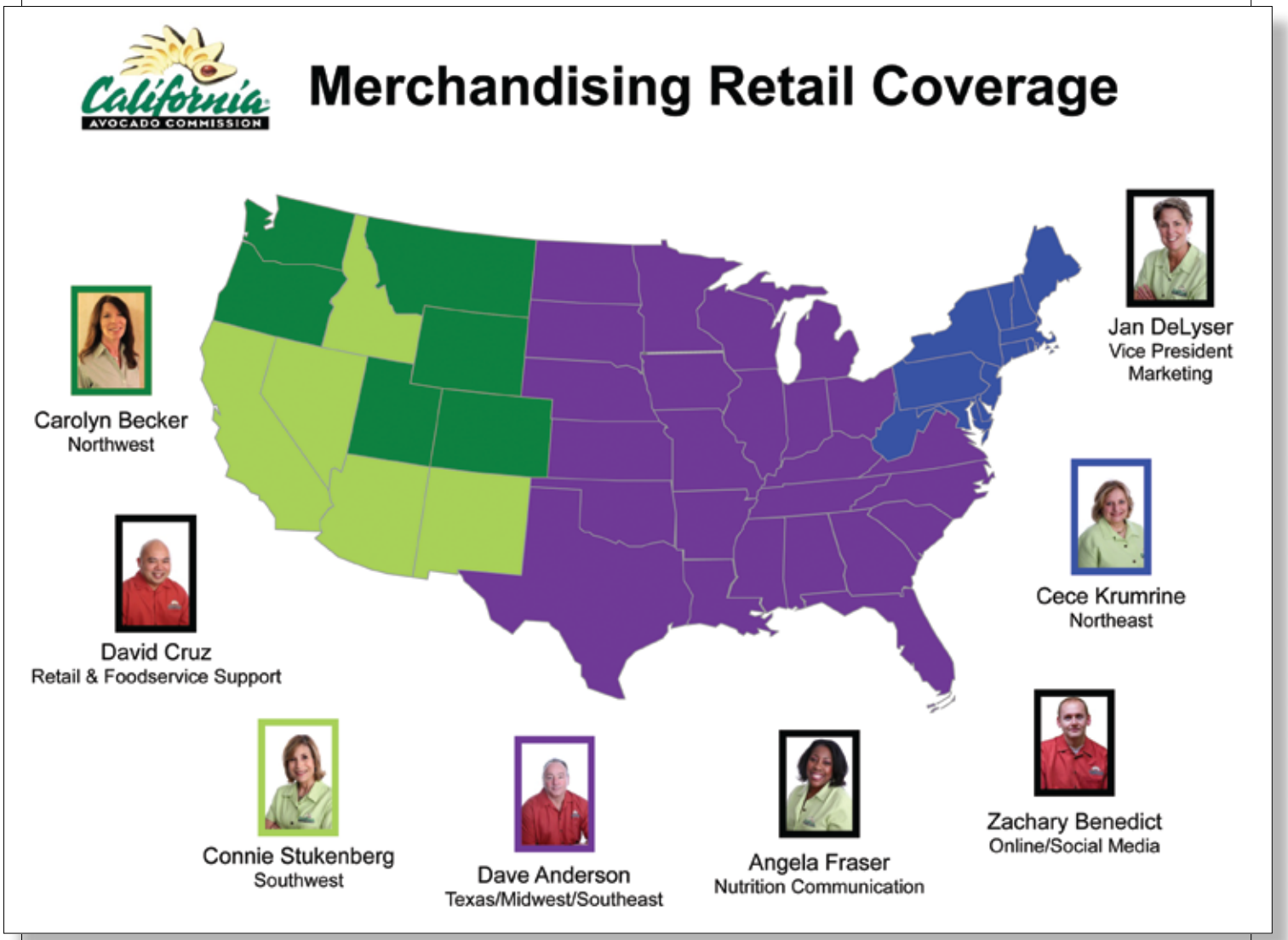
The new creative for the 2016 trade advertising program is designed to have synergy with CAC's new consumer campaign. The ads integrate the "California by Nature" theme and use a local artist's painting depicting California and the American summer holidays. Two headlines will be used: *California Gold* and *California Red, White and Blue*. The *California Gold* ad will launch and conclude the campaign. The *California Red, White and Blue* ad will run from May through early July.

DeLyser noted that while consumer campaigns are designed to build awareness and drive consumption, "Retail trade advertising communicates availability with programs in support of retail promotions and keeps California avocados' branding and leadership positioning top of mind with key retailers." According to DeLyser, CAC's ad placement and creativity in their ads in trade publications encourage retailers to specifically merchandise California avocados. Additionally, the ad copy in the call-to-action section showcases California avocados' American origin because locally grown and point-of-origin identifiers are important merchandising aids for many retailers. Among the various Hass avocado options, only California growers can make the claim that their product was grown in the U.S.A.

Trade Marketing Team Prepares for California Avocado Season

Retailers and foodservice operators play a critical role serving as the gatekeepers who determine whether their operation will carry California avocados in season, and, if so, how they will market the fruit to drive sales. To that end, each year the California Avocado Commission (CAC) launches a pre-season trade marketing initiative designed to demonstrate the value of carrying the California fruit, manage an account's transition to the California avocado season and synchronize handler supply, retail promotional calendars and CAC's marketing activities.

To build excitement concerning the upcoming California avocado season, in October CAC's retail and foodservice teams met with key decision makers at the Produce Marketing Association (PMA) Fresh Summit in Atlanta, GA. CAC staff discussed 2016 crop projections, shared research and category sales data and showcased the Commission's 2016 marketing programs.



The California Avocado Commission's retail and foodservice team demonstrate the value of California avocados while providing promotional support to drive sales of the fruit.

Jan DeLyser, CAC vice president of marketing, and CAC RMD David Anderson discuss promotional plans with Walmart's Melissa Heinrich (right) at the PMA Fresh Summit.

To ensure connectivity between CAC's marketing team, retailers, foodservice operators and handlers, in December 2015 CAC began meeting with handlers in Fallbrook, Temecula, Escondido, Bloomington, Oxnard, Ventura and Santa Paula. Discussions covered retail tiered account prioritization, foodservice account opportunities and an update on the California avocado label usage. To ensure California avocados are available in stores and foodservice locations when they are on promotions, they discussed the timing of account transitions to California avocados and reviewed sales coverage, retailer and regional data.

After the first of the year, the Commission's Retail Marketing Directors (RMDs) and foodservice team began meeting with targeted customers to discuss unique account strategies, promotional planning and execution for the California avocado season. Targeted foodservice operators have been scheduled for unique California avocado menu ideation strategy sessions for the upcoming 2016 season. Commission staff will continue to meet with specific customers to discuss performance-tracking data and adjust marketing and promotional strategies as needed.

In February, the Commission released one of its most important trade marketing tools – the Marketing Program Book. RMDs utilize this fact-filled book to clearly demonstrate to retailers the value of merchandising California avocados. The book also features a portfolio of the Commission's 2016 California avocado season marketing support.

Peggy McCormick and Chef Dave Wooley present California avocado menu ideas to Cheddars.

Connie Stukenberg, CAC retail marketing director, reviews data from the Marketing Program Book with John Savidan of Bristol Farms.

CAC's Marketing Program Book (sample page shown) uses data to show retailers the benefits of carrying California avocados in season.

By Tim Linden

World Avocado Organization Launches; Eyes European Promotions

After literally eight years of discussions, several groups, companies and individuals from the world's top avocado-producing countries have created a global avocado marketing entity called the World Avocado Organization (WAO).

Based in the United States, the organization's primary and initial purpose is to promote the consumption of avocados in the European Union, through a voluntary self-funded marketing program. As time moves on, the WAO expects that it would be the perfect platform to also promote increased consumption in Asia and other parts of the world outside of the United States, (which, of course, already has a national promotion program under the umbrella of the Hass Avocado Board).

Jim Donovan, senior vice president of international operations for Mission Produce Inc., Oxnard, CA, is the treasurer of the four-member officer committee of the new organization. The chairman of that executive committee is James Bosworth of Peru's ProHass. Donovan expressed optimism that WAO will be able to increase the worldwide consumption of avocados. The increased consumption in the United States is well documented, with most people crediting the significant promotional activities that have occurred in this country over the past half century. There are no similar programs in Europe, or other parts of the world, for that matter.

Donovan said that since the 2007 VI World Avocado Congress in Chile, there have been ongoing discussions about establishing a global promotion program patterned somewhat after the Hass Avocado Board, which is a U.S. government-sanctioned effort that is funded by mandatory assessments. He said after years of trying, there just didn't seem any way to move forward globally on a similarly-funded program, so the voluntary WAO was established.

Establishing a voluntary marketing program will present its challenges but producer organizations in South Africa and Peru are committed to funding WAO's early efforts. In time, he said organizations from all of the producing countries as well as companies and individual growers will be encouraged to join and help fund the program. The founding member countries include Brazil, Mexico, Peru, South Africa, and the United States

"The World Avocado Organization represents the creation of a major international body that has been years in the making and is, to date, the only multinational global marketing organization of its kind," said Bosworth, in a press release.

Donovan said he and Mission Produce are involved in this organization because "we believe increasing consumption of avocados is a worthy goal that will benefit us all."

The Mission Produce executive said he understands why some producers may stand on the sidelines as it is somewhat of a tough sell to convince people to fund a promotion program for a market in which they are not participating. But Donovan said avocados are being sold on a global basis in a global market. Increased consumption in Europe will increase demand for the fruit and will benefit growers thousands of miles away selling to a different market.

He noted that both South Africa and Peru are very interested in Europe's growth as they are suppliers in that marketplace. He pointed out that every piece of fruit sold in Europe is one less avocado that will land in the U.S. market.

The WAO plans to launch its first collectively-funded marketing programs later this year in several European markets including Germany, Spain, the United Kingdom, and select Scandinavian countries. In 2015, the EU consumed about 800 million pounds of avocados and in 2016 consumption is expected to increase by 10 percent. That still puts consumption levels well below those in the United States. With a population topping 500 million people, EU's total consumption is only about 40 percent of U.S. avocado consumption, with a population of only 325 million people. With a concerted promotion program, WAO believes it can narrow that gap…and improve the marketing situation for all producers.

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The 2015-2020 Dietary Guidelines:

What Are They and What Do They Mean for California Avocados?

By Andrea N. Giancoli, MPH, RD

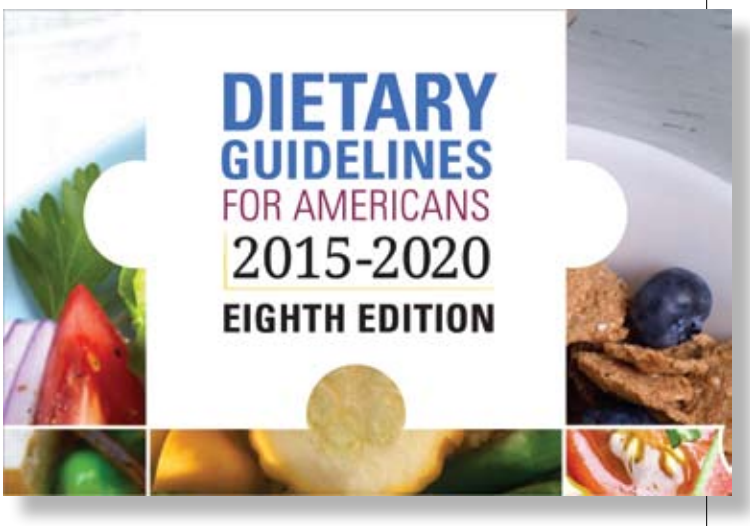
On January 7, 2016, the U.S. Department of Agriculture, in partnership with the U.S. Department of Health and Human Services, jointly released the long awaited 8th edition of the *Dietary Guidelines for Americans 2015-2020* (DGAs). You've likely heard something about this in the news, but may still be asking yourself, "What exactly are the DGAs and what do they have to do with avocados?"

2015-2020 DGAs - The What and Why

Based on the latest scientific information and updated every five years, the DGAs are the U.S. government's food and beverage recommendations intended to help Americans make healthier food choices.

The new DGAs consist of the following five overarching guidelines (see table for more detailed information on each guideline):

- Follow a healthy eating pattern across the lifespan
- Focus on variety, nutrient density and amount you consume
- Limit calories from added sugars and saturated fats and reduce sodium intake
- Shift to healthier food and beverage choices
- Support healthy eating patterns for all



Avocados and the 2015-2020 DGAs

In taking a closer look at this edition of the DGAs, there is a notable language change from previous releases. This edition provides specific advice to *shift to* choosing healthier, nutrient dense food and beverages, while simultaneously *shifting away* from less healthful choices.

Indeed, a key DGA recommendation is to consume less than 10 percent of daily calories from saturated fats and *shift* to food choices higher in polyunsaturated and monounsaturated fats. This recommendation, or message, is a perfect fit for avocados, which are known to be a source of unsaturated fats with little saturated fat. More than 50 percent of an avocado's fat content comes from monounsaturated fats.

Avocados also fare well when it comes to food groups encouraged by the 2015-2020 DGAs. While botanically classified as a fruit, in the DGAs avocados reside in both the vegetable group and the oils group. The oils group is not considered a stand-alone food group, but is recognized within the DGAs as part of a healthy eating pattern delivering a major source of essential fatty acids and vitamin E.

This recognition suits avocados because they contain beneficial fats and many other essential nutrients. Specifi-

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cally, avocados are highlighted in the DGAs for supplying monounsaturated fats to the diet. According to the American Heart Association, when eaten in moderation and used to replace saturated fats or trans fats, monounsaturated fats can have a beneficial effect on health by helping to reduce bad cholesterol levels in your blood.

The Avocado Industry's Response to the DGAs

The Hass Avocado Board (HAB) is taking the lead on evaluating and determining how to leverage the key recommendations of the DGAs to further drive avocado consumption.

On the consumer communications front, HAB has drafted brand new messaging for use by the California Avocado Commission (CAC) and other industry partners. The new messaging aligns avocado nutrition attributes to healthy eating patterns conforming to the 2015-2020 DGAs and their key recommendations. This kind of messaging helps to encourage increased avocado consumption in the marketplace.

The California Avocado Commission's DGA Activities

Since the January release of the 2015-2020 DGAs, CAC has been busy updating and building new resources to spread the word to consumers, influencers and stakeholders about California avocados' starring role in a healthy diet that aligns with the DGAs. CAC's consumer outreach activities and resources are designed to advance California avocado purchasing and consumption relevant to following the 2015-2020 DGA guidelines. Here are a handful of initiatives CAC has been working on to get the word out:

- Refreshing the nutrition content on CaliforniaAvocado.com, updating the DGA content and adding the DGA's key recommendations. Visit CAC's Dietary Guidelines webpage to learn more (californiaavocado.com/nutrition/dietary-guidelines)
- Promoting and sharing the Commission's DGA-themed 7-Day Plant Based Meal Plan showcasing California avocados as part of a healthy eating pattern. The meal plan was created by CAC Registered Dietitian Nutritionist (RDN) Ambassador Katie Ferraro and has been posted on the consumer website, featured in a March The Scoop blog, and promoted on CAC's and RDN Ambassadors' social media channels. To promote broader distribution, the meal plan was provided to select media-friendly RDNs encouraging them to share the plan with their clients and on their professional social media channels
- Partnering with the *Produce for Better Health Foundation's MyPlate – Half Your Plate* program to create a DGA-compliant California Avocado Super Summer Wrap recipe now featured on the CAC website

To learn more about the 2015-2020 DGAs, visit the official DGA site at http://health.gov/dietaryguidelines/2015/guidelines/.

Andrea N. Giancoli is a registered dietitian and nutrition communications consultant for the California Avocado Commission. Her valuable media know-how and nutrition expertise help the Commission deliver effective evidence-based messages that appeal to all audiences. Giancoli is a graduate of UCLA, where she also earned her Master of Public Health in Community Nutrition.

Drought Management Conference Targets Tree & Vine Crops

By Tim Spann
Research Program Director

The United States Department of Agriculture (USDA) sponsored a drought management workshop, "Water Management Strategies for Perennial Crops with Limited and Impaired Water Supplies," in Modesto, CA January 12-13. To my knowledge, this was the first such workshop specifically targeted at the perennial tree and vine crops that are so important to California's agricultural economy. The workshop's speakers were experts from around the world, with heavy input from Australia and Israel, two large agricultural producers who are familiar with drought.

The workshop was broken into several sessions over the two days, focusing largely on technological solutions, alternative water supplies and management strategies. The second day included specific breakout sessions concerning different crops, including tree nuts, grapes and citrus, avocado and olives.

The workshop started with an overview of the current drought conditions in California and forecast information for the current El Niño. Not to anyone's surprise, the early winter rainfall received by much of California has done little to reduce the overall drought conditions, and more than 60 percent of the state remains under extreme or exceptional drought as of mid-February. However, what struck me the most was data presented by Michael Anderson, state climatologist with the California Department of Water Resources (DWR). In his talk, Anderson addressed why the forecasts for this year's El Niño have been so far off. Essentially, forecasters are dealing with weather conditions that are completely outside the realm of the historical norms on which they base their forecasts, resulting in greater inaccuracy.

Technology

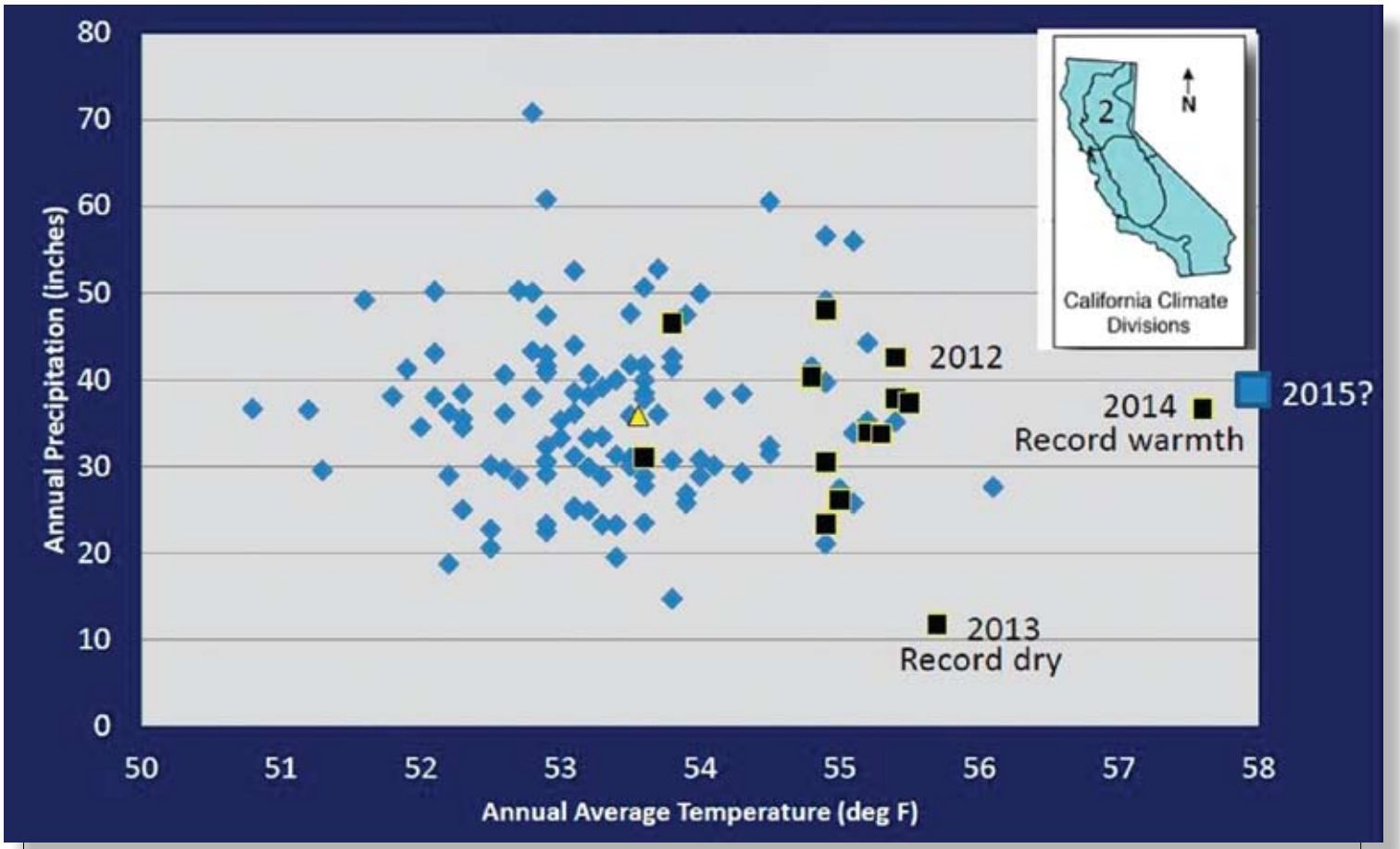
Several talks focused on various technologies available to help growers deal with drought. The primary theme of these talks was utilizing tools to improve irrigation application rates and timing by knowing precisely when to apply irrigation and how much to apply.

For most tree crops, knowing when to irrigate is based on soil moisture content with the goal of maintaining your soil between field capacity and the permanent wilting point. This is primarily achieved by using various forms of soil moisture sensors. The different types of soil moisture sensors and knowing how to use them in scheduling irrigation have been covered in previous *From the Grove* articles (see Fall 2014 and Fall 2015 issues), and not much has changed with respect to soil moisture sensors and monitoring.

The other aspect of drought management is knowing how much water your trees are using to avoid over irrigation. This is what we refer to as crop evapotranspiration (ETc), which is based on a reference evapotranspiration (ETo) value that is multiplied by a crop coefficient (Kc). Historically in California, growers rely on California Irrigation Management Information System (CIMIS) data to obtain ETo values. The ETo calculated by CIMIS is based on a well-watered grass field of specific standards. However, there are inherent flaws in this system because the grass plots are quite small and, especially over the past couple of years, not all of them are equally "well-watered." In addition, the plots are usually on relatively flat ground so they don't take into account how exposure aspect affects ETo, which is very important to avocado growers, many of whom are growing on slopes.

ET calculations are an active area of research that was discussed at the workshop. DWR has been working on a project for the past several years utilizing state-of-the-art technology to refine the models used for the calculation of CIMIS ETo. Other groups have been working on developing ETc data directly from satellite image analysis. The current satellites provide resolution of a couple of meters, but the next generation of satellites will provide sub-meter resolution. This technology not only allows a grower to look at ETc for their specific field or orchard, but allows them to zoom in to specific plots, which is extremely valuable if you are growing on slopes or you have trees of different ages.

The group that has made the most progress developing this satellite technology is led by John Hornbuckle at Deakin University in Australia. The system they have developed is available online at https://irrisat-cloud.appspot.com/ and utilizes Google Earth as the underlying map engine (a Google account is required, but is free). The system uses analysis of different spectral bandwidths to calculate



Annual average temperature for the northern Sierra Nevada region plotted against annual precipitation for the period 1895-2000 (blue diamonds). The yellow triangle in the center is the historical average (1895-2000). The black squares are the years 2001-2014. The projected number for 2015 is shown to the far right. All but two of the years since 2000 have been at or beyond the limits of the historical data. (Figure compiled by Michael Anderson, California Department of Water Resources, from National Oceanic and Atmospheric Administration climate data.)

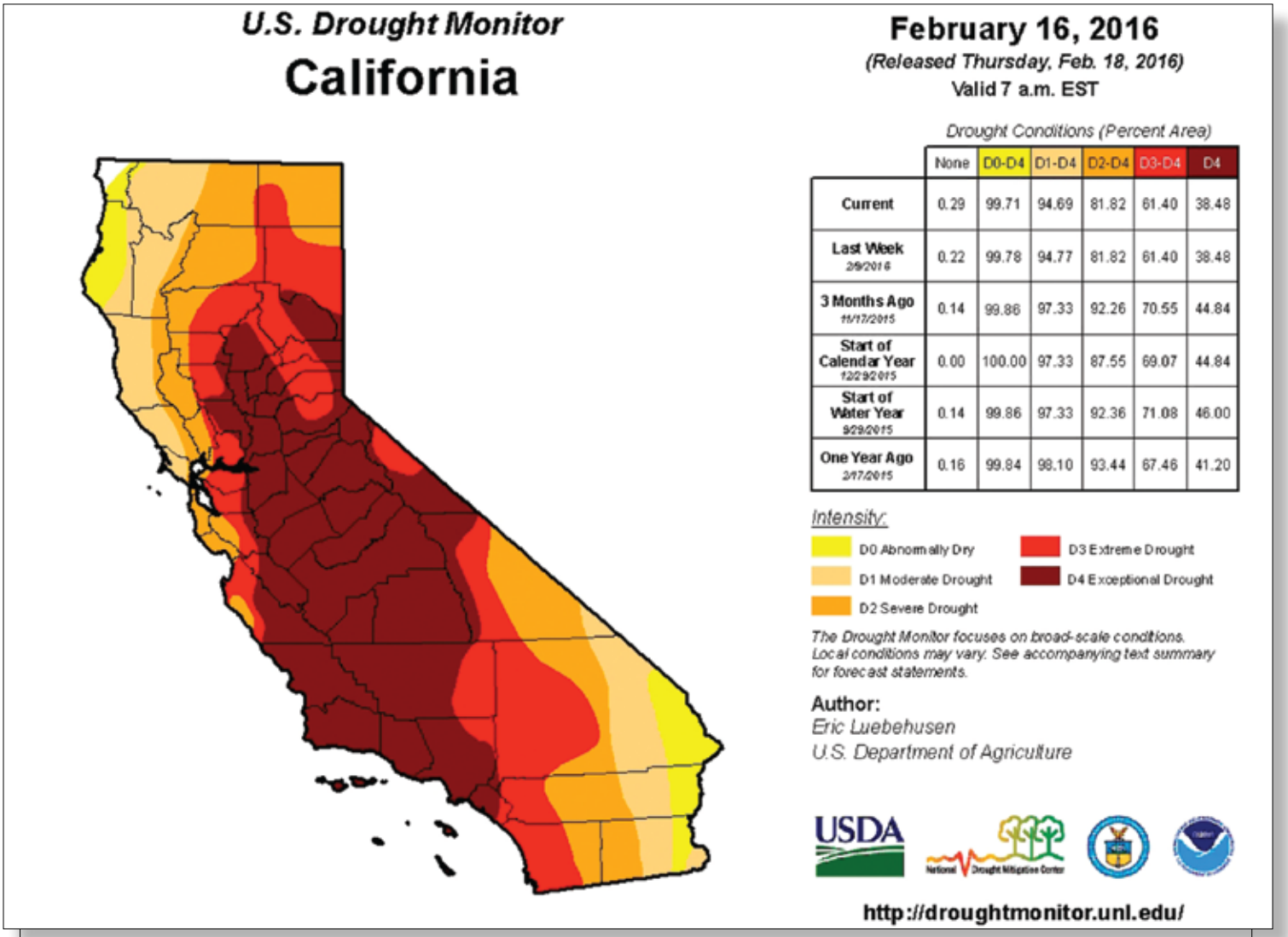
the ET for a given location. These satellite-based systems will probably become the norm over the next 10 years in part because there's no maintenance of ground-based stations needed and they can provide precise data about specific locations.

There also are significant advances being made on soil salinity management, especially with respect to mapping salinity within a given area. Two systems being used to map salinity in a plot are electromagnetic induction and electrical resistivity units. Both of these technologies involve a small device that is dragged along the ground behind a tractor or four-wheeler to give an estimate of soil salinity and their data can be used to generate maps of a given field so that management practices can be tailored to specific conditions. Both of these technologies are best used to map a field before planting. However, satellite technology also is being developed to use specific canopy reflectance data to determine salinity levels. Although this technology is not commercially available yet, it was recently used experimentally to perform large scale mapping in the western San Joaquin Valley, determining that 1.35 million acres of land are affected by salinity in that area.

Alternative Water Supplies

The talks on alternative water supplies focused on reclaimed water and the long-term effects of irrigating with water high in salts, and were presented by three leading Israeli researchers and Don Suarez from the USDA Salinity Lab in Riverside. Overall, the long-term use of saline water for irrigation results in the loss of soil structure and poor infiltration, which is exacerbated with water that has a high pH. One of the interesting points made by Don Suarez was that our method of measuring soil salinity usually averages the salinity across the root zone, but this tends to overestimate the salinity because there is a gradient of salts in the root zone — becoming more concentrated at deeper depths. This is important to consider, especially for a relatively shallow rooted tree like avocado where the majority of water uptake occurs in the top few inches of soil. In addition, Don pointed out that leaching is most effective during the winter months, when ET is generally lower so a larger portion of the applied water can infiltrate and move salts lower in the soil profile.

Data from a 16-year trial in Israel in which avocados were irrigated with treated waste water illustrated the points made by Suarez. The waste water had a pH of 8.1, 220 ppm

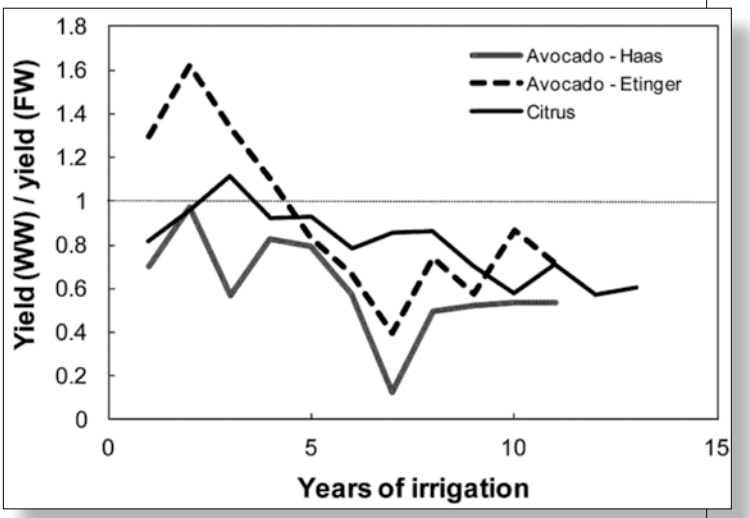


U.S. Drought Monitor map of California showing that more than 60 percent of the state is still under extreme to exceptional drought conditions, despite some promising early season rains. (Figure from the United States Drought Monitor droughtmonitor.unl.edu/).

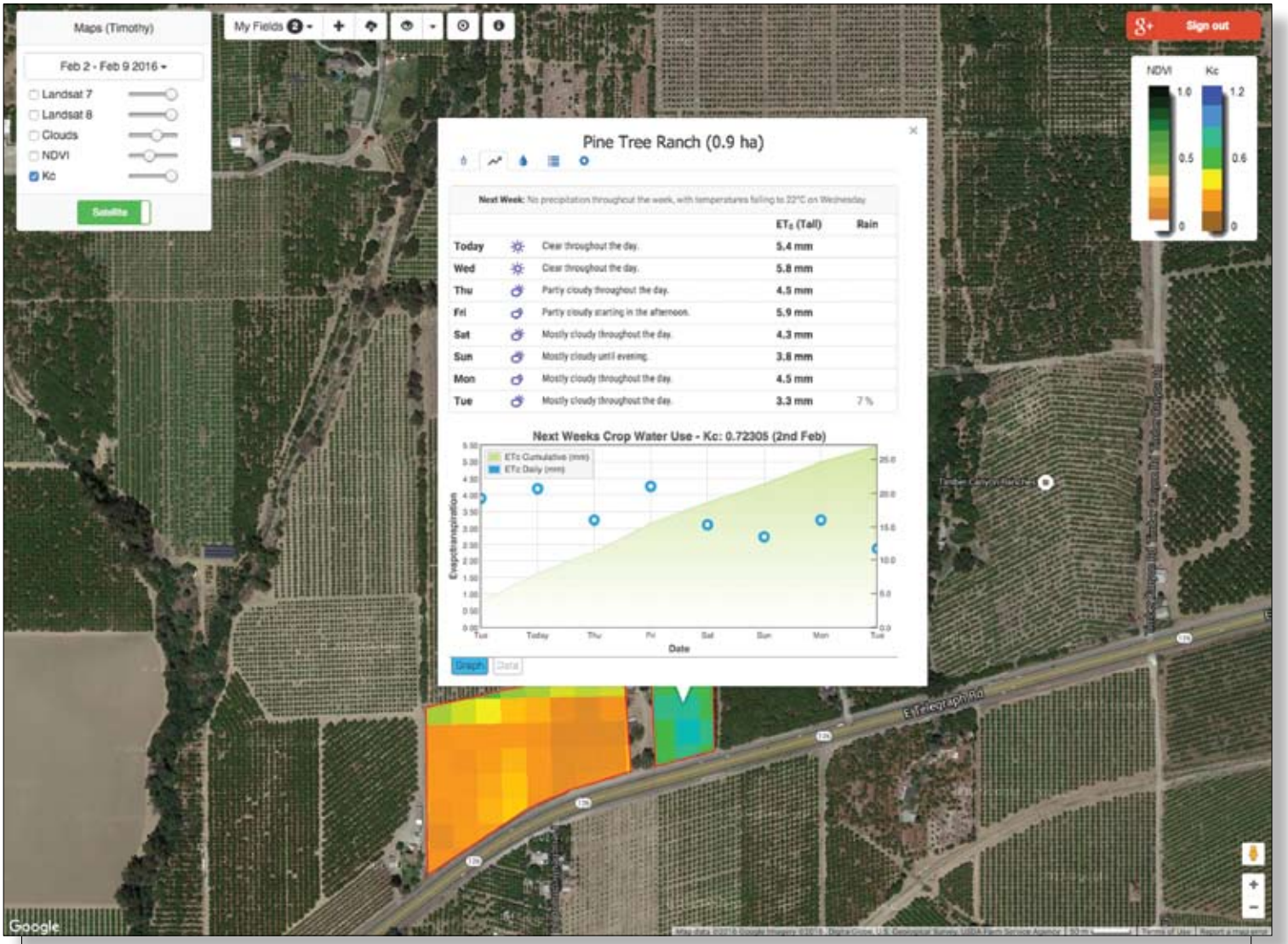
chlorides, EC 1.8 and 7.4 ppm sodium, compared with fresh water at pH 7.1, 70 ppm chloride, EC 0.83 and 1.3 ppm sodium. Over 10 years, the yield of both 'Hass' and 'Etinger' declined by 50 percent. The authors noted that the long term use of the treated waste water led to a "degradation of soil hydraulic properties." Such data led Alon Ben-Gal from the Gilat Research Center to conclude that the long term sustainability of irrigation with high saline water is questionable, even when best practices are followed.

Management Strategies During Drought

Strategies for coping with drought were discussed by two Australian and one Israeli researcher. Unfortunately, the Australian researchers didn't provide many new strategies that California growers aren't already familiar with. These include removal of unproductive trees, grafting over to new varieties or stumping trees, irrigation system maintenance to reduce leaks and improve efficiency, and conversion to drip irrigation. However, one option that was mentioned that hasn't been widely adapted in avocados is spatial man-



The ratio of yield of trees watered with treated waste water to those watered with fresh water in Israel. From: Assouline, S. and K. Narkis. 2013. Effect of long-term irrigation with treated wastewater on the root zone environment. Vadose Zone Journal 12(2).



A screen capture of the Irrisat ET estimation tool developed by John Hornbuckle, Deakin University Australia. The screen capture shows the mature trees (right) and young trees (left) at the California Avocado Commission's Pine Tree Ranch demonstration grove and the colorized crop coefficient for each block for the week of February 2-9, 2016. By clicking on a block the weather forecast and estimated evapotranspiration for that block can be seen.

agement of irrigation. This involves mapping groves for soil types, tree age/size, and slope/exposure, then breaking up irrigation zones into smaller units based on these characteristics so that each zone can be more optimally irrigated to match the soil conditions and the tree needs. Examples presented for apples and peaches showed water savings of 10 to 35 percent.

Shabtai Cohen of the Volcani Center presented what I would consider the most extreme idea for saving water: cultivation under protective structures. While this isn't a new idea, it has not received a lot of attention specifically for water savings. Data presented by Shabtai showed that the screens used to cover structures can reduce mid-day maximum temperatures and slightly increase night temperatures for an overall reduction in average temperature of about 3°F. There is also an increase in humidity, which reduces evaporative demand. The structures also can help reduce wind damage since wind speeds are reduced by about 35 percent. In apples and bananas, the combined effect reduced evapotranspiration by 35-60 percent, reduced irrigation by 25-30 percent and increased water use efficiency by 10-30 percent.

A group in Florida has been using similar structures to grow citrus to protect trees from the Asian citrus psyllid and Huanglongbing (HLB). In addition to protecting the trees from HLB they have seen reduced water use and reduced wind scarring of the fruit, which leads to an increased percentage of unblemished fruit.

The greatest take home message from the meeting is that there is no easy solution to drought or salinity issues. In order to be sustainable with less and poorer quality water, growers are going to have to adopt an array of technologies and tools that each provide an incremental benefit. Of course the question always asked is: "Are these technologies and tools affordable?" Perhaps the more appropriate question is: "Can we afford not to adopt them?"

The Food Safety Modernization Act:

How Does It Impact You?

By Ken Melban
Vice President of Industry Affairs

The Food Safety Modernization Act (FSMA) became effective on January 26, 2016. The FSMA requires growers (along with harvesters and handlers) to demonstrate compliance with specific standards designed to minimize the risk of adverse health consequences and death related to the consumption of fresh produce. Under FSMA, farmers and harvesters will have to verify that they have implemented policies and procedures and demonstrate that they and their workers are in compliance.

The intent of FSMA is for the United States Food and Drug Administration (FDA) to focus on preventing food safety problems rather than primarily reacting to problems after they occur. In addition, FSMA provides the FDA new enforcement authority to help achieve compliance with safety standards and to better respond to and contain problems when they occur. The FSMA focuses on mitigating risk from microbial contamination through identified possible routes, and includes Five Separate Rules.

The Produce Rule: Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption "Produce Rule," covers the production and harvesting of raw commodities for all produce sold in the United States, including produce grown internationally. This rule includes all avocados grown for commercial purposes. Key requirements of the rule include: 1) Worker Training and Health and Hygiene; 2) Agricultural Water (Quality and Testing); 3) Biological Soil Amendments; 4) Domesticated and Wild Animals; and, 5) Equipment, Tools and Buildings.

The Commission developed "A CALIFORNIA AVOCADO GROWER'S GUIDE TO NEW FOOD SAFETY REGULATIONS." It can be found on the grower website at www.californiaavocadogrowers.com/articles/avocado-growers-guide-new-food-safety-regulations-available.

This guide provides a detailed overview of FSMA and the legal requirements specific to California avocado production practices. In addition, a comparison between FSMA requirements and provisions in the Commission's Good Agricultural Practices (GAP) program is included.

In general most parts of the rule's key requirements are fairly straightforward and consistent with the Commission's Good Agricultural Practices (GAP) program. **The key exception is the Agricultural Water section, which is rather complicated and will require growers who have water supplies**

The California Avocado Commission conducted educational seminars in early March to inform the California avocado industry about requirements under FSMA. In addition, detailed information was provided on the Commission's Good Agricultural Practices and becoming GAP certified. Nearly 300 growers attended the seminars. If you'd like to receive a copy of the GAP manual or have any questions please email cac.iaf@avocado.org.

other than public water to initially conduct multiple water samples over a period of up to four years, depending on the source, to create a rolling dataset. Once the rolling dataset is established, testing frequency will be based on water supply source.

The Produce Rule also disallows the harvesting of windfall fruit – a major change for the industry.

Although by law growers will not have to demonstrate compliance with FSMA for a minimum of two years, it is the Commission's recommendation that growers begin the process now. Beyond compliance with FSMA, buyers of California avocados, both food service and retail, are increasing their demands for fruit that has been certified by a food safety program. The market for fruit that is not GAP certified is continuing to shrink. There are a plethora of food safety audits, including the U.S. Department of Agriculture's Good Agricultural Practices, Primus Ranch, the Global Food Safety Initiative, and many others. Unfortunately, acceptance from buyers for specific audits varies tremendously. Understandably, this creates frustration for many growers who may feel that some of the requirements are unmerited and that it is impossible to keep up with the changing demands.

As difficult as it may seem, it is imperative that California avocado growers keep pace with the changing world in this global economy. It is difficult to stand on the California premium avocado brand if, as an industry, we are not serving as leaders in food safety initiatives.

The Commission will continue to provide the tools and training necessary for growers to become GAP certified. In the near future this will include another update of the Commission's GAP manual to address the agricultural water requirements in the Produce Rule. Hopefully, as more growers become GAP certified some stability will emerge regarding buyer demands.

Ultimately, there is no choice. Food safety is part of our new world and we must deliver.

Exemptions:

The Standards for Produce Rule does not apply to:

- Farms that have an average annual value of produce sold during the previous three-year period of $25,000 or less.

The Produce Rule also provides a qualified exemption and modified requirements for certain farms.

- To be eligible for a qualified exemption, the farm must meet two requirements:
  - The farm must have food sales averaging less than $500,000 per year during the previous three years; and
  - The farm's sales to qualified end-users must exceed sales to all others combined during the previous three years. A qualified end-user is either (a) the consumer of the food; or (b) a restaurant or retail food establishment that is located in the same state or the same Indian reservation as the farm or not more than 275 miles away.

Compliance Dates:

Most avocado farms will not have to show compliance for two or more years following its inception, based on the following criteria:

- Very small businesses, those with more than $25,000 but no more than $250,000 in average annual produce sales during the previous three year period: Four years (January 26, 2020).
- Small businesses, those with more than $250,000 but no more than $500,000 in average annual produce sales during the previous three year period: Three years (January 26, 2019).
- All other farms: Two years (January 26, 2018).
- The compliance dates for certain aspects of the water quality standards, and related testing and record keeping provisions, allow an additional two years beyond each of these compliance dates for the rest of the Produce Rule.

Commission Hosts EPA Officials in SHB Infested Areas; Secures Additional Research Funding

By Ken Melban
Vice President of Industry Affairs

In January, the California Avocado Commission (CAC), hosted officials from the Environmental Protection Agency (EPA) and visited areas in San Diego County infested with the Kuroshio shot hole borer (SHB) and Fusarium dieback (FD).

Ron Carlton, EPA agricultural counselor, and Kerry Drake, EPA associate director of Region 9, toured avocado groves and the Tijuana River Valley (TRV) to see the devastation firsthand. The Commission has submitted a Section 18 emergency registration for Hero® (bifenthrin) as a possible control for the SHB and is awaiting approval. As of this writing, EPA had yet to issue the emergency registration. Both Carlton and Drake expressed their level of shock at the damage the SHB had brought, especially to the TRV, and assured the Commission that EPA would complete the review for the Hero Section as soon as possible.

The devastation in the TRV is absolutely shocking. Willow trees are snapped in half as if they had been cut down by artillery fire. Based on images taken in April of the same area, the destruction has moved very rapidly. The Commission believes the TRV provides a critical opportunity to get non-avocado stakeholders involved in supporting research for possible solutions.

As part of that strategy, the Commission met with San

in laboratory conditions. Because these bacteria isolates are naturally occurring in the plants, Eskalen hypothesizes that they may be used as an effective and long-lasting injectable biological control method to limit the growth of FD in treated plants. He believes this research could be applied on native tree species in riparian areas to control SHB/FD. The Commission is pursuing funding from other stakeholders to support this biocontrol work.

Recently the Commission received $175,000 to aid in CAC's ongoing SHB surveying and grower outreach efforts. The grant funding was awarded through the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service Section 10007 of the 2014 Farm Bill. This marks the third time the Commission has secured USDA funding to help support our SHB work. In addition, the California Department of Food and Agriculture has committed $31,000 in emergency funding towards the Commission's SHB surveying and monitoring. The Commission will continue to explore any possible sources for additional research funding.

Diego County Parks Department Director Brian Albright, representatives from the U.S. Fish and Wildlife Service and non-profit organizations to discuss collaborating on funding opportunities. The majority of the highest risk areas outside of avocado groves — parks, riparian right of ways, conservation areas — will likely face significant limitations for pesticide applications due to their sheer size and risk of the public being exposed. The best option for controlling SHB in these areas will likely come through biocontrol measures.

Through the Commission's funded research, Dr. Akif Eskalen has identified biological control agents — endophytes (fungi and bacteria within plant tissues) — that have shown promise in preventing pathogen establishment in numerous hosts. In one of Dr. Eskalen's ongoing projects he is developing a biological control method to inhibit the growth of FD. Using xylem samples from relatively healthy and uninfested members of host trees species within infestation sites, he was able to isolate species of plant-endophytic bacteria that are able to inhibit the growth of FD

Avocado Tree Decline:

What's Happening to Our Trees?

By Tim Spann
Research Program Director

In late 2015, the California Avocado Commission (CAC) started to hear reports about fairly widespread tree decline, particularly in Ventura County and northern growing areas. Symptoms begin as wilt – maybe some tip burn – with the trees declining rapidly, often resulting in death. In an example of Mother Nature's equitability, CAC has not been spared from this issue, with a number of trees at CAC's Pine Tree Ranch demonstration grove in Santa Paula falling victim. But exactly what is happening?

In early November a number of trees in the mature block at Pine Tree Ranch were wilted. On an earlier visit in mid-October there were no signs of wilting and all the trees appeared healthy, so these symptoms had developed quite quickly. The declining trees showed symptoms of wilt, tip burn and had few, if any, healthy roots in the top few inches of soil. The endpoint of this decline was apparently death and several trees had already reached this point. To add insult to injury, the declining trees all had a good to heavy crop load.

An initial inspection of the block in November did not find any issues with the irrigation system, and it was suggested that the decline may be related to the recent pesticide trunk-injection treatments that were conducted on some of the trees. A tree-by-tree survey of the block on December 8 found that both treated and untreated trees were declining. Some of the declining trees were more than five trees and several rows away from the nearest pesticide-treated tree, ruling out the treatments as the cause of the decline.

To try to determine the cause of the decline, an initial soil sample was taken on December 8 and analyzed by Fruit Growers Lab (FGL) for electrical conductivity (EC). The results of those tests were inconclusive, but suggested that there may be elevated salinity in the soil beneath the declining trees. A more comprehensive sampling was performed by FGL on December 11, collecting leaf, soil and root samples from five pairs of healthy and declining trees across the block. These samples were submitted for comprehensive soil, leaf group plus chloride, and Phytophthora analysis. Additionally, water samples were taken from both wells on the property on January 6 and submitted to FGL for an ag water suitability test.

The leaf analysis data showed a few significant differences in nutrient content between the healthy and declining trees, but, with a couple of exceptions, all of the nutrient levels were within the optimum range for both the healthy and declining trees. Phosphorus (P) levels were low in the declining trees, but not deficient. Leaf chloride (Cl^-) levels were high in the declining trees (0.402%) compared with the healthy trees (0.208%), which is consistent with the tip burn symptoms. The Cl^- levels in declining trees are right at the threshold value of 0.5% established by David Crowley's recent work (see *From the Grove*, Fall 2015). However, leaf sodium (Na) levels were very low in all samples (0.006-0.008%).

Similar to the leaf analysis, there were some differences in the soil analysis for macronutrients between healthy and declining trees, particularly among the soluble potash (K_2O), calcium (Ca), magnesium (Mg) and Na. In all cases, the soluble forms of these nutrients are higher in the declining trees than the healthy trees. However, this may be an artifact of the poor health of the trees and their inability to take up these nutrients from the soil solution.

Among the micronutrients in the soil analysis there is little of note with the exception of Cl^- (Table 1). Although not statistically significant, Cl^- is numerically higher in the declining trees, and for both healthy and declining trees,

soil Cl^- levels are at the high end of acceptable limits.

Soil chemical properties are shown in Table 2. In both healthy and declining trees, the soil pH is slightly higher than optimal (optimal 6.0 – 7.5). Salinity is significantly higher for the declining trees, well exceeding the upper threshold limit of 2.0 dS/m. And the soil salinity of the healthy trees is also on the edge of being problematic.

The tests for *Phytophthora cinnamomi* indicate that the pathogen is present in some apparently isolated areas of the block. Four of the 10 samples collected (five healthy, five declining) were positive for *P. cinnamomi*, but of these samples two were healthy and two were declining. Thus, it does not appear that *Phytophthora* is the cause of the observed decline, but may be a contributing factor for some trees.

There are two wells on the property that water samples were taken from in early January. The large well on the upper part of the property was used to irrigate the entire grove (CAC's portion as well as Cal Poly's portion) until June 2015. In June 2015, the smaller well located nearer the front of the property was repaired and became the primary water source for CAC's portion of the grove.

The results of these water analyses show striking differences in the water quality between the two wells. The large well had an EC of 1.09 dS/m and a pH of 6.6, with 65 ppm Na and 35 ppm Cl^-. However, the small well had an EC of 2.12 dS/m and a pH of 6.9, with 85 ppm Na and 79 ppm Cl^-.

These values are interesting particularly in the context of David Crowley's Fall 2015 article in which he wrote, "Yields can be maintained at leaf nutrient analysis values as high as 0.5 percent for leaf chloride, but this becomes increasingly difficult to achieve as irrigation water chloride levels go above 80 ppm." Based on what we are seeing at Pine Tree Ranch, Crowley's analysis seems to be spot on.

Taking everything into consideration it appears that we have a pretty good picture of what has happened at Pine Tree Ranch. Starting in June 2015, the trees were being watered with poor quality water. We have now gone through four years of historic drought and the only water available to trees is what is provided by irrigation. There was a late-season heat wave that hit in mid-October with temperatures as high as 106 °F for several days. When coupled with a heavy crop load, these factors – and perhaps a little *Phytophthora* – combined to create a perfect storm that shocked the trees and caused them to rapidly decline. In early January, the ranch received more than 6 inches of rain with another 2+ inches falling later in the month. This temporarily relieved some of the stress on the trees and they seemed to perk up again. However, a dry February caused them to go back into wilt, suggesting that the damage is permanent.

The events that came together to cause the tree decline at Pine Tree Ranch may not be the same as what all growers are experiencing. However, the scenario of a prolonged drought coupled with a myriad of other stresses – *P. cinnamomi*, botryospaeria, salinity, heat, crop load, *P. mengei* and others – appears to be taking its toll on avocado trees. Each of these factors in and of itself may be manageable, but together they are dealing our trees a one-two punch. As El Niño fizzles and the drought continues, it will be imperative for growers to recognize the suite of stresses their trees are experiencing and take steps to mitigate those they can. Praying for rain wouldn't hurt either.

Table 1. Pine Tree Ranch soil micronutrient analysis for healthy and declining trees sampled on Friday December 11, 2015. Data represent the means of five samples collected from beneath five trees of each health status.

Tree Health	Zn	Mn	Fe	Cu	B	Cl^-
	-- Lbs/AF --					
Good	38.08	21.04	72.40	42.64	0.878	410.6
Poor	35.60	21.20	67.28	36.88	0.984	516.2

Table 2. Pine Tree Ranch soil chemical properties for healthy and declining trees sampled on Friday December 11, 2015. Data represent the means of five samples collected from beneath five trees of each health status.

Tree Health	CEC (meq/100g)	pH	Salinity (dS/m)
Good	14.44	7.61	2.044
Poor	17.32	7.63	2.836
	ns[z]	ns	*

[z]ns or *: Statistically non-significant or significant differences, respectively, between means of each nutrient at the 0.05 level.

By Tim Linden

Market Should Improve As Season Progresses

With a huge amount of imported fruit in the market in January, the market price for the start of the California avocado season was not very strong, to say the least. However, handlers believe the market will improve as the season progresses and this still could be a good season for growers from the Golden State.

"Theoretically, we would have liked to have had an early start to this season," said Rob Wedin, vice president of fresh sales and marketing for Calavo Growers Inc., speaking of the California crop. "However, the volume out of Mexico created pressure on the price and we haven't had the rain we expected, so overall we have gotten off to a slow start."

Speaking on the last day of February, Wedin said many retail customers do want to shift to California fruit, but the volume hasn't been there yet. He noted that the shift was right around the corner and, combined with an expected drop in volume from Mexico, he pegged mid to late March as the time frame in which the California deal will garner a lot more retail support, and presumably command a better market price. Wedin said the early timing of Easter (March 27) should be advantageous to the market price as there is a significant gap between that holiday and the always avocado-centric Cinco de Mayo celebrations. He said volume from Mexico should begin to wane around Easter as retailers won't feel the pressure of having to stock up again for the early May event.

As far as the length of the California season, Wedin believes the fruit will be marketed through Labor Day because of the close to 400 million pounds expected to be harvested. He is also anticipating less volume from Peru this summer. "We are not going to be bringing in Peruvian fruit at all this year," he said, "as we expect to have 50 percent more volume from California. We are concentrating on fruit from North America to satisfy our customers."

Gary Clevenger of Freska Produce/Harvest Time, who recently became the newest handler alternate on the California Avocado Commission (CAC) Board, echoed the comments of Wedin. "Right now we are only doing a little maintenance picking in California," he said, "just taking the fruit that has to be picked."

He guessed that by late March many retailers will switch to California fruit. "The price hasn't been there so we haven't had the volume. Hopefully, the switch will happen soon. Retailers don't like to switch until they know there's enough fruit. We're just waiting to see what's going to happen."

Clevenger said in the early going most packers have been fairly conservative on pricing because of the large volume from Mexico but that should start to change. "We're the new kid on the block and just watching what everyone else is doing."

Clevenger is excited about the new direction of CAC's promotional effort. "From what I have seen it looks really good. It looks like we are going after the millennials, who are going to be the next big group to buy avocados."

Robb Bertels, vice president of marketing for Mission Produce, is also on the CAC board and excited about the new creative direction of the group's promotions. "I've seen the creative materials and there are some very impressive pieces for retailers," he said.

Bertels said the key for California avocados to achieve the premium positioning and pricing that they seek is the retailer. "I like the new agency and the approach they are taking. It was time for a change. This new agency is really a big deal," he said of their reputation in the advertising

industry. "I think they will take good care of the California program."

Bertels specifically likes the grassroots effort that relies heavily on social media to spread the word.

Speaking of the crop itself, he is anticipating a very good year for California growers. "We had a grower barbecue in late January and I'd say everyone is pretty bullish about this year."

Discussing the crop in late February, the Mission Produce executive anticipated that the light California volume in the five to six million pounds per week range that marked February would double by the end of March. He expects volume to peak in April and carry through July at a very strong level.

Dana Thomas, president of Index Fresh Inc. also is excited about this year's California crop and how he expects it to play out. Speaking in early March, he said volume of California fruit "would increase throughout March, hit its stride in April and remain strong in May, June, July and August, before beginning to taper off in late August."

He also anticipates a strong market during most of that marketing period. Thomas opined that the large volume of avocados brought into the United States during the fall and winter months increased the distribution channels and has created a very strong demand for the fruit. "This will become more apparent as we enter the spring and summer and (as a result) I expect to see improvement in the market."

Like other packers, Index Fresh did pick, pack and market California fruit in January and February when the market price was not stellar. He supported the earlier start to the deal and said it happened for three distinct reasons: "We have a big crop, some growers are worried about the drought and wanted to avoid stressing their trees any more than they had to and there is also a general shift toward early picking in an effort to smooth out the effects of the alternate bearing tendencies of avocados."

Thomas said every year is different and growers and packers are confronted with a different set of circumstances that influence the market price. He believes the strategy involved remains valid despite this year's lower early market.

But as the California season heats up, this longtime participant is excited about the new direction CAC has taken for its promotional activities. He said the grower-centric campaign of the past several years was very successful but he likes the concept of targeting millennials with a new campaign in an effort to increase consumption and advance the premium positioning strategy. He said using more digital advertising and social media interactions appears to be a great way to reach this important demographic.

In an effort to capitalize on the premium positioning for California fruit, Index Fresh has launched its own split branding strategy this season. Only California fruit will be packed in its Index Fresh label with its Avoterra brand being used for imported fruit. Thomas said this differentiation will be supported with trade advertising for each brand as Index markets the fruit. He said virtually all of the Index Fresh label will be marketed west of Denver and he does expect to get a premium for the fruit. Even in a large crop year like this one, Thomas said the demand for California fruit will outstrip the supply.

Harvest Time Purchased by Freska

Freska Produce International LLC, based in Oxnard, CA, and a leader in the mango business, acquired California avocado packer Harvest Time Produce Inc., located in Oceanside, CA, late last year.

With the new California program to complement its existing Mexican avocado deal, Freska will now have a year-round avocado program to offer its customers. The firm has been importing Mexican avocados into the United States for the past three years.

Harvest Time Produce was formed in 1985, packing mostly Hass avocados from growers in San Diego County. As demand for avocados expanded, the firm began importing from Mexico and Chile in 2002 and installed a larger packing line and bagging equipment in 2010.

Clevenger noted that both he and partner Jesus "Chuy" Loza live in Ventura County and will be making a play for growers in the northern districts as well as the south. "We look at this as a tremendous opportunity," he said. "We see avocados as a real complement to our mango business. The (retail) buyers for avocados are often the same people buying mangos."

As the newest entrant in the California deal, Clevenger said Freska will be making an aggressive run at growers and make sure that its field price is very competitive.

Both Loza and Clevenger were involved in the avocado business in the 1990s before they formed their mango distribution company.

Clevenger said most of the avocados will be packed under the Freska label but the Harvest Time label also will be utilized. The avocados will be sold from the Freska office in Oxnard but the Harvest Time Produce name will continue to be used. He said the firm should harvest and pack eight to 12 million pounds of California avocados this season, though he observed that number could go higher because of the heavier set on many trees, and the company's effort to attract new growers.

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