From the Grove

Fall 2018

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Message from the President

The Rise and Fall of Reserves

Tom Bellamore

Earlier this year, at the California Avocado Commission's (CAC) annual meetings, management reported that the organization was in sound financial health. A crop size of around 375 million pounds was expected, revenue was projected to exceed expenditures, and ending reserves were forecast to exceed $12 million.

Reserve levels have sparked grower interest and debate since the Commission's inception. Historically, they have hovered around 33 percent of the budget, so at the annual meetings there was little doubt in anyone's mind that the projected year-end reserves were atypically high. Management made a point to call attention to that fact, reminding growers that reserves have increased in importance over time, as a budget and risk management tool.

For decades, California avocados were harvested year-round, and the Commission realized some revenue every month. Our current pattern of seasonal shipping has changed that. The Commission now operates for nearly six months (November through April) without income and reserves are used to develop the marketing campaign in advance of the season start and to carry operating costs. Still, you might say, wouldn't a lower level of reserves suffice? The answer is: "yes, however..."

Reserves also are needed to contend with unforeseen circumstances, and this crop year was chock full of those. The season had barely begun when the Thomas fire consumed more than 280,000 acres, impacting avocado production in Ventura and Santa Barbara counties. On the heels of the fire were crop-damaging freezing temperatures and then fog, which coincided with and impaired the bloom in some parts of the growing region. By spring, most industry experts had adjusted their crop size downward. Then came the heat. As the season wraps up, the final crop size for the year appears to be around 320 million pounds, about 50 million pounds below the opening estimate. To support the late season shipments, and in light of the ample reserves, the Commission chose not to curtail marketing expenditures this year. Ending reserves are now forecast to be $2.5 million less than the original projection.

Everyone knows that the heat in early July not only caused damage to the current crop, but also the new crop set on the trees. The 2019 crop that looked to be setting nicely prior to the heat is now thought to be considerably smaller, perhaps as low as 160 million pounds. A crop of this size would generate roughly $8 million in revenue at the current assessment rate, substantially below what is needed to maintain strong marketing and non-marketing programs in the coming year.

Of course, management's proposal to the CAC Board is to tighten the belt in 2019, to the point of discomfort. There is little choice. We cannot, however, risk becoming inconsequential as a brand, so the work of maintaining awareness and preference for California avocados among our trade customers and consumers must continue, as cost-efficiently as possible. Here's where reserves help.

By the close of 2019, reserves are projected to be on the order of $6 million. What looked to be "excessive" reserves in March 2018 will now be – just a few shorts months later – exactly what was needed to carry us through the last three crop years (***2017***: 216 million pounds, ***2018***: 320 million pounds and ***2019***: 160 million pounds). A look back through the industry's statistical data confirms that consecutive small crop years are an anomaly, but certainly a possibility.

It is the board and management's responsibility to be prepared for such a possibility, and for other contingencies unrelated to crop size. Reserve levels rise when the market overperforms price projections and they fall when crop volume projections do not materialize. Some of the "fall" can be mitigated with close budget management – scaling back expenditures when the crop size dips – or with assessment rate changes, if necessary. There is no manual for managing reserves and any seasoned board member will explain that it is more art than science. And ultimately, it is an art that a new, incoming CEO must learn, and learn quickly.

That takes me to my final point. When growers stood up at the annual

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

meetings and offered suggestions for reducing reserves, we listened. The board's officers explained that a leadership transition was on the horizon, and the change in personnel would likely result in a short-term spike in overhead, hence another contingency, another reason for carrying higher reserves. Still, ahead of the weather-related trouble, it was management's intent to propose an assessment rate decrease in the new fiscal year. Unfortunately, that decrease now seems ill advised. Mother Nature, more than anyone else, has seen fit to temper the Commission's reserves, which now appear to be just where they needed to be to get us through three lean years.

Chairman's Report

Time for a Change

Rick Shade

The time has come to write the column that some have been dreading, some eagerly anticipating, and most will read with measured indifference: my last column as chairman of the California Avocado Commission (CAC). I am eligible to run for one more term as the District 5 representative and sit for one more year as chair, but it is time to step away.

I have several good reasons for stepping aside. The first is my wife, Trish. During our years together, she has sat by as patiently as she is able while I have coached youth sports teams, been active with Farm Bureau, CAPCA (California Association of Pest Control Advisors) and the Commission. I promised her travel and adventure when we married and I owe it to her to do those things while we still can. Sitting in a board meeting can hardly be considered high adventure.

I also have three adult sons and one grandson. Each one of those young men deserve more of my time than they currently get; it is time to make more time for them. My grandson is three-and-a-half years old and has only seen me a handful of times. I am the only living grandfather he has so I am really feeling obligated to do double duty for him.

Lastly, I have tried to bring aboard the next generation of leaders and have met with some real success. The new leaders have a solid grip on social media and new types of promotion that are more or less foreign to my gray old head, but so vital to our goals for California Avocados. I would not be true to my goals if I brought in the new leaders and then stood as a roadblock to their success and innovation.

I have been asked why I have spent nearly two decades involved with the Commission. There are a few reasons. First, I was raised to volunteer and be active in the community, and being active with CAC was a great way to be actively immersed in the avocado community. Second was a lesson from my college days well learned. On the first day of class in Fruit Science 101 at Cal Poly Pomona, Professor Lloyd Newell took roll, looked out at the class, pointed around the room at us, and bellowed, "If you can't sell it, don't grow it!" Those were words I took to heart and serving on the Commission has allowed me to do my part in promoting what I grow. I also must point out that California avocado growers and the CAC staff are some of the greatest people around, and being with everyone in the group has been a thoroughly enriching experience.

We have just finished the initial round of crop estimating meetings for the 2019 crop. One thing is abundantly clear: we are looking at a very small crop in 2019, and possibly 2020, due to weather related factors. A side effect of small crops is lack of work for our experienced and dedicated harvesters. If we don't keep them busy, they will drift off to other crops or new trades. Now is the time to seriously consider some of those jobs on the ranch you've been putting off. Those pruning projects? The time to do those is now when there will be minimal fruit loss. Use your labor contractors and harvesters to get the jobs done and keep labor around for when our crops return to normal size.

As a multi-generational California farmer, I have known since childhood that rain and rainfall totals were life and death topics. Listening to the near reverential tones in which rain was discussed around the dinner table taught me that rain had more going for it than just water. Since this magazine will be landing on peoples' desks in the early fall, there is no doubt in my mind that my fellow farmers will be starting to cast their eyes skyward wondering when the first storms will hit and what they will bring. For those looking for rain comes the first closing quote from Walt Whitman, "And who art thou? Said I to the soft-falling shower, which, strange to tell, gave me an answer, as here translated: I am the Poem of Earth, said the voice of the rain".

Rainfall is poetry to this farmer to be sure. The second quote, which I cannot resist, is from the immortal Bugs Bunny, "That's All Folks!"

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Issues Watch

By Ken Melban
Vice President of Industry Affairs

CAC Chairman Rick Shade, HAB Chairman Scott Bauwens, Commission staff Ken Melban and Tim Spann host FDA and CDFA food safety officials.

Food Safety, FDA Field Visit and On-Farm Readiness Reviews

At the end of June, the California Avocado Commission (CAC) hosted more than a dozen officials with the Food and Drug Administration (FDA) and California Department of Food and Agriculture (CDFA) for tours of an avocado grove and packing facility. The visit came at the request of FDA as they are continuing to prepare for the implementation and enforcement of the Food Safety Modernization Act's (FSMA) Produce Safety Rule (PSR).

FSMA, which was signed into law in 2011 and became effective in early 2018, requires producers of fresh produce sold in the United States to comply with a series of policies, cultural practices and procedures intended to mitigate possible food safety contamination. The mandatory FSMA implementation deadlines are shown in the box on page 9. Although the PSR is now the law for the largest producers, enforcement has not begun. For 2018, FDA and CDFA are conducting education and outreach activities to provide impacted industry members with information concerning PSR requirements. In 2019, CDFA, under an agreement with FDA, will begin conducting PSR inspections of California farms, including avocado groves.

During the grove visit, Commission representatives focused on CAC's comprehensive Food Safety program, stressing the importance the California avocado industry places on producing and delivering a safe, high quality piece of fruit…every time. In addition, CAC staff highlighted specific regulatory issues that, in the Commission's view, do not improve food safety but do create unnecessary and burdensome requirements for growers. One example of this is the PSR mandate requiring a grower to conduct microbial water sampling from wells that strictly deliver into a reservoir that also is being tested for microbial contamination. The Commission argued that these wells are part of a larger delivery system, into one

reservoir, which also is being tested. If the test results from the reservoir return outside of the acceptable levels, then it makes sense to test the individual feeder wells. But to require initial testing of a well in this scenario is a redundant, costly requirement. While FDA would not provide any official response to the Commission's concerns, there seemed to be general agreement with the positions put forth.

The Commission also has coordinated a few On-Farm Readiness Reviews (OFRR) with CDFA. The purpose of these OFRRs is to provide industry members an opportunity to better understand the PSR and determine whether they are prepared for a PSR inspection. CDFA is offering the OFRRs through 2018. Before an OFRR will be conducted, as required under the PSR, growers must have at least one employee (or owner) who has completed an FDA-approved PSR Grower Training course. The course is a one-time, seven-hour training that follows the person. If you are interested in participating in an OFRR, more information may be found at the CDFA website (cdfa.ca.gov/producesafety/educate.html).

Based on the OFRRs held thus far, all indications are that if a grower follows the Commission's Food Safety program, which supports a Global Food Safety Initiative (GFSI) audit, they will be in position to demonstrate compliance with the PSR, except for the water testing requirements. As reported before, the FDA has delayed the PSR water testing requirements until 2022. Once FDA determines the PSR water testing requirements, the Commission will conduct a review to determine if the Commission's Food Safety program fulfills the requirements.

On a related note, many of you may recall that initially the Commission worked with United States Department of Agriculture (USDA) for the food safety certification of groves. However, there are two parallel tracks the Commission considers in terms of food safety certification: 1) does the certification meet the PSR requirements; and, 2) does the certification meet with major buyer requirements. The Commission shifted to third-party auditors because major buyers refused to accept the USDA audit and expressed a preference for the Global Food Safety Initiative (GFSI) audit. Now, the USDA has achieved technical equivalency of its Harmonized GAP Plus audit program by the GFSI. This new accreditation of USDA by GFSI may allow growers to once again utilize USDA for the auditing purposes, if it's proven acceptable to retailers.

Osama El-Lissy, APHIS deputy administrator, and Ken Melban discuss trade issues.

As is often the case with federal and state regulators, there definitely exists some level of disconnect between their offices in Washington, D.C., and Sacramento and the farms their regulations are targeting. The Commission continues to be very active on working to shape policies and regulations, such as the PSR, that impact California avocado growers, and will continue to inform industry members as details change.

Produce Safety Rule deadlines for producers are as follows:

- January 26, 2020 deadline for very small businesses — more than $25,000 but no more than $250,000 in average annual produce sales during the previous three-year period
- January 26, 2019 deadline for small businesses — more than $250,000 but no more than $500,000 in average annual produce sales during the previous three-year period
- January 26, 2018 deadline for all other farms

CAC VP of Industry Affairs Ken Melban meets with USDA Undersecretary Ted McKinney.

NAFTA, Tariffs and China

At the time of this writing, the Commission had just concluded a meeting with Ambassador Greg Doud, chief agricultural negotiator, Office of the United States Trade Representative, to discuss the North American Free Trade Agreement (NAFTA) renegotiations and the U.S. and China trade situation. During the meeting, the Commission stressed the importance of maintaining a stable U.S. avocado market and the need for offshore supplies to meet the increasing domestic demand. Although Ambassador Doud could not provide absolutes until the renegotiated NAFTA is ratified, he did assure us that the Commission's "Do No Harm" message has been heard loud and clear by the administration.

In July, Mexico elected Andres Manuel Lopez Obrador president, and the U.S. administration appears motivated to finalize an agreement with Mexico ahead of the change in power, which will occur on December 1, 2018. As of this writing, there are strong indications an agreement with Mexico may be achieved prior to an agreement with Canada.

As discussed in previous writings, although some California avocado industry members may see the supplies from Mexico as a threat to their livelihood, a look back over the last few years indicates that those supplies are essential to keep up with increasing U.S. demand. This makes for a very "delicate partnership" — one that strives to maintain a stable flow of avocado supplies to meet growing consumer demand, but at a level that continues to keep pricing strong. While it has not always been perfect, in general this "delicate partnership" has worked.

In the past few months, the NAFTA renegotiations have been overshadowed by the U.S./China trade dispute and resulting tariffs. California avocados are on the China tariff list, although currently we do not yet have market access to China. The Commission has been working with the USDA's Animal and Plant Health Inspection Service (APHIS) since 2005 to secure China market access. Considering the current trade situation with China, the Commission's successful pursuit of market access will likely be further delayed.

The Commission recently held meetings with USDA's Ted McKinney, undersecretary for trade and foreign agricultural affairs, and APHIS's Deputy Administrator Osama El-Lissy. Commission staff discussed the importance of California avocado exports, which accounted for nearly 10 percent of California's 2018 total volume. South Korea and Japan are the two primary export markets. The point was made that although, at present, California avocado exports are not impacted by the China tariffs, we remain concerned about the possibility of unintended consequences with our existing trade partners. The administration officials understood our concern and acknowledged the potential risk for the China trade dispute to impact trade with South Korea and Japan. Both the undersecretary and deputy administrator confirmed the administration is maintaining communication with other Asian trade partners and they feel confident the California avocado industry will not experience negative fallout. Currently, California avocados have a zero tariff into South Korea and a 3 percent tariff into Japan. The U.S. has a free trade agreement with South Korea and is working to establish a free trade agreement with Japan.

Through NAFTA and other U.S. trade access agreements (e.g. Chile, Peru, others) avocado imports into the U.S. will continue. This is our reality. Globalization is here, and the California avocado industry is part of a global market. As such, it is imperative we recognize this global market and we compete…globally. That is the best option.

Gem Variety Crop Insurance

Over the last few months, the Commission has worked with USDA's Risk Management Agency to pursue inclusion of the Gem variety for federal crop insurance. On August 1, 2018, the Commission learned that the Federal Crop Insurance Corporation has approved Gem as an eligible avocado variety for crop insurance.

This eligibility has been approved for all covered counties beginning in reinsurance year 2019, which is fruit for the 2020 crop year. Interested growers will need to purchase crop insurance by the sales closing date of November 30, 2018, for crop year 2020.

Avocado crop insurance is available in the following counties: Monterey, Orange, Riverside, San Diego, San Luis Obispo, Santa Barbara and Ventura. If production is outside of these counties, a grower can request insurance via a written agreement.

If you have questions, please contact your crop insurance agent or Ken Melban at the Commission office (949.341.1955).

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Western Retailers Report Avocado Sales Top the Charts

By Tim Linden

Four different Western U.S. retailers report that avocado sales continue to climb and have become one of the top, if not the top, produce item in their respective stores. California avocados remain a very important part of both the past growth in avocado sales and the future that lies ahead.

Bristol Farms is an upscale grocery store chain with a dozen of its 15 stores in Southern California. John Savidan is the director of produce merchandising and has watched the popularity of avocados grow into the stratosphere. "Avocados are a hip must-have item now, where 10 years ago it wasn't the case," he said. "People now know that they are very good for you and quite versatile. Avocados really were always a great item for us, but I'd have to say roughly six or seven years ago is when they really started to take off. We have never looked back and look for more great things to come."

At Bristol Farms, the avocado is always one of the top 10 sales items and many times they are in the top 5. "Avocados are a very important driver in our business today," he said. "It's not uncommon for us to have avocados and fresh guacamole in the top 10."

The company's Southern California roots make it a natural to promote California avocados. "For us, being a Southern California retailer makes the avocado the perfect fit. We rely heavily on the California Avocado Commission during the California season. We have somewhat trained our customers on the fact that if they want to eat the best avocados, it's when they are in season from California. We work closely with the California Avocado (Commission) staff to plan and strategize ahead for each upcoming season. Having this relationship makes for a seamless season that seems to prosper and only get better as we move into the future. During the month of August we run a Hatch Chile event where we tie in late season California avocados and really promote and push fresh guacamole."

Though California has been a mature avocado market for many years, Savidan said sales gains have been steady over the years, and even more dramatic when you add in fresh guacamole. "We don't have any real formal data on the actual consumption percentage, but I'd guess that many of our customers track on the heavy- to even mega-user status when it comes to avocado consumption."

John Savidan, Bristol Farms

Of course, Bristol Farms offers other sources of avocados throughout the year, but Savidan said "the California avocado is the anchor to our whole program. Our consumers love avocados and although we carry fruit from Mexico and perhaps even Peru, it's the California fruit that sees the most consistent results. We do promote California fruit and we are constantly working with Jan DeLyser and her staff year-round to ensure we have all the right tools and support."

He continued, "We only carry one origin at a time and it's usually always California and then Mexico. Our customers ask for California fruit when Mexico is at the tail end of the season as it's more synonymous with summer, BBQs, grilling and get-togethers."

Though he did add, "Having supply 365 days a year is so key to our program. Without the fruit we have no sales and nothing to sell. Fresh guacamole is also a big part of the program and without fresh avocados there'd be no guacamole. Having fruit available year-round offers us the ability to run programs, promote and offer great-eating fruit to our customers 365 days a year. "

Bristol Farms typically carries two to three fresh avocado SKUs on a regular basis, as well as several guacamole SKUs.

"Our customers like the larger fruit and tend to lean towards organic over conventional. We do not sell a lot of small single serve or bags for that matter."

He added that, "Organic, for us, is the name of the game when they are in supply and our costs are favorable."

Jeff Fairchild, New Seasons Market

Jeff Fairchild, produce director for the 19-store New Seasons Market chain – which has stores mostly located in the Portland, Oregon area – calls the operation a collection of "quality, neighborhood grocery stores." He further notes that the chain is "a tweener" with the bookends being a conventional supermarket and a high-end specialty market. Organics make up about 70 percent of its produce sales, and "quality" drives Fairchild's purchase decisions in that department.

"I buy a lot of California avocados. I like the fruit and you tend to buy what you like," he said.

But Fairchild readily admits that he doesn't start buying fruit from California until it reaches that top-quality level that he loves. "I don't buy the first fruit from California. I usually switch in late March or early April and then I stick with California as long as I can...through September and into October if I can."

In late September or October, he usually switches to Mexican fruit but says the last quarter of the calendar year is typically when his sales are the lowest. He believes that avocado quality is not at its best in that time frame, which is why sales suffer. "But from January through March, Mexico produces a very good piece of fruit, which is why I typically stick with it through March," Fairchild says.

He believes his Northwest shoppers are driven by quality, not place of origin. Fairchild likes California avocados because he thinks they taste better during their peak time in market, not just because they are from California.

New Seasons' goal is to carry only one source of avocados at a time, but the company uses distributors who sometimes have to supplement supplies with other sources of origin to fill the order. And the avocado order is as big as any other.

"For us, avocados are ranked either one or two," Fairchild said. "It's either avocados and berries, or berries and avocados."

He indicated that many of the chain's clientele are aging "hippies" who fell in love with the avocado in the '70s, '80s and '90s and still love it today. Though he is amazed at how "hot" an item it has become, he said "it has always been a big item for us."

New Seasons sells both a large piece of fruit – 32 or 36 – and a bagged option, offering value and a smaller avocado. While the preference is to offer organic produce when it is available, Fairchild reiterated that quality is always the overriding criteria. While the chain's customers prefer organic produce, Fairchild indicated they understand it is not always available and they will buy conventional produce when it is presented to them.

Michael Schutt, Raleys

Michael Schutt has been with Raley's Supermarkets, headquartered in Sacramento, for 32 years. He has risen from store level to a senior position on the produce buying team. One of his responsibilities is the avocado category, an item he has been dealing with for most of his career. In fact, when he first moved from the store to the distribution center in the quality assurance department, ripening avocados was an important part of the job. Avocados have to be jockeyed between the ripening room and the cold room to ensure a consistent supply of a consistently ripe piece of fruit.

For the past decade, he has been in charge of purchasing the fruit and making sure Raley's stores have an ample supply. "It is our number one item and it is the clear-cut winner. It reached that level two years ago when it surpassed bananas and now it's not close."

For years, Schutt said managing avocado supplies meant using California as long as you can and then switching to Chile until California got going again. Today, it is a different ball game with huge supplies from Mexico, increasing supplies from Peru, and Colombia on the horizon. "Chile is opportunistic. They only come here when the market is good."

With its California location, Schutt said his customers clearly prefer the California fruit when it's available. "When California is in season, that's what we feature. California grown resonates with our customers. I start with California in the beginning of the season and stay with it as long as we can."

Speaking in early August, Schutt spoke as the California crop was entering its latter stages of the season. He said Raley's will switch when it has to and will look at fruit from Mex-

ico, Peru and Chile. He said Peru is doing a much better job on quality this year so he will probably feature some Peruvian fruit before heading "full steam into Mexico" when its new crop is ready in mid-to late-September. "Every year is a little different," he said.

Though his customers have a preference for California avocados during their season, he said avocados are popular all year long and create great dollar sales, as well as strong unit velocity, virtually every sales period of the year. He also noted that the use of avocados by consumers has gone through a tremendous shift. "As avocados have proliferated, they have become a part of every diet and they are featured in all facets of meals," he said. "Guacamole used to be the number one use; now I think it's about number seven."

Like all the retailers interviewed, Schutt said it is quality that always drives his produce buying decision. "Quality is the first thing we try to curate," he said. "There are very few states of origin that denote quality (for any product). Idaho potatoes is one and California-grown avocados is another. They go hand-in-hand."

Raley's typically handles a 48-count conventional avocado, a 60-count organic avocado and a four-count bag featuring 70-80 size fruit. That size differential in organic and conventional is designed to present a relatively similar price point. Organics has been a labor of love for Schutt for the past two decades. He launched Raley's organic program and has pushed and pulled it to its current successful perch. He said when it comes to most organic produce – and the avocado is no exception – sales tend to mirror the conventional side of the aisle. If conventional sales are great, they also are great for organics. As far as avocados are concerned, he believes Raley's over-indexes when it comes to heavy avocado users.

As produce sales manager for the 141-store Portland Division of Albertsons/Safeway, Jim Molamphy oversees merchandising for a wide variety of operations. But they all sell the heck out of avocados. With his 35-plus years with the organization, the veteran retailer remembers when avocados were a specialty item. "We carried California fruit and limited supplies from Mexico. It was mostly a June, July and August deal."

Those times have come and gone with Molamphy calling the avocado category a "million-dollar item" with sales in the top five on a year-round basis and often reaching the top spot. He said the addition of foreign supplies and the improvement in quality from foreign sources has greatly enhanced the popularity of avocados. "That's the beauty of it; it is now a year-round crop."

While Molamphy sources from other districts, he said California still "carries its weight and is valued by my customers. Understandably, shoppers in California have more passion for fruit coming from their own state, but it is still a strong point for my customers. It is a U.S. product and has that California label, which is important."

He noted that for his customer "quality is always number one. In fact, I might not switch to California during that first week or the first 10 to 14 days of the season. I wait a bit so they get a little more oil," he said, adding that when the quality is there California fruit is tough to beat.

Jim Molamphy, Albertsons/ Safeway

And he promotes the fruit almost non-stop. Speaking in early August, with the first 26 weeks of the year under his belt, Molamphy could not recall one week in that time frame in which he failed to promote avocados, mostly California avocados. "Out of the last 26 weeks, I believe I have had a conventional avocado, organic avocado or guacamole on ad every week."

He was especially complimentary of organic avocados from California. "The whole month of July I promoted organic California avocados," he said.

The Albertsons executive also discussed the great synergy between the retailer's ripe avocado program and its in-house guacamole program. With the ability to transfer unsold ripe avocados for use in the making of fresh guacamole, a store can offer a greater volume of preconditioned ripe fruit, which definitely increases sales. "I love our guacamole program," he exclaimed.

He added that Albertsons/Safeway typically carries several different avocado SKUs. "The proliferation of sizes has been great. Twenty-five years ago, we only carried a 48," he said. "Now we have a three-size program. We carry an organic 48, an extra large 32 or 36 and medium size 60. Our market has struggled with bags. We haven't had a lot of success with bags, but I think there is a growth opportunity there at a good price point. We are going to try to start that up again."

While the Western U.S. is a mature avocado market, Molamphy said some newer customers do struggle to pick out ripe fruit and need help. At the same time, he noted that during a two-year hiatus from Albertsons several years ago, he worked with various East Coast retailers and the comparative volume of avocado sales was startling. "The difference between the Northeast and the Northwest blew me away. We sell truckloads of avocados while they sell pallets of avocados."

Molamphy expects avocado sales to continue to soar as the various sources offer increased opportunities for promotions and introduce new consumers to the product.

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ATTORNEY ADVERTISING

By Tim Linden

A Year Like NO Other

Jan DeLyser, vice president of marketing for the California Avocado Commission (CAC), likes to say that no two California avocado years are ever the same. She has been closely aligned with the industry for two decades and stands by that comment. Every year is different than the one before it and the one after it. However, over time, there are years that look alike.

But 2018 broke the mold…any mold. "It is clearly unlike any year we have ever seen," she said. "Everyone is saying that."

About a year ago – early fall 2017– growers were impressed with the fruit on the tree. No one was predicting a record year but they were expecting a solid bounce-back from the 2017 season when only 216 million pounds of California avocados were harvested and sent to market. There were whispers of a crop north of 400 million pounds.

Fall weather, including wind, and a pair of devastating fires in December tempered the enthusiasm for a big, big crop and led industry officials to re-estimate that 375 million pounds of California avocados would make their way to market in 2018.

As the season wore on it appeared that the estimate of 375 million pounds might be a bit high but at least in the ballpark. Then a devastating heat wave hit California in early July. Unseen and unheard of temperatures approaching 118 degrees were registered in some Southern California avocado groves. High temperatures everywhere exacted a toll. Much fruit still on trees dropped or suffered heat damage, making it unsaleable, and many trees also experienced damage from the extreme temperatures. Some observers predicted volume would never reach 300 million pounds and only limited production would make it past mid-August.

A solid August has instead pushed the crop past 300 million pounds and helped those growers with fruit to register good returns for the season. Though an average crop in historical terms, it is a solid rebound from 2017 and a year that did produce above average farm gate prices.

"The returns have been good," said Gary Caloroso, director of market-

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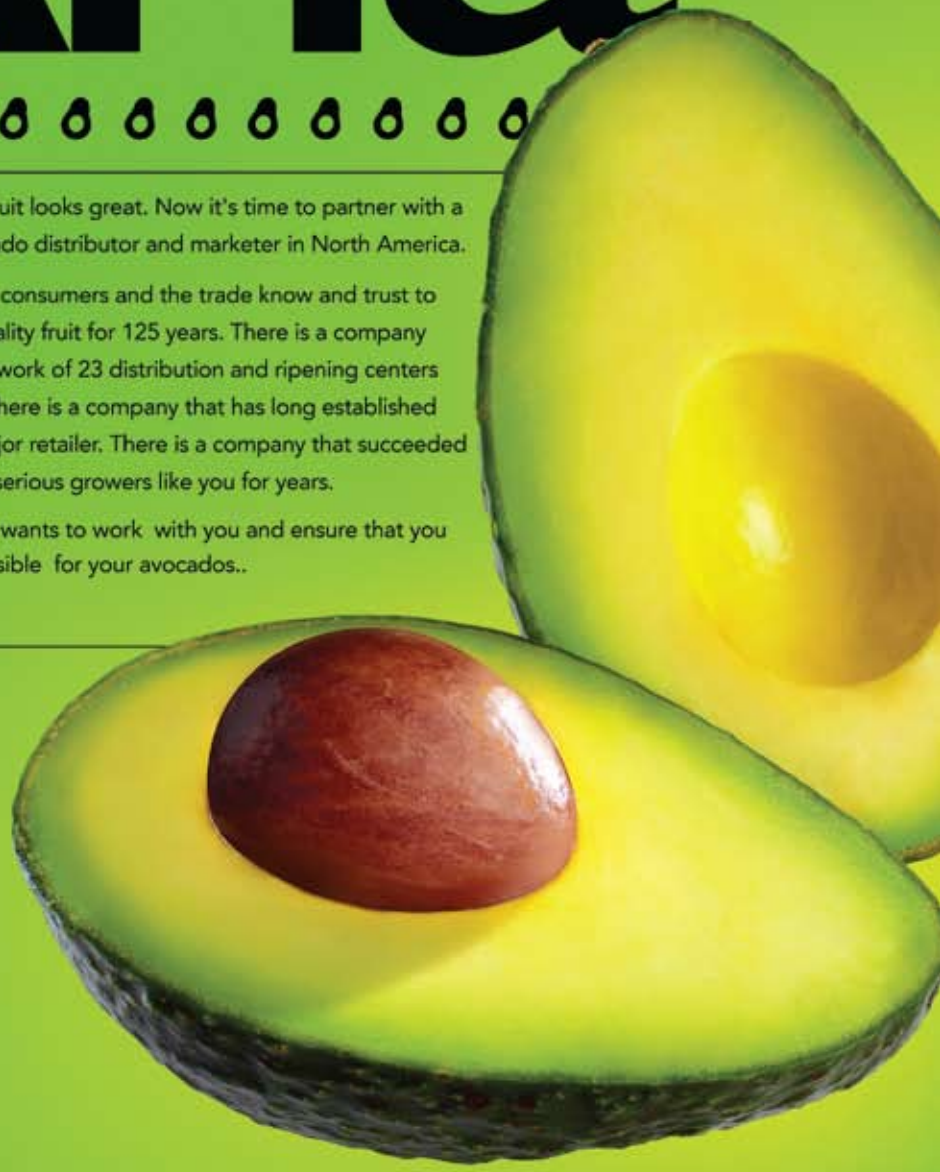

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ing for Giumarra. But he quickly added that there were pockets of growers that were devastated in 2018 because of the many calamities. "Our hearts go out to these growers," he said. "Some experienced devastating losses. We're feeling very badly for those growers."

In fact, the losses are still being calculated. Caloroso said in early September that it is still very difficult for some growers to assess the damage to their trees caused by the heat. "When we get into the fall – two to three months down the road, we will have a much better handle on it."

For preliminary budgeting purposes, CAC has asked handlers to estimate the 2019 crop. As always, it is necessary for the Commission to start to budget well before the first piece of fruit is picked. April Aymami, CAC's industry affairs director, said that the Commission had just recently completed the very preliminary handler crop surveys and field meetings to discuss the 2019 industry estimates. As expected, estimates represented a wide range of responses, with no one fully confident in their numbers, perhaps cautioned by the experiences of the past 12 months.

"It's just too early to tell," said Caloroso repeatedly, in response to several questions from this reporter on the subject.

Rob Wedin, vice president of fresh sales and marketing for Calavo Growers, was equally hesitant to reveal his firm's response to CAC's pre-season estimate request. He said it is very difficult to create an accurate estimate at this point in time (early September) because of the unknown damage to trees from the December fires as well as the July heat wave. While the damage to some groves from these weather events is evident and can be calculated, there are many other trees where the effect won't be known until the 2019 crop is actually harvested. What is the ultimate reduction of pounds on these trees exposed to extreme heat either by fire or the strange July weather? No one knows and that is a very important factor in determining what the ultimate tonnage will be for 2019.

DeLyser said crop forecasting also has become more challenging because of different tree densities. Yield from an acre of traditional planting could be significantly different than an acre with twice as many trees. No longer can you just average yield and multiply it by the number of acres. She did say that CAC is working with experts to refine its crop estimating tools in an effort to come up with a more accurate number.

Wedin said growers are reporting vastly varied pictures of their own groves, which makes estimating even more challenging. "Growers in inland valleys where the early July temperatures reached 118 degrees have reported significant damage," Wedin said. "On the coast, there was far less impact."

Another handler, Gary Clevenger chief operating officer at Freska Produce International, gave a very vague answer that everyone repeated in their conversations. "It (the 2019 crop size) will be less than this year."

He said Freska is a relatively small player and doesn't have the volume to allow it to make an accurate estimate about the industry at large. While saying it will be smaller than 2018 is vague, it is an important distinction as it clearly points to a short crop year.

DeLyser said every year CAC creates a unique marketing plan to fit that year's crop. "Our role is to get the best information we can from the handlers about the size and timing of the crop and relay that to retailers so we can market and promote that crop in the best way possible."

For 2019, she said it appears that the bulk of the volume will be marketed in the April through July time frame.

Wedin concurred, noting that during the past two years the April through July time frame has been a very good one for California growers with strong markets and strong demand. He expects that many growers will ramp up their production in mid-April to participate in the always-strong Cinco de Mayo promotional period.

He said a short crop has its own peculiarities including a more varied size profile as there is very little size picking. He reasoned that many groves will not have enough fruit to justify two harvesting passes.

Wedin said production from other points of origin will play an important role as growers determine when to enter the market with their fruit. For the past two years, Mexico's late spring/early summer volume has waned while Peru's summer volume shipped to the United States has increased. This year Peru's volume skewed later which created a different set of marketing dynamics.

And another potential factor on the horizon is the approval of fruit from the state of Jalisco, Mexico, to be shipped into the United States. For the past two years, the approval process has been delayed as the United States and Mexico were working through trade issues. Recently, the United States government announced that those talks are coming to a conclusion. Approval of Jalisco fruit, which matures during the summer, could be a byproduct of that effort.

Caloroso said another very important factor is when the retail community wants California fruit. "We have a core of Western retailers who prefer California avocados and want to switch to California as soon as they can," he said. "Our strategy will be the same as always, which is to take care of those core customers as soon as we can."

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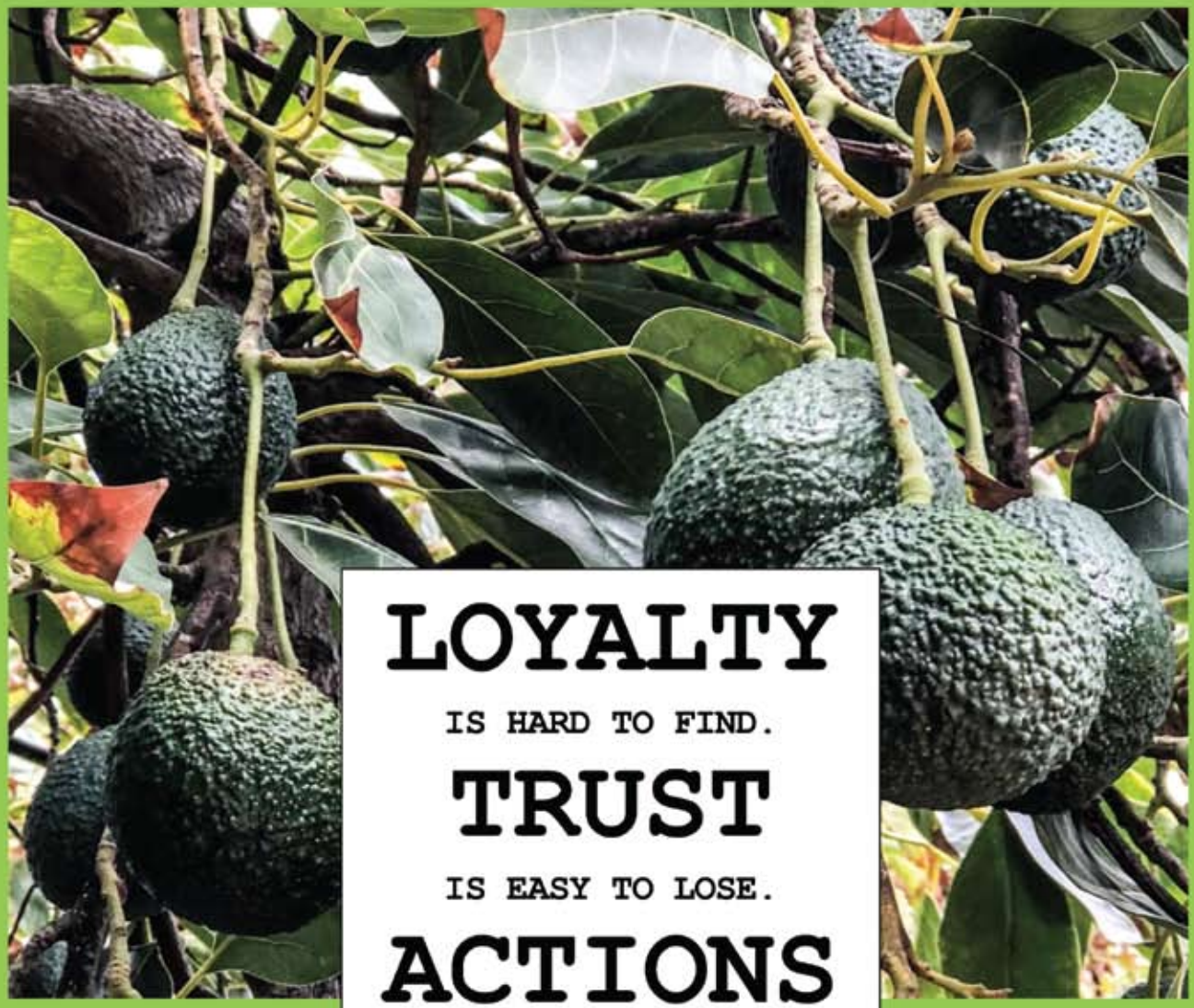

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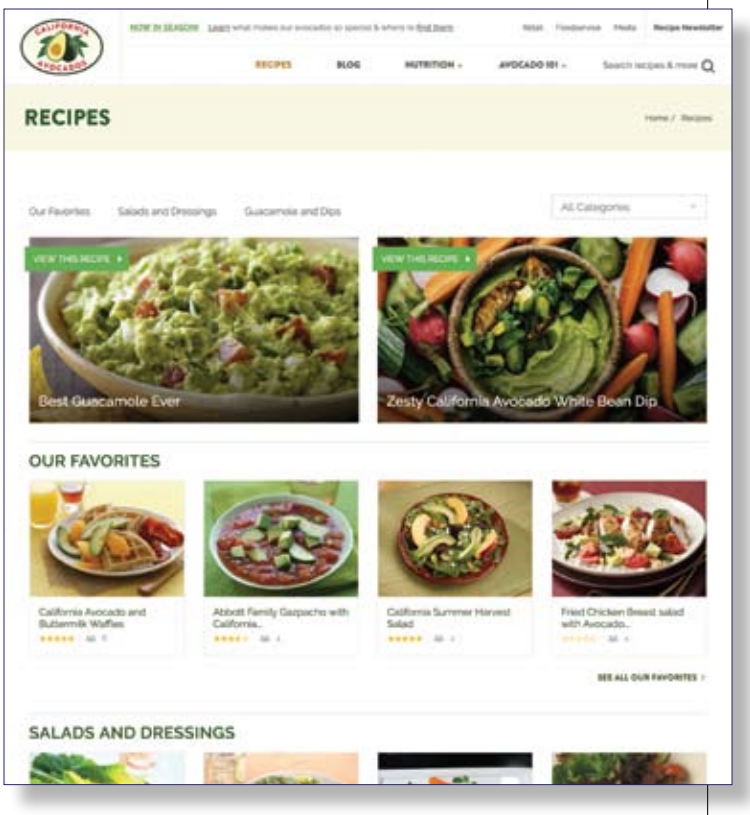
CaliforniaAvocado.com Improvements Make it Easier for Visitors

The California Avocado Commission (CAC) was one of the first commodity boards to launch a website, back in 1996, when online marketing was in its infancy. Since then, the digital world has advanced at a rapid pace with consumers increasingly turning to trusted online sites for relevant and interesting content they can access whenever and wherever they want. The Commission has strived to match that innovative pace and maintain the premium positioning of the California avocado brand at the forefront of the industry by continually improving its digital assets.

With 4.5 million visitors annually, the CaliforniaAvocado.com website has established itself as a go-to resource for all things avocado — from how to prepare California avocados and incorporate them into everyday meals and celebrations, to the fruit's nutritional value and where to find the nearest California avocado retailer. The key, however, to maintaining — and growing — the Commission's loyal digital audience is meeting and exceeding the expectations of visitors. We have positioned CaliforniaAvocado.com as the go-to resource for avocado content online while delivering key messages and availability information.

While updates and fixes happen daily, the most recent round of significant upgrades to the CaliforniaAvocado.com website began in 2017. Site improvements were completed in phases with each implementation tested to ensure the results provided an optimal experience for site visitors; the latest group of changes launched in June 2018.

The Commission utilized visitor data compiled from the backend of the website to target areas in need of improvement that would deliver the most value. The recipe portion of the site, which houses nearly 1,000 California avocado recipes and is one of the most visited areas of the website, was redesigned in order to make it easier for consumers to find recipes that fit their lifestyles and preferences. Recipe categories were streamlined to allow consumers to more easily locate recipes by meal and dish types (such as breakfast, beverages or salads), by special diets (vegan, gluten free, diabetic friendly, etc.) or by other categories like chef or blogger recipes and "quick and easy."



The recipe landing page's "recipe search" functionality was improved to ensure consumers can filter, sort and display results based on their personal preferences.

The improved "recipe search" function allows consumers to utilize a variety of filters, sorting functions and display options to customize their search. For example, a site visitor can search for sandwich recipes and filter the results to show

only those sandwiches that are dairy free. Results can then be sorted in six different ways: by newest, what recipes are "trending," preparation time, number of ingredients, and alphabetical order A-Z and Z-A. Consumers can even choose how they would like the results displayed — in rows with large recipe photos or simple lists that provide descriptive information about the dish. As features like these become more common on websites that target California avocado consumer visits, it becomes increasingly important to keep pace with those websites – especially for users looking for a more personalized, relevant experience.

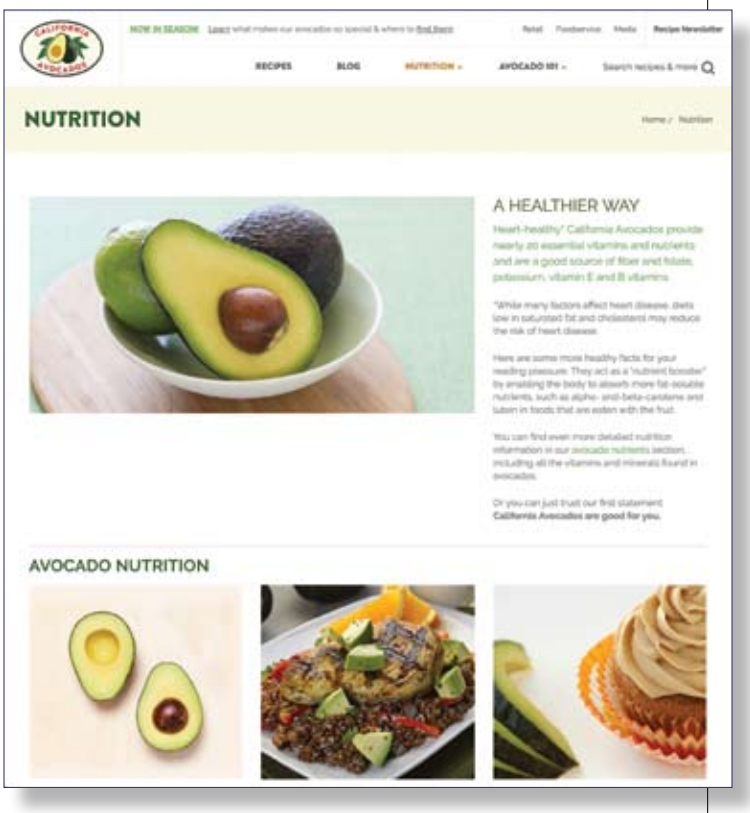
Throughout the year, a variety of integrated California avocado promotions take place at partner restaurants, events, foodservice chains and retail locations, as well as on the digital and social media channels of CAC's content partners. Because the newly designed CaliforniaAvocado.com recipe landing page allows the Commission to select which featured recipes and categories are displayed, CAC can better align consumer campaigns with the website by showcasing categories and recipes that complement current promotions.

A new template for the avocado nutrition page was designed based on visitors' browsing behavior. The new design allows consumers to more easily access nutrition-relevant content, such as recipes designed around specific dietary concerns, California avocado nutrition information for those with medical concerns and easy ways to adapt recipes by substituting avocados for other ingredients.

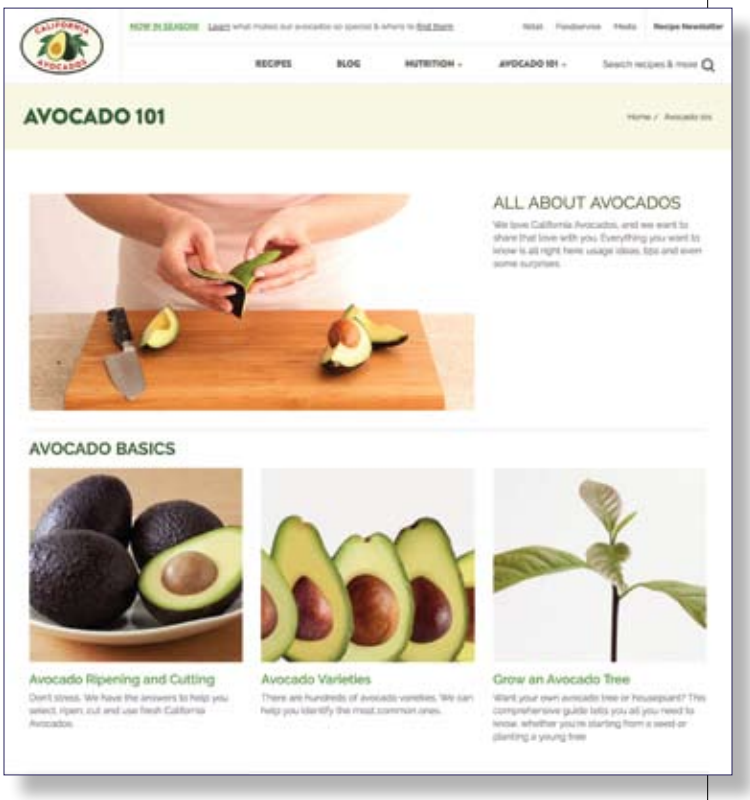
The Avocado 101 page (formerly known as "Avocado How-Tos") also was redesigned to better showcase content. In particular, the new design features popular #avocado101 and #howto blog content that ranges from how to cut or peel an avocado to creative California avocado entertainment ideas. The FAQ portion of the page answers some of California avocado fans' commonly asked questions about the fruit.

The "California Difference" portion of the website was enhanced to better engage consumers. The newly designed landing page incorporates more branded content, brand messaging, grower stories and The Scoop blog posts. The webpage touting California avocado growers was redesigned as a more personalized space featuring grower profiles, showcasing their legacy and craftsmanship, and including a recipe section devoted solely to growers' favorite California avocado dishes.

Because CaliforniaAvocado.com blends compelling California avocado content with messaging around availability and branding, the website connects with consumers on numerous levels. "The easier it is for our consumers to find California avocado recipes ideas, answers to their nutrition questions, local retailers who carry the fruit and inspiring information about California avocado growers, the more likely they are to seek out and purchase California fruit during our season," concludes Zac Benedict, CAC's online marketing director.



The new template for the nutrition page was designed based on data concerning consumers' browsing behavior.

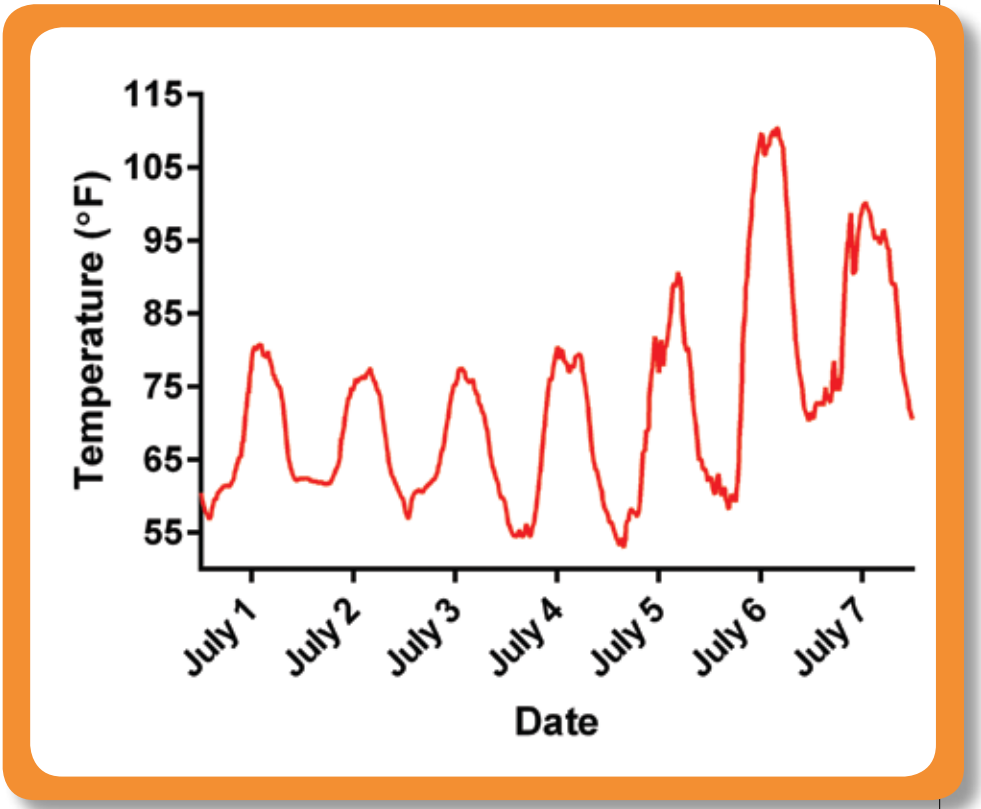


The new Avocado 101 design showcases educational information and usage, preparation and handling tips in an easy-to-navigate manner.

By Tim Spann, PhD
Research Program Director

Avocado Heat Damage Follow-up

On Friday, July 6, 2018, the California avocado industry was hit by an unprecedented heatwave. For many growing areas, the heat continued into July 7 and July 8. What made this event so different from previous heatwaves? First, it had been a very mild season up to this point — some growers reported that their groves were in the 70s on July 5, climbing to triple digit temperatures on July 6. Second, this event hit the entire industry; there were very few groves that escaped damage.



A graph showing the daily high temperatures at Pine Tree Ranch, Santa Paula, leading up to the heatwave on July 6. Note that daily high temperatures were at or below 80 °F most days leading up to the heatwave when the high temperature spiked by more than 30 degrees.

What Happens to an Avocado Tree During a Heatwave?

Under normal conditions, an avocado tree is extracting water from the soil through its roots, which moves through the tree and exits through leaf pores known as stomates. Stomates can open and close to regulate the flow of water vapor out of a plant and the entry of carbon dioxide for photosynthesis. The opening and closing of stomates is driven by plant hydration, temperature, relative humidity and wind. The loss of water from a plant's leaves through the stomates acts as an evaporative cooler, maintaining leaf temperature close to that of air temperature.

The purpose of closing leaf stomates under high temperature and/or low humidity is to slow the movement of water from the soil, through the plant, to the atmosphere. If this "flow" is too rapid, the water column – which is under very high tension – can snap, resulting in the formation of an air bubble (embolism) in the water conducting tissue (xylem) of the plant. These air bubbles are nearly irreversible and can lead to permanent damage to the plant.

Avocados evolved in a very moderate climate. As a result, they are poorly adapted to the high temperatures and low humidity that is common in California. Research conducted in the mid-1990s at the University of California, Riverside (UCR), looked at the leaf function of avocados in Irvine at the South Coast Research and Extension Center and on the UCR campus. What they found is that trees that grew in a hotter average climate (UCR campus) were better adapted to high temperatures, but photosynthesis dropped off and stomates closed during the after-

A 4-year-old Hass tree at Pine Tree Ranch, Santa Paula, showing heat damage to several branches.

noon in both locations. Their data show that avocado stomates begin to close when air temperatures rise above about 88 °F.

During a heatwave, the avocado tree's response is to close its stomates to prevent excess water loss and the development of embolisms. This results in leaf temperature increasing because the evaporative cooling has been reduced. Under extreme conditions like we saw on July 6, the leaves and small stems of the tree will overheat and literally cook. The rapid onset of this heatwave meant that the trees had virtually no acclimation to the high temperatures.

Damage

Young trees were severely damaged or even killed in this heatwave. The greater space between young trees, compared with mature trees, allowed the heat to fully surround the trees, exposing them to high temperatures from all sides. Young trees also have less mass and smaller diameter branches. As a result, they have less water content relative to surface area and heat up much more quickly than large trees. Lastly, young trees simply don't have the extensive root system and reserves to weather an event like this and likely closed their stomates sooner than a more mature tree. Mature trees and trees about four years old and older tended to fare much better than the young trees. Damage to the mature trees was primarily across the top of the canopy and on exposed sides of the trees.

As leaves wilted from the heat, they exposed fruit and branches that were previously shaded. This resulted in sunburn damage to small and, in some cases, large branches. These damaged branches may sprout in time, but without some intervention they will never be healthy, fully functional branches in the tree canopy.

Fruit suffered both direct and indirect damage from this heatwave. Mature fruit exposed to heat can become very hot. At the recent Brainstorming meeting in South Africa, a Chilean consultant showed a picture, taken with a thermal imaging camera, of a bin of fruit – half of the bin was shaded and half was not. The shaded fruit had a surface temperature of about 75 °F, whereas the exposed fruit had a surface temperature approaching 110 °F – and this was not under heatwave conditions! Current season fruit on the trees during this recent heatwave softened and became unmarketable. There also is some evidence that a heatwave like this can cause changes in the composition of the various oils in the avocado, result-

Young 2019-crop Hass avocado fruit damaged by the July 6 heatwave. The fruit flesh is soft, and the developing seed has shriveled.

A heat damaged branch on a 4-year-old Hass tree, 35 days after the heatwave. The young shoot (yellow circle and inset) developing at the base of the damaged branch indicates where the living tissue is. This branch should be removed by pruning just above the new growing point.

ing in decreased fruit quality.

Young fruit for next season, like a young tree, have very little mass and heat up very quickly. These fruit reached at least ambient temperature all the way to the center of their developing seed, and may have even exceeded ambient temperatures. As a result, the fruit became soft, their developing seed shriveled, and they are no longer viable. In addition, many of these young fruit were severely sunburned as the surrounding leaves wilted and exposed them to direct sunlight.

Recovery

Many growers have probably heard the analogy: treat it like a freeze, wait and see. While this is true, there are some nuances missing in this analogy. Following a freeze, it is difficult to know the full extent of the damage and where the dead tissue ends and live tissue starts. Thus, the common advice is to wait until the tree begins to regrow, indicating where the living tissue is, and then prune back to this new growth. In the case of a freeze, this usually takes several months since we're not in an active period of growth for the tree. And that is the big difference — our trees want to grow now!

In most cases, trees damaged by the heatwave are already sprouting and showing you where the living tissue is. Once this new growth appears, it is safe to come in and prune the dead and damaged wood from the tree. However, **sunburn protection is critical**!!! Remember, you will be pruning these trees during the hot weather season and they will require protection to prevent more damage. It is very important to pay attention to the weather forecasts and use your best judgement before pruning. If another hot spell is coming, it would be best to wait until temperatures return to more normal levels. Hopefully, by late August or early September the danger of high heat events will be past and it will generally be safe to prune.

Whitewash **must** be applied the day of pruning — it takes only a very brief exposure to full, mid-day sun for previously shaded branches to burn. Some growers prefer to whitewash their trees prior to pruning. They do this to prevent the whitewash from coating the pruning wound and inhibiting the normal wound healing response of the tree. If using this approach, be sure that all exposed branches are protected after the pruning is complete, and apply additional whitewash if needed. Typical whitewash is a diluted latex paint – use 1-part paint to 1-part water up to 1-part paint and 3-parts water – but some growers, particularly those who are certified organic, prefer to use a natural kaolin clay product (e.g., Surround®).

The most devastating aspect of this heatwave was the timing. Most trees were beginning to produce this year's summer flush when the heat hit. This year's summer flush is

Young 'Gem' trees killed by the extreme heat in Ojai. Photo courtesy of Bob Davis.

A young tree well whitewashed to protect exposed branches from sunburn.

where the spring 2019 bloom will set to produce the 2020 crop. Thus, the effects of this heatwave will be felt for several years.

For young trees, those less than about three years old where most of the canopy was damaged, the goal should be to get leaves back on the trees before the end of this season. These trees are unlikely to bloom in the spring for a 2020 crop. Once these trees are growing, prune away the dead and damaged branches and whitewash the tree. Be judicious with your water and fertilizer application. Remember, the leaf area on these trees has been drastically reduced and thus, so has their water need. Hand fertilizing with a good quality water-soluble complete fertilizer, rather than fertigation, would be a good way to nurse trees through recovery. This will allow you to tailor the amount of fertilizer applied to each tree based on its level of damage and regrowth.

For larger trees (about four years old and older) and mature trees, where only a portion of the canopy was damaged, it's likely there will be some bloom next year. These trees also should be pruned once new growth starts and whitewashed as needed. However, unlike with young trees, the reserves of these larger trees will result in a more rapid regrowth. If well-managed, this regrowth *may* bloom in spring 2019 depending on how quickly it develops. It will still be important to modify irrigation schedules to account for canopy loss to ensure these larger trees are not over-watered, but their greater size provides some buffering capacity and regular fertilization can resume once new growth starts. Keep in mind that we are still in the hot weather season and these trees have been severely stressed. It is probably best to reduce the duration of each irrigation set, but maintain the frequency of irrigations to avoid additional undue stress from drought that may occur if irrigation frequency is reduced.

The damaged tissue from this heatwave is going to provide a massive opportunity for avocado branch canker (*Botryosphaeria* and *Colletotrichum* fungi) pathogens to enter the trees. It is critical that the damaged branches be removed from the trees before the possibility of winter rains arrive. The damaged tissues are essentially open wounds in the trees. When we get rain, or even high moisture from heavy fog, the avocado branch canker pathogens will release their spores into the air, which will land on the damaged leaves and branches, forming latent infections. When conditions are right, those spores will germinate, and we will see severe cases of avocado branch canker. Thus, it is critical to begin the cleanup process now to prevent more severe damage down the road.

CAC Summer Consumer PR Activities

The California Avocado Commission (CAC) celebrated summer at the height of California avocado season by hosting public relations campaigns showcasing unique, summer-friendly California avocado delicacies.

From May through July, three distinct programs were launched to capture the attention and imagination of consumer press, bloggers, social media influencers and consumers: California Avocado Month food hall takeovers; the first-ever *California Avocado Season Summer Soundtrack Cookbook*; and Compartés limited edition California Avocado Toast Chocolate Bar.

The Commission commemorates California Avocado Month, an annual promotion that was created in June 2012, to recognize the peak season for California avocados and encourage consumers to purchase the locally grown fruit. This year, the team continued to leverage the increasing popularity of "food halls" – collective spaces that bring together a variety of restaurant stalls and local culinary artisans — with promotions timed to coincide with California Avocado Month. CAC collaborated with Grand Central Market in Los Angeles for a second consecutive year and added another partner, the up-and-coming Pine Street Market in Portland, OR. To showcase the culinary versatility of fresh California avocados, select vendors at both markets created limited-time dishes featuring California avocados that were available on their menus through the month of June.

CAC Board Secretary Jessica Hunter with media influencers at the Portland Pine Street Market California Avocado Month event.

Restaurant partners who participated in the promotion included DTLA Cheese, Golden Road Brewing Company, Horse Thief BBQ, Olio Wood Fired Pizza, Prawn, Ramen Hood and Sari Sari Store in Grand Central Market; and Bless Your Heart Burgers, Checkerboard Pizza, Olympia Provisions Public House and Wiz Bang Bar in Pine Street Market.

To kick off the food hall partnerships, CAC held exclusive media and influencer preview events to build excitement leading into California Avocado Month. The preview events were hosted on May 15 in Grand Central Market and on May 22 at Pine Street Market. Both events featured the exclusive California Avocado Month dishes being offered at the food halls, as well as the chance for guests to meet the chefs at each participating restaurant. Each event also featured a California avocado grower who provided insights into the craftsmanship and legacy of growing the state fruit. CAC Chairman Rick Shade attended the Los Angeles preview, while CAC Secretary Jessica Hunter represented growers in Portland. Regional blogger advocates, press and social media influencers attended the event and generated expansive coverage through editorial articles, blogs and social media posts.

In addition to the preview events, CAC also utilized artisan chef partners Chef Marge Manzke of Sari Sari Store in Grand Central Market and Kim Malek of Wiz Bang Bar in Pine Street Market for California Avocado Month media outreach activities. They each created a recipe featuring California avocados, which were incorporated into the program's press release and mat release. Recipes created by Manzke and Malek included a Filipino-inspired *Chicken Adobo and California Avocado Fried Rice* and a refreshing *Wildberry Frozen Yogurt and California Avocado and Lime Fudge Parfait*, respectively.

Collectively, California Avocado Month activities generated more than 146 million impressions across press and social media, including coverage in key media such as LA Weekly, NBC Los Angeles and Eater Portland. This very visible promotion helped increase the popularity of celebrating California Avocado Month among California avocados' key consumers, highlighting seasonality, versatility and premium quality in a highly engaging way.

Building upon the momentum of California Avocado Month, the Commission developed the first ever *California Avocado Summer Soundtrack Cookbook* to highlight two distinctly Californian elements fundamental to the Golden State's lifestyle – regional music and California avocados. From appetizers and entrees to desserts and beverages, the cookbook features a collection of 15 recipes inspired by various musical genres with West Coast roots. CAC collaborated with Chef Phillip Lee Frankland of Scratch Restaurants and Top Chef fame, who contributed two recipes to the cookbook – an elegant *Seafood Ceviche with California Avocado Mousse and Pickled Onions*, and a unique *California Avocado and Heirloom Tomato Tartare*.

The remaining 13 recipes were contributed by CAC blogger advocates and additional tastemakers, including: Ali Bonar of Avokween, Carolyn Ketchum of All Day I Dream About Food, Dara Michalski of Cookin Canuck, Erin Alderson of Naturally Ella, Jennifer Lee of Kirbie's Cravings, Jen Nikolaus of Yummy Healthy Easy, Julia Mueller of The Roasted Root, Kylie Mazon of Cooking with Cocktail Rings, Laney Schwartz of Life Is But A Dish, Lindsey Baruch of Lindsey Eats LA, Maria Koutsogiannis of Food by Maria, Marlynn Schotland of Urban Bliss Life and Prerna Singh of Indian Simmer.

The cookbook is available for consumers (and growers!) to download at CaliforniaAvocados.com/blog. A dedicated blog post and various social media postings promoted the cookbook to California avocado fans. Additionally, a press release and mat release featuring the cookbook and Chef Lee's two recipes were distributed to media. All participating bloggers also promoted their recipes and the cookbook on their own blogs and social media channels. More than 67 million impressions have been generated to date from the *California Avocado Summer Soundtrack Cookbook*.

Finally, CAC re-engaged with the wildly popular Compartés Chocolatier, joining forces for a second season to create an exclusive California avocado chocolate bar. From late May through August, Compartés offered the limited edition California Avocado Toast Bar in its Southern California boutique shops and nationally through its website. Crafted with white chocolate, caramelized bread crumbs and California avocados, the result is a decadent, creamy bar with a light crunch that's been delighting fans all summer long.

News of the California Avocado Toast Chocolate Bar was shared with national and regional media and influencers in late May with continued outreach throughout the California avocado season.

To date, more than 461 million earned media impressions have been generated – including coverage on "TODAY with Kathie Lee & Hoda," Good Morning America's digital channels, and several national lifestyle outlets such as Bustle, Dessert Insider, FoodNetwork.com and HelloGiggles – giving California avocados heightened visibility nationwide in a manner that highlights the fruit's versatility, premium taste and quality.

By Tim Spann, PhD
Research Program Director

The Westfalia property extends to the ridgeline along the horizon. Avocado (foreground) and timber (midground) blocks are visible. To the left is African blue basil which is used to attract pollinators.

Westfalia Fruit and Westfalia Technological Services

During the Avocado Brainstorming meeting in late May, the attendees were treated to a full-day tour of Westfalia Fruit and Westfalia Technological Services. The day started at the packinghouse where we were treated to traditional dancing and singing by the packinghouse crew. We were told they start every day like this. The day finished late in the evening with a traditional South African braai (barbecue).

Westfalia's story dates to 1895 when the 15,000-acre property was purchased by a couple from Germany's Westfalen province and the estate was named "Westfalia." The farm originally grew eucalyptus, corn, tobacco, cotton, citrus and a few avocados. In 1914, the estate was sold and subsequently fell into disrepair until it was purchased by Dr. Hans Merensky in 1929.

Merensky's philosophy was that the land should be used in harmony with nature. He implemented agricultural and forestry programs to help preserve water resources and prevent soil erosion. In 1939, Merensky moved to the property permanently and redoubled his efforts to preserve its resources. The farm became a model farm and Merensky invested generously in the local community, supporting schools and universities, and establishing scholarships.

Merensky left specific instructions in his will for how farming efforts should continue at Hans Merensky Holdings (HMH) after his passing. He specifically directed the HMH Board to solve root rot problems "by research and demonstration and through the correlation and application of scientific knowledge."

Phytophthora Root Rot Research

What is today known as Westfalia Technological Services, got its start in the early 1970s when Westfalia assembled its first avocado technical team. Those early efforts focused on fungicide trials, developing clonal rootstock techniques and screening for seedling rootstock selection.

In the early 1980s, Westfalia pio-

We were greeted with singing and dancing by the Westfalia packinghouse crew. They begin each morning with this celebration to give thanks to the Earth and the abundance it produces.

neered the use of trunk injections of fosetyl-Al (Aliette®) for the control of phytophthora root rot. The subsequent work resulted in the discovery that it was the phosphorous component that was key, and the same results could be achieved using phosphorous acid. Westfalia currently uses a product called AvoGuard, which is a buffered phosphorous acid product.

Today, Westfalia is still injecting those original trees that have now been injected for almost 40 years. Injectors have had to slowly move up the trunk of the tree and, in some cases, are now injecting major scaffold limbs.

Westfalia's system has evolved from the early days when a generator and long extension cords would be carried into the field. Today, a 10-person team — two drillers and eight injectors — can cover about 15 acres per day. They make their injections during October/November and February/March to coincide with root flushes. To keep things simple for the field crews, they use a long pole with hash marks every one meter. This pole is used to measure the canopy diameter and determine the number of injections based on a table that has been developed during the company's many years of experience.

Westfalia currently has about 600 acres of trees still on seedling rootstocks. Each of these trees receives one maintenance injection per year, except in weak areas where two injections are done per year.

Rootstock Selection Program

Westfalia is arguably most famous for its rootstock selection program, which developed the Dusa rootstock (also known as 'Merensky 2'). The rootstock selection program at Westfalia has been around since the earliest incarnation of the technical program, having been called for by Merensky himself. Today, I would characterize the Westfalia rootstock selection program as a finely tuned, precision machine.

Westfalia's rootstock selection program begins on Fire Tower Hill, an isolated grove of avocado varieties specifically selected for their phytophthora tolerance. By isolating these varieties, Westfalia can have a high level of certainty that the progeny (seeds) from this block are the result of cross pollination among the selected varieties. Researchers are striving for hybrid vigor, whereby a seedling inherits traits from both parents and has a level of tolerance that is more than just an additive effect

Stefan Köhne (right) discusses the development of phosphorous acid injection technology for phytophthora root rot management in the original grove used for trials in the early 1980s. (Inset, lower left) A closeup of the trunk of an original tree from the phosphorous acid injection trials still being injected today.

The killing fields where new rootstocks are tested. Note the poor condition of the larger trees just beyond the young trees.

of the parents.

The second stage of the program is where many programs fail — planting large numbers of seeds. Westfalia plants about 10,000 seeds a year. Unlike breeding in apples, for example, where controlled crosses can be made by moving pollen from one flower to another, avocados rely on natural cross pollination (hand pollination is laborious and results in very low fruit set). Thus, finding that elusive superior tree is a numbers game — the more seeds planted, the greater the chances of success.

After the seeds are collected, they are germinated and the seedlings are grown in a greenhouse for six weeks exposed to phytophthora. Any seedlings surviving after six weeks are propagated to produce 10 clones and those 10 clones are re-screened for another six weeks. Anything still surviving and performing as well or better than Dusa is re-propagated and moved to the "killing fields."

The killing fields is a site with high phytophthora infection. To ensure that the phytophthora stays active, Edranol seedlings — highly susceptible to phytophthora — are planted with every batch of test trees. In the killing fields, potential rootstocks are first planted without a scion variety grafted on top. If they continue to perform well (2-3 years), another group will be planted with Hass grafted on top (2-3 more years). Finally, those still performing well will be propagated with several different scions for final evaluation in the killing fields (another 2-3 years).

After this final stage of screening in the killing fields, the best performing trees will move to semi-commercial trial sites. These trials consist of planting 2.5-acre blocks with half of the trees on the new rootstock and half on Dusa (or another commercial standard for the growing region). These trials are all conducted off Westfalia property, in various growing regions in cooperation with commercial growers, to ensure an independent evaluation.

The process from the time a seed is planted to commercial release takes about 20 years. Westfalia is confident it has several new rootstocks better than Dusa that will be released in the coming years. A similarly structured program is in place for selecting new fruit varieties as well.

Dr. Ben Faber, University of California Cooperative Extension Farm Adviser, next to Gem trees planted in November 2015 under shade netting (left) and outside adjacent to the shade net (right).

Hiking trails abound on the Westfalia estate. This plaque along one trail documents the historic nature of the adjacent block and the pioneering work done there to develop the phosphorous acid injection technology.

Shade Netting

Westfalia also is working on improving production practices to help growers produce the highest quality fruit. In Soekmekaar, about an hour north of Tzaneen in Limpopo province, avocados grow very well. The area is at an elevation of about 4,000 feet, receives good rainfall (about 40 inches annually) and fruit mature for the late market. But the area is prone to high winds and hail storms, resulting in 20 percent more grade #2 fruit than in other growing areas.

In November 2015, Westfalia established a 3.5-acre shade net trial with Gem trees. The trees are planted with 6.5 feet between trees and 20 feet between rows. An equivalent planting was established outside the net at the same time. The net produces 20 percent shade and the roof incorporates three different hail release systems.

Westfalia reports the netting has resulted in a 6.2 percent increase in grade #1 fruit compared with the non-netted control, with a 17 percent reduction in wind scar. In addition, the netting resulted in a shift in fruit size to one size larger on average and reduces tree water use by 3.2 percent.

Ben Faber and I studied the netted trees carefully and noticed the netting also affected the growth of the trees. Outside, Gem looked as expected — upright and compact. However, under the netting, the trees appeared stretched, with longer branches, and were significantly taller.

Westfalia is a progressive company with a proven track record in research and development. Hans Merensky left a tall order for the company, but the team that has been assembled has risen to the challenge. It will be interesting to watch and see what new discoveries come from Westfalia Technological Services over the next few years.

By Tim Spann, PhD
Research Program Director

Maluma on the Bounty:

A Tale of High Yields and Phytophthora Tolerance

Grower Nick Human (front) and Abraham de Villiers (rear, Allesbeste) show off the incredible yield on a young Maluma tree.

The avocado cultivar Maluma and the rootstock Bounty appear to be a match made in heaven. Both are proprietary South African varieties worthy of testing in California.

Maluma

Maluma began in the early 1990s as a stand-out tree in a Hass orchard belonging to the late Dries Joubert. The tree that would become known as Maluma produced consistently year in, year out. The fruit were large with a small seed, creamy texture and nutty taste.

In the late 1990s, Andre Ernst of Allesbeste Nursery was asked to propagate some trees for Joubert and another grower. With Joubert's permission, he also propagated some trees for himself since he was already beginning his own cultivar development program.

In 2004, Maluma became a patented variety based on its unique characteristics and was named after Joubert's farm. The A.H. Ernst and Sons Company became the assignee for the patent and began the arduous task of commercializing a new variety.

Today about 500 acres of Maluma are planted in South Africa and the variety continues to grow in popularity. As part of its commercialization strategy, Allesbeste started Maluma Day. What began as a couple-of-hours event with a handful of attendees has grown into a two-day program of scientific talks, nursery and grove tours, and discussion of all things Maluma attended by hundreds.

Maluma has been brought to the United States. It is currently in quarantine and should be cleared by early 2020. While in quarantine only limited propagation is allowed, so it will be some time after it is released from quarantine that trees will start to become available commercially.

Trellises

Allesbeste has been trialing various growing methods for Maluma to achieve maximum yield, including plantings on trellises and at high density. The first trellis trials were planted

An immature Maluma fruit showing the variety's large fruit size and small pit.

Maluma trees growing on a vertical trellis with 8-inch wire spacing (left). A close-up view of how the tree is trained to grow along the wires (right).

in 2016. These trials were vertical trellises with wire spacing of 8, 12 and 16 inches. The trees were planted at 6.5 feet between trees and 13 feet between rows.

Tatura (Y-shaped) trellis plantings went in during 2017. Because of the shape of the tatura trellis, the spacing was slightly wider at 8 feet between trees and 16 feet between rows. Allesbeste is testing two planting systems on the tatura trellises — single trees with two leaders trained to a "Y" shape and two separate trees planted on each side of the trellis. The second option doubles the number of trees needed to plant a given trellis, but Allesbeste officials believe it has some advantages.

Both the vertical and tatura trellises are established on berms about 3 feet tall and Allesbeste admits they should be shorter by about one-third on future plantings. In the case of the vertical trellis, all canopy management work (pruning and tying) are done from the row middle and the extra berm height can make it difficult to reach the top of the trellis. For the tatura trellis, all the canopy management is done from on top of the bed (inside the Y). This is where having separate trees on each side of the trellis helps because the workers don't have to step over the split tree.

What Allesbeste researchers have

Maluma trees trained on a tatura trellis. On the left is the single tree training system where one tree is split to have two main stems, one on each side of the trellis. On the right is the two-tree system where separate trees are planted on each side of the trellis. Note how the top of the berm is open and walkable on the right compared with the left.

A sylleptic branch on a Maluma tree. Sylleptic growth is characterized by the lateral shoots growing at the same time as the main branch axis. Note the smooth transition from the main branch axis to the lateral shoot, indicating that a lateral bud and a rest period never occurred before the lateral shoot began to grow.

observed is that Maluma on the trellises produces longer growth flushes. This is likely due to better light exposure. Observers also have seen higher yields on the trellises with the wider wire spacing and hypothesize that it may allow for more efficient pollinator movement in the canopy. Additionally, when trained to the trellises, Maluma releases more sylleptic lateral shoots, which create a more complex canopy structure with small spur-like shoots.

Although very early, the yields on these trellising trials have been impressive. On the vertical trellises, when spaced 13 feet between rows, they have achieved up to 3,200 pounds per acre and when row spacing is reduced to 10 feet, yield increases to as high as 5,600 pounds per acre — at 2 years. On the tatura trellis the yields have been even more impressive, 7,000 pounds per acre at 18 months. These yields are likely the result of Maluma's high yielding nature as well the benefits achieved from the trellis.

Going forward, Allesbeste has selected to continue its trials with the tatura trellis. They are easier to manage than the vertical trellis, fruit are more protected because they hang below the canopy, and between-row spacing is less relevant. By their calculations, the tatura trellis increases their land area by 50 percent because of the greater canopy surface area.

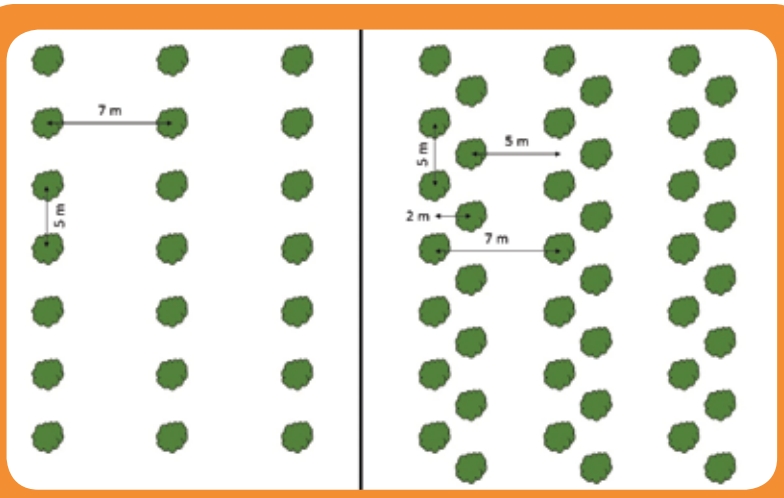
It will be interesting to see how these trials progress. Will they be able to continue to manage the canopy effectively as the trees age? Will the additional labor costs for canopy management be offset by higher yields?

High Density

Allesbeste has been trialing high density plantings for more than a decade. Their oldest groves are similar to old groves in California with about 50 very large trees per acre. Today, a standard planting density is about 16 feet by 16 feet (170 trees per acre). For Maluma (and Gem) most growers are reducing the between-tree spacing to about 8 feet (341 trees per acre). Standard high density plantings are going in at 6.5 feet between trees and 13 feet between rows (525 trees per acre). Ultra-high density plantings are being trialed at 8 feet by 8 feet spacing (681 trees per acre).

Allesbeste also has trialed what is known as a tramline planting — a double row of closely spaced trees offset from one another with a wider between row spacing between the double rows. For example, a block originally planted at 5 meters between trees by 7 meters between rows (118 trees per acre) effectively became 5 meters by 5 meters with 236 trees per acre when a second row was planted 2 meters away from each original row. However, they have found this to be an inefficient means of increasing planting density. The closely spaced trees in the double row become difficult to manage, and if/when they grow together production is lost on the touching sides. In their experience, it is more efficient to plant the grove at 4 meters by 4 meters and achieve the same planting density while being able to manage each tree.

An 8 feet by 8 feet high density planting of Maluma trees.



A cartoon representation of a tramline planting system. A 5 meter by 7 meter planting (left) is effectively turned into a 5 meter by 5 meter planting (right) with the addition of a second offset row of trees 2 meters from the original rows.

Vigorous, healthy roots of the Bounty rootstock.

Bounty

Bounty rootstock is a survivor tree that was found at the Bounty Farm in Kiepersol, South Africa. It has outstanding phytophthora tolerance outperforming Dusa rootstock in side-by-side plantings in heavily infested soil and in replant situations. In addition, it appears to have good tolerance to heavy soils and does not suffer from waterlogging like Dusa. Some reports have suggested that Bounty should not be planted on good soil as it will result in too vigorous of a tree.

Although Bounty is well-liked in South Africa, it has been poorly managed commercially. The variety is patented and has two owners — the Agricultural Research Council Institute for Tropical and Subtropical Crops in Nelspruit (a government research institute) and the Fruit Farm Group — neither of whom has apparently made a major effort to promote the use of this promising rootstock. Allesbeste is trying to work with the owners to help get Bounty distributed around the world for testing.

South Africa has essentially no issues with salinity in its primary growing area around Tzaneen, so it is unknown what, if any, tolerance Bounty will have to saline conditions until it is tested. However, its phytophthora tolerance alone makes it worthy of pursuing for testing in California. The California Avocado Commission will continue to communicate with the various parties to try to bring Bounty's bounty to our growers.

A replant trial in phytophthora infested soil with three different rootstocks. Bounty is in the foreground (left), followed by Duke 7 and Dusa is at the far end. The Bounty trees are about 30 to 40 percent larger than the Duke 7 and Dusa trees.

Maluma and Bounty are two impressive cultivars that appear to be a perfect match for production under heavy phytophthora pressure. Maluma's compact, upright structure and regular bearing make it well suited to high density plantings and the use of Bounty as a rootstock allows for good production in replant situations.

Retail Promotions

To catch the eye — and capture the purchases — of grocery shoppers, the California Avocado Commission partnered with select retailers on customized California avocado-branded promotions throughout California, the Western U.S. and targeted customers beyond. The Commission's retail support is customized for each of its partners, giving retailers the opportunity to showcase California avocado demos, displays, feature ads, recipe programs and point-of-sale materials uniquely suited to their customers. To encourage sales of premium California avocados, the Commission supported sales and display contests that inspired retailers to capture the best of summer merchandising opportunities with creative cross-promotional displays showcasing the availability of California avocados.

Ask Meredith Your Questions at healthcents@rednersmarkets.com

Meredith McGrath,RD, LDN
Redner's Registered Dietitian

HealthCents

Substituting California Avocados for mayo in coleslaw is a creative way to reduce calories, fat & sodium!

California Avocado Coleslaw

Serves 8 • Total time: 10 min

Ingredients:

- ⅓ cup rice wine vinegar
- 2 Tbsp. honey or agave nectar
- ½ tsp. dry mustard
- ¼ tsp. orange zest
- ½ tsp. salt
- 1 Tbsp. toasted sesame oil
- 1 (1-lb.) bag coleslaw mix*
- ½ small red onion*, very thinly sliced
- ¼ cup chopped cilantro leaves*
- 2 ripe, Fresh California Avocados
- ½ cup pineapple*

*Those Items Are On Sale In Our Produce Department!

Fresh California Avocados
4/$5
each
Save $1.72 on 4

In a large bowl make the dressing by whisking together the vinegar, honey, mustard, orange zest and salt until the seasonings are dissolved. Whisk in sesame oil. Add coleslaw mix, onion and cilantro to the dressing. Toss well to combine. Refrigerate to let the flavors blend (may be refrigerated for up to 24 hours). Just before serving, peel, seed and dice the avocado. Add the avocado and pineapple to the coleslaw. Use a slotted spoon to serve. Serving Suggestion: Stir in coursely chopped peanuts or cashews for a nutty variation.

Foodservice Promotions

Throughout California and targeted Western states, diners enjoyed limited-time-offer (LTO) California avocado menu items ranging from crisp salads and fresh California-style burgers to spicy tortas and flavorful omelets. By featuring LTO California avocado-branded in-restaurant, digital and social media promotions, the California Avocado Commission's foodservice chain partners encouraged demand for the fruit in season and expanded the reach of the California avocado brand.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CALIFORNIA AVOCADOS

Avocado Brainstorming 2018 attendees. Photo courtesy of Dr. Mary Lu Arpaia.

Avocado Brainstorming 2018

By Tim Spann, PhD
Research Program Director

The Avocado Brainstorming meeting was held May 28 – June 1, 2018, in Tzaneen, South Africa. Tzaneen, in Limpopo Province in northeastern South Africa, is the heart of South Africa's avocado industry. This is a warm subtropical climate with average annual rainfall above 40 inches. There also is significant production in KwaZulu-Natal province in the southeast, which is a cooler climate, and Western Cape province, which is a warm dry climate like California.

The South African Industry

The South African avocado industry is currently about 30,000 acres and is growing by about 2,500 acres annually. Hass and Hass-like (Lamb Hass, Maluma, Carmen, Gem) cultivars make up the largest percentage of South Africa's production at about 40 percent, while Fuerte is a close second at just under 40 percent. Varieties like Pinkerton, Ryan, Reed and Edranol make up the balance of the country's production. Europe is South Africa's largest market and as its preference

for Hass has grown, the South African industry has begun to shift its production away from Fuerte and other greenskin varieties. Eastern Europe and the United Kingdom absorb about 90 percent of South Africa's exported fruit, with Western Europe and the Middle East taking the balance. Efforts are underway to gain access to the United States, Japan and China.

This was my first visit to South Africa and I was surprised at the level of sophistication in the industry. Nursery production practices, planting practices and grove management are top notch, and its harvesting, packing and shipping protocols are rigorous. Unlike the California industry, the South African industry is dominated by a couple of large, vertically integrated companies — Westfalia, Allesbeste and ZZ2. For more details about the South African avocado industry, please see the article about Allesbeste in the Summer 2018 issue of *From the Grove* and the articles about Westfalia, and Maluma and Bounty in this issue.

Brainstorming

There were about 80 attendees at this, the fifth, Brainstorming meeting, representing 11 countries. This was the first time the meeting was not held in conjunction with the World Avocado Congress. South Africa had the largest representation at the meeting with 30 participants, followed by 18 people from the United States. The meeting program was divided into eight sessions over 2.5 days, with an additional half-day tour of Allesbeste Nursery and Groves, and a full-day tour of Westfalia Fruit.

The eight session topics were:

- Providing for the Consumer: Health, Safety, Flavor
- New Technology to Improve Avocado Production
- Challenges to Productivity: Diseases
- Challenges to Productivity: How the Tree Regulates Return Bloom and Crop Load
- Where Theory Meets Practice
- Challenges to Productivity: Genetics, Genomics and Biotechnology
- Meeting the Challenges of the Future
- Tying the Loose Pieces Together: Planning for the Future

Notable Research Reports

Dr. Aureliano Bombareley, Virginia Tech University, reported on the accomplishments of an international group working on the avocado genome. He reported that the group will have an annotated genome published by the end of 2018, but if everything goes smoothly it could be published as early as September. The avocado genome was previously reported to have been sequenced by a Mexican group, but it has never been published. A Chinese group recently published an avocado genome, but it is only half the expected size, so it is likely not a good genome.

Having the avocado genome does not, in and of itself, provide anything real and tangible for growers. However, researchers will be able to search the genome, when published, for orthologs — genes with similar sequences to known genes of known function in other species — and thereby begin to identify specific avocado genes and link them to functions. Knowing which avocado varieties/races/species possess different traits can allow breeders to have more focused selection programs, or possibly allow for gene editing through any number of biotechnology techniques.

Dr. Iñaki Hormaza, Institute of Subtropical and Mediterranean Horticulture in Malaga, Spain, updated the group on work he has been doing to understand why so many avocado flowers do not set fruit. With laborious hand pollination avocado fruit set is barely 1 percent, and is well under 1 percent naturally. Dr. Hormaza has been leading a group that has developed a technique to assess the carbohydrate storage (energy) of individual flowers without removing the flowers from the tree. This allows them to know the energy status of a flower and then track that flower to see if it sets fruit. They've conducted their studies with both natural pollination and hand pollination. They have collected very convincing data that suggests the fruiting potential of an individual flower is directly correlated with that flower's carbohydrate storage – the higher a flower's carbohydrate storage, the greater likelihood that flower will produce a fruit. The next step in this work will be to understand what, if any, management practices can be implemented to increase overall flower carbohydrate storage and if this leads to greater fruit set.

In the session concerning new technology to improve avocado production, the topics of remote sensing, image analysis for grove mapping, and trellising for high density plantings were discussed. Remote sensing continues to hold a lot of promise for a lot of different applications but has yet to deliver on many of these. There are many different systems around the world using remote sensing — specifically NDVI, normalized difference vegetation index — for estimating crop water status and calculating crop evapotranspiration. But promises for systems that can detect disease or nutrient deficiencies still have not had much success outside the laboratory and uniform row crop situations.

Zander Ernst from Allesbeste discussed the use of aerial image analysis for grove development. Allesbeste, with its in-house IT (information technology) department, recently developed a new block on a steep slope. The terraced layout and specific grading requirements were all computed using aerial images and computer software. This information was then used with GPS-equipped grading equipment to create the desired contours that were calculated to maximize row

Mary Lu Arpaia addresses the Brainstorming attendees in front of a clone of the Mother Hass tree during a tour of Westfalia Fruit.

spacing and use of the site.

Zander also presented on Allesbeste's trials using vertical and tatura (Y-shaped) style trellises for growing avocados at high density. In their trials to date, researchers have seen up to a 137 percent yield increase on vertical trellises and up to a 321 percent yield increase on tatura trellises. They are currently planting larger scale (several hectares) trials of the tatura trellis system to determine its commercial feasibility.

The disease session included updates on laurel wilt, as well as several other emerging pathogens from around the world. Noelani van den Berg, University of Pretoria, discussed the latest concerning a disease known as white root rot (WRR) caused by the pathogen *Rosellinia necatrix*. This is a root pathogen similar to phytophthora root rot but it is much more aggressive. It is known to occur in Israel and Spain and was recently confirmed in groves in the Nelspruit growing region of South Africa. There is an ongoing breeding program in Spain trying to develop WRR-resistant rootstocks. The project currently has 22 selections that are moving into field trials and it has identified 250 different genes that may play a role in WRR resistance.

Another pathogen that is emerging, particularly in humid subtropical and tropical regions of Australia, is called brown root rot (BRR), caused by the pathogen *Phellinus noxius*. This pathogen has a very wide host range (>200 species) and is very persistent. In Australia, researchers have been able to recover the pathogen from decaying root pieces in the soil four years after tree removal. BRR can be spread easily from tree to tree through root grafts or by using wood chips from infected trees as mulch.

Summary

As I am still relatively new to the avocado industry, meetings like this are a great way for me to place faces with names of various people whose work I read. For me, the highlight of the event was meeting Nigel Wolstenholme, retired professor from the University of KwaZulu-Natal. Nigel was a prolific avocado researcher and is co-author, along with Tony Whiley (Australia) and Bruce Schaffer (Florida), of the avocado bible — *The Avocado: Botany, Production and Uses* — now in its second edition. Nigel wrote and presented a fantastic piece at the meeting wrap-up about planning for the future. In it, he highlighted what he sees as the challenges to the world avocado industry (and agriculture in general) looking ahead to 2030 — commoditization, changes in land ownership, sustainable farming and safer food trends, low average yield, alternate bearing, phytophthora root rot, too few elite cultivars and rootstocks, and a lack of best orchard management practices.

Was this a successful meeting? This is a difficult question to answer and it depends, to some degree, on who is answering the question and what they wanted to gain from the meeting. For me, personally, yes, the meeting was a success. I made some great contacts and I learned about who is doing what in avocado research around the world. I took copious notes that I will continue to sift through for months to come.

That said, the Brainstorming and its structure poses some challenges. The Brainstorming was modeled on the Gordon Research Conferences (GRC). GRCs were started in the 1930s by Dr. Neil Gordon at Johns Hopkins University with the intent "to bring together a group of scientists working at the frontier of research of a particular area to discuss, in depth, all aspects of the most recent advances in the field and to stimulate new directions for research." GRCs are by invitation only and have several guiding principles, chief among them being "no publication." This policy is to ensure that the researchers present feel free to share ideas within a close group and that conversations will remain private.

As Avocado Brainstorming has evolved, and organizations like the California Avocado Commission and the Hass Avocado Board have become sponsors, the no-publication policy becomes difficult to manage since the funding agencies expect a report in return for their financial support. In addition, the invitation-only policy artificially restricts who attends — some don't attend on principle because they don't believe in the invitation-only policy, and others simply aren't invited.

Lastly, Brainstorming really has been continuing almost exclusively because of the drive from Dr. Mary Lu Arpaia. And I wonder about the long-term sustainability of the meeting and who else in the world avocado industry is willing or able to pick up such a monumental task? In other words, is this meeting self-sustaining? This is the greatest challenge facing the Avocado Brainstorming meeting and its long-term success.

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