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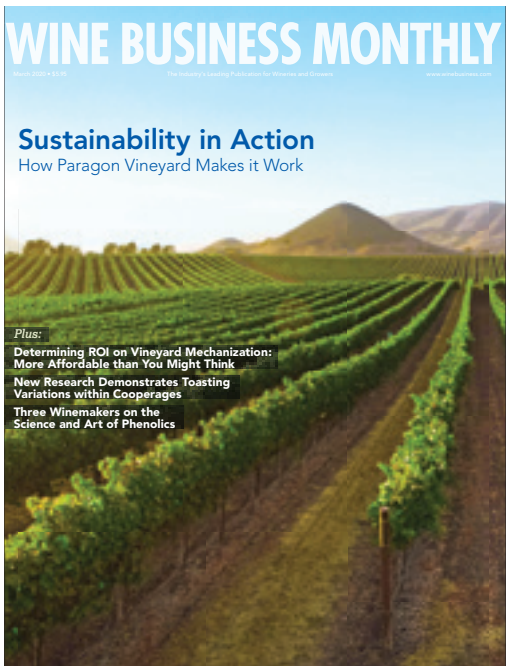
The Ebb and Flow of Wine Supply

LAST MONTH DURING THE Unified Wine & Grape Symposium, Allied Grape Growers president, Jeff Bitter, estimated California is oversupplied by at least 30,000 acres of winegrapes. He said 30,000 acres of vines need to be pulled to balance out the market—and that's in addition to the planted acreage that should be ripped out annually anyway, due to attrition. Efforts are already underway to remove these vines, but he cautioned that the industry needs to pull underperforming vines out sooner, rather than later.

One could say its *déjà vu* all over again. I was reminded that, back in February 2003, *Wine Business Monthly* ran the headline, "30,000 Acres of Central Valley Winegrapes May Go Away Soon." At the time, Allied Grape Growers president Nat DiBuduo estimated 30,000 acres of winegrapes and an additional 25,000 vineyard acres of Thompson Seedless grapes would need to be removed in California's San Joaquin Valley.

In this issue, we're looking at the state of the bulk wine market, and what caused this round of oversupply. The industry has enjoyed a long period of unimpeded growth and when times are good, growers tend to overplant; yet all it takes is one light harvest to even things out. Oversupply situations bring challenges, but also create opportunities to offer consumers wines at friendlier price points.

Competition from other alcoholic beverages has grown, however, and is one factor that has contributed to the grape glut, but supply cycles are nothing new. Results of *WBM*'s annual equipment survey, beginning on page 38, indicate wineries will purchase fewer grapes this year and 15 percent of wineries surveyed expect to cut back production in 2020—a contributing factor could be high inventories and lower-than-average sales. Around 45 percent of them expect to be making more wine in 2020, while the remainder expect to maintain current production levels. Not too surprisingly, the survey indicates most wineries planning to buy equipment in 2020 are looking to buy tanks.



Though the focus of recent news has been on less-than-positive aspects of the wine industry, the March 2020 issue features a lot of great reading material, including several articles focused on innovation and quality. This month, Jim Gordon writes about how Silver Oak's new winery in Alexander Valley is one of the first commercial wineries in the world to earn LEED Platinum status for building design and construction. Silver Oak was awarded a California Green Medal: Sustainable Winegrowing Leadership Award in 2019.

Don't miss Lance Cutler's roundtable on how winemakers make decisions using phenolic data; Deborah Parker Wong's report on corks and total package oxygen; Ted Rieger's article focused on emerging vineyard sensor technology; or Mark Greenspan's column about Oregon State University's study on vineyard mechanization economics.

Cyril Penn – Editor

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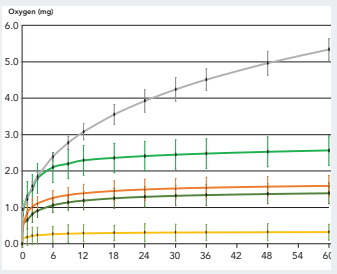

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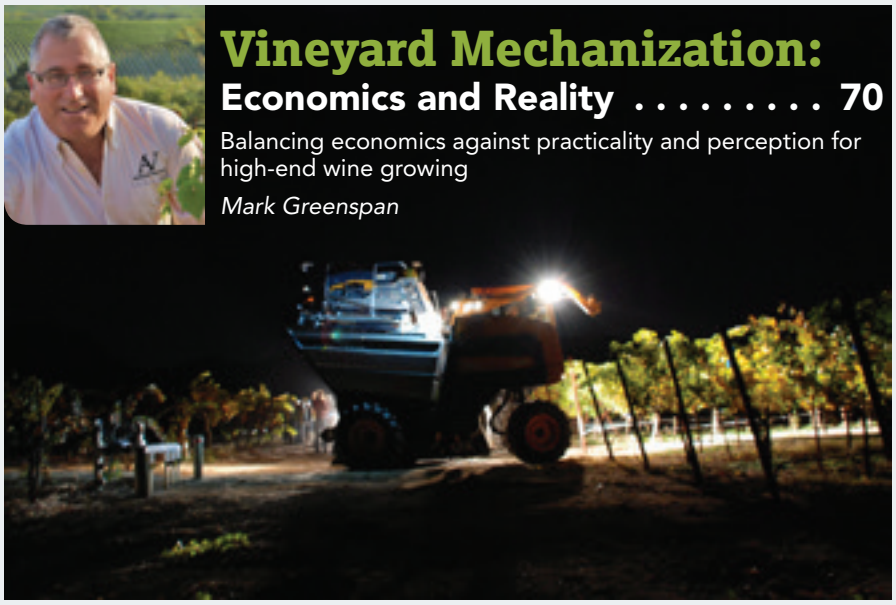

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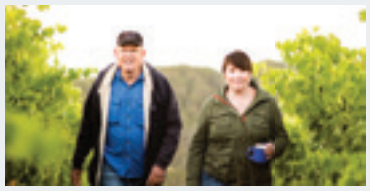

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who's talking in this issue

Steve Fredricks, president & partner, Turrentine Brokerage, "The Long Road Ahead: The State of the Bulk Wine Market," page 98

"This market we're in, of excess and challenge, is also a market of opportunity in terms of new things that can be developed for consumers."

Dr. **Peter Cousins**, research scientist, E. & J. Gallo Winery, "Evaluating Grapevine Rootstock Performance in Field Trials," page 82

"We're still using rootstocks today that are among the first ever used in viticulture, such as St. George and *Riparia gloire*."

Alison Rodriguez, winemaker, Hess Family Wine Estates, "Phenolics Testing and Winemaking," page16

"The tools to measure tannins and phenolics help us understand what is happening in our fermenters and what is going on in each vintage so we can modify our strategy and approach."

Dr. **Paulo Lopes**, Research and Development Manager, Amorim & Irmãos, S.A., "Taking Control of Total Package Oxygen," page 44

"We know precisely how much oxygen a closure will provide to the wine but only by accurately measuring oxygen during the bottling process are we able to make precision additions during winemaking."

Tondi Bolkan, winemaker, Francis Ford Coppola Winery, "Phenolics Testing and Winemaking," page 16

"We like to say that data collection is a sport. Between our viticulture team and our winemaking team, having these phenolics has been so helpful in bringing both teams together."

Mark Greenspan, founder, Advanced Viticulture, "Vineyard Mechanization: Economics and Reality," page 70

"There is really no downside to pre-pruning spur-pruned vineyards because there is absolutely no downside to wine quality, and there is a disease management benefit."

Brett Olson, assistant winemaker, Monterey Wine Company, "Phenolics Testing and Winemaking," page 16

"The numbers keep you honest. There is a balance between that subjective human factor and when you can be objective. Making wine is still an art form, but the objective part of having the numbers in front of you keeps everybody honest about what is happening, especially in the vineyards."

Mick Schroeter, winemaking director, Sonoma-Cutrer Vineyards, "The Future of Half Bottles: Boon or Bust?" page 90

"There are still a good number of consumers that just like having a half bottle at the table, and I think that's definitely the benefit of having a 375 ml in our portfolio. It's not a massive volume by any means, but it's still a good, steady business for us in the tasting room and online as well."

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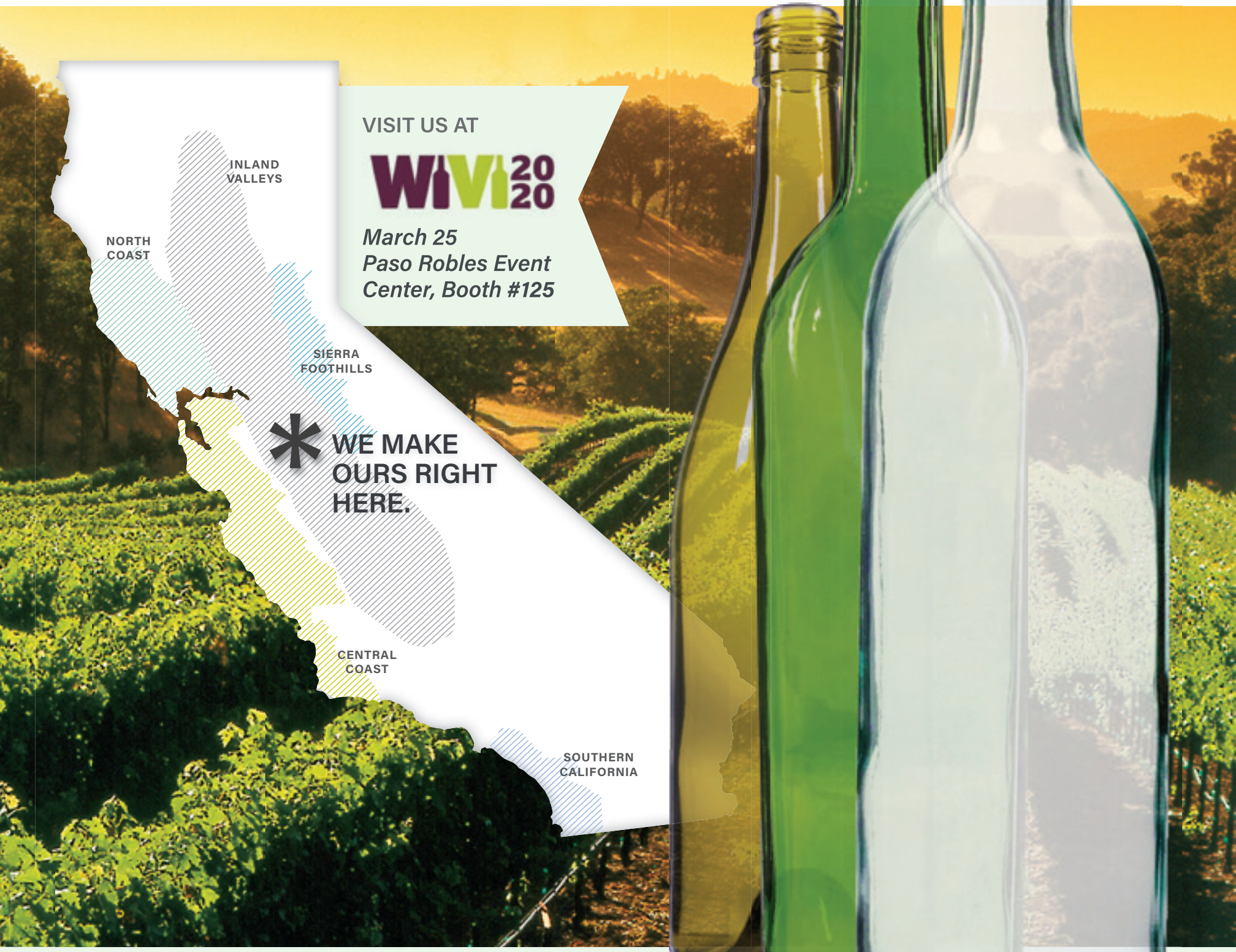

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Top Stories from WINE BUSINESS.com – In Case You Missed It

WX Brands Buys Portfolio of Wines From Niven Family Wine Estates

In January, WX Brands acquired the 100,000-plus case portfolio of wines from Niven Family Wine Estates, a winery based in the Edna Valley AVA. The purchase price was not disclosed. Brands incorporated into the deal include Baileyana, Tangent, Zocher and True Myth. WX Brands will also run and manage the Baileyana tasting room in the 1909 Schoolhouse in San Luis Obispo.

TTB Approves Stabilizer Against Tartrate Crystal Precipitation in Wine

The U.S. Alcohol and Tobacco Tax and Trade Bureau has approved the use of Zenith in the United States to prevent tartrate crystal precipitation in wine. Zenith, an Enartis product, contains potassium polyaspartate for tartrate and color stabilization in red, white and Rosé wines. Potassium polyaspartate is a polyaminoacid produced from L-aspartic acid—an amino acid naturally present in grapes. According to the TTB regulations, the amount of Zenith used must not exceed 100 milligrams per liter of wine.

Jim Trezise Receives Richard Smith Distinguished Service Award

In February, WineAmerica president Jim Trezise received the Richard Smith Distinguished Service Award. Trezise received the honor during Winegrape Growers of America's annual luncheon at the 2020 Unified Wine and Grape Symposium. Trezise served as president of the New York Wine and Grape Foundation for more than three decades. During his tenure, the number of New York wineries grew from fewer than 40 to more than 400. Trezise has served as WineAmerica president since January 2017.

DTC Wine Sales Continue to Increase

U.S. wineries continued to ship more wine directly to consumers in 2019, though overall shipments grew at a slower rate than last year, according to the 2020 Direct-to-Consumer Wine Shipping Report released in January. Wineries' direct-to-consumer (DTC) wine sales totaled $3.2 Billion, which is 7.4 percent more than in 2018, according to Sovos by ShipCompliant and Wines Vines Analytics, which also reported that DTC wine sales increased by 4.7 percent in volume in 2019, to 6.6 million cases of wine.

30,000 Acres of Vines Need to Be Pulled Statewide

In February, Allied Grape Growers president, Jeff Bitter, said 30,000 acres of California winegrapes—or 5 percent of the 590,000 acres currently planted—need to be pulled in order to balance the grape supply market. The state is currently in the midst of a winegrape glut after the large 2018 harvest and the softening demand for wine by consumers. During the 2020 Unified Wine and Grape Symposium, Bitter advised that older vineyards, those dealing with disease infestation and/or are simply low-yielding are among the vines that should be removed.

French Wine Imports Down Since Implementation of 25 Percent Tariff

French-packaged wine imports have steadily declined since 25 percent tariffs were imposed on French and other European wines under 14 percent alcohol in mid-October, according to bw166 LLC. The tariffs did not affect bulk wine imports. The company reported that French-packaged wine imports decreased by 26.6 percent in volume in November/December 2019 from November/December 2018. Red, white and Rosé wines are all affected—altogether decreasing by 49.2 percent in total during that same time period. **WBM**

Critical thinking skeptic that you are, some gimmicky ad with shiny pictures and bold slogans probably won't even get your attention. Maybe a few cold hard facts and a little math will. Let's say your winery is crushing 1,000 tons of grapes, in turn aged in 1,400 French oak barrels to achieve 50% new oak. You sell 70,000 cases of wine each year, with an operating profit of $3,000,000. Consider this: In the field of barrel alternatives StaVin is unrivalled, with 30 years of proven experience. Tirelessly hunting down vastly superior source product and continually innovating more efficient infusion techniques. Using StaVin *will* improve your wine *and* save you upwards of 94% in oak costs. Which means 33% more profit or $1,000,000 go into your pockets, instead of directly into the trash. Got your attention now?

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Winemaker Roundtable:
Phenolics Testing and Winemaking

Lance Cutler

Lance Cutler has been a working winemaker in Sonoma Valley for 40 years. He has been a contributing editor for *Wine Business Monthly* for 15 years. His unique perspective on winemaking has led to our Industry Roundtable series and our Varietal Focus series. Lance is also the author of five Jake Lorenzo books and *The Tequila Lover's Guide to Mexico*.

OVER THE PAST 10 YEARS, "real time" phenolic assays have become important tools for winemakers, confirming in-house taste tests with real scientific data. These assays allow winemakers to track the extraction of anthocyanins and tannins, along with other compounds, at various stages of the winemaking process, giving winemakers a framework with which to assess extraction rates and allow them to vary production regimens to slow or speed up that extraction and make the best wine possible from each given lot.

Wine Business Monthly was interested in how winemakers chose which assays to use, how they recorded the data of individual wines and how they use that information to vary production methods and improve their wines. We were fortunate to interview three winemakers well-versed in real-time winemaking, who were willing to share their experience and knowledge during this roundtable.

Brett Olson started out as a production winemaker for E. & J. Gallo Winery. He was winemaker for the Rosé and sparkling wine programs at Bronco Wine Co. He has been assistant winemaker at Monterey Wine Company for five years, where he also works with more than a dozen custom crush clients.

Tondi Bolkan is the winemaker at Francis Ford Coppola Winery where she just completed her 19th harvest. While at Coppola, she helped refine the Adams-Harbertson phenolic assay, which improved turnaround time on the testing. Prior to this, she worked at Pine Ridge Winery.

Alison Rodriguez is the winemaker for Hess Family Wine Estates, a position she has held for four years. She earned a B.S. degree in viticulture and oenology from the University of Applied Sciences in Wiesbaden, Germany. After winemaking stints in Italy and Germany, she arrived in California, working as an enologist with Acacia Winery, followed by time at Sterling Vineyards and later with the Beringer Vineyards' winemaking team.

Brett Olson | Tondi Bolkan | Alison Rodriguez

Why should winemakers test for phenolics?

Olson: It is worth the price to see if you are being consistent, just to check the numbers from vintage to vintage and look back. To have a phenolic profile of your wine program in front of you is only going to help.

Rodriguez: Every winemaker I know is driven to make better wine. This analysis gives them another tool in that perpetual quest to make better wines.

Bolkan: If they are checking alcohol or TA to help assess their wines, then they should run phenolics as well. Phenolics will give just as much information in understanding the texture of their wine as other tests.

Tell me about the different phenolic assays available and why you selected the one you are using.

Olson: We use the Adams-Harbertson assay. We chose WineXRay for our methodology because Gianni Colantuoni, one of the co-founders, had 10 years of data defining his assay points, so they had a lot of data delineating their curves. Every time we run a sample we get consistent results. We spin a sample, it goes into the spectrophotometer and is sent to WineXRay. They print out values for bound anthocyanins, total anthocyanins, free anthocyanins and iron-reactive phenols. We make our decisions based on that data.

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Winemaker Roundtable:
Phenolics Testing and Winemaking

Bolkan: The history of phenolics at our winery started in 2003, when I reached out to Jim Harbertson while he was a grad student, and we brought the Adams-Harbertson assay to Niebaum-Coppola in 2004. I reported to Scott McCleod, who co-founded WineXRay. From 2003 to 2007 we used the Adams-Harbertson assay for live analysis of color, tannin and phenols, allowing us to make quick decisions. The downside of the assay was it took four hours to do maybe 25 samples.

WineXRay worked off the Harbertson assay and built a model to do similar tests in less than half the time. Currently, we use the AWRI (Wine Cloud) out of Australia through Enartis, which is a subscription service. We run the spectro-scan, submit it and we get the analysis within the hour.

Rodriguez: I've worked with WineXRay and various in-house systems. Now, I'm at The Hess Collection, which has been partnered with Enologix for a long time. All the systems are based off the Adams-Harbertson system. That method is tried and proven, but the other techniques make it a lot faster. The goal is to know your total phenolics in some measurement, your tannins and your anthocyanins—free and bound. You are looking at these measurements as a measure of your fermentations, which is every bit as important as Brix or acid or YAN.

How do you evaluate the data?

Olson: We initially got into using WineXRay because we bring in a lot of new technology at Monterey Wine Company. We were one of the first wineries to have flash détente, and we wanted to find something that could enhance Pinot Noir, which is not helped by flash détente. We compared electro-pulse technology to ultrasound technology to flash and traditional methods. We needed objective, real-time numbers to show us if these systems were working. Nobody had run numbers before, and we wanted to learn what was going on. If I send the grapes through the ultrasound, would it be the same as the traditional method or the electro-pulse? We needed real-time data that wasn't subjective to tell us if this stuff was working and if it was worth the investment.

We started by taking all our old vintages and running the numbers on them. They were very similar. We learned our profile for each wine. We try to match up those numbers, without being dogmatic about it. We want to enter the wheelhouse of where we want to be with our tannins or bound anthocyanins, etc.

Bolkan: We source grapes from all over California; so when people say "Let the grapes speak," we can use these assays to visually see what the climates are doing, not just for Brix accumulation, but also for color and tannin development. Flavor and tannin phenolics don't develop at the same rate as the sugar accumulation. It is all dependent on the vintage and the year. These tests provide us with a way to see what the vintage has given us.

The first questions we ask are: How is the ferment going? Do we have a healthy Brix drop each day? If we do, we adjust our pump-over regime based on the data. We can increase or decrease the number of pump-overs or shorten or lengthen the duration of those pump-overs, depending on how much color, tannin and phenols are being extracted. Using the numbers, we can visually see the extraction. We know that color is a finite number—you get what you get, and you don't get more in the fermenter. Enzymes release what you have, but they don't increase what you have. Leaving wine on the skins will increase the tannins but not the color.

Rodriguez: It is important to think about phenols because they are the components of structure and longevity. They are quality markers. It is always a race between how much color we can get out of this wine before we extract too many astringent tannins. That's why we use these tools to

measure how it is going in the fermenter. Sugar interferes with our ability to sense these phenols. That's why this more objective form of measurement is important and so widely adopted.

We need to realize that no vintage is the same. It is not only about what your phenolic potential is in the grapes; it is also about whether you can get it out. Some years are very easy to extract while other years you really have to work the grapes to get your color and phenolics out. The tools to measure tannins and phenolics help us understand what is happening in our fermenters and what is going on in each vintage so we can modify our strategy and approach.

How far into the vintage can you detect any issues that may need to be addressed?

Rodriguez: You'd like to recognize it as soon as possible. Enologix provides a valuable service by doing a lot of pre-fermentations early in the vintage to try to assess how easy or difficult it is going to be to extract your color versus your tannin within a particular vintage. That is helpful. It gives you a head start.

Olson: That kind of testing involves a lot of berry sampling. We'd have to hire a full-time person to do that. WineXRay does that for you, but we feel comfortable in our pump-over and cap management programs to not do that in advance. If we see a wine is not going where we want, we pull a sample, test it and discover why it is not working. Then we can decide to increase the time, do a rack and return or increase the temperature to get the extraction and color we want.

Rodriguez: Tannin and phenolic analysis is kind of like a weathervane, similar to Brix and acid. It doesn't necessarily point the way to success, but it gets you into the ballpark. The sooner you can recognize a possible vintage variation, the better chance you have of overcoming it.

Bolkan: For us, it is about red wine cap management. We start harvest with Pinot Noir all the way through Cabernet. I could tell from our Pinot Noir this year that it was a high tannin release year. We had to adjust the amount of enzymes, if we chose to use them at all. We also changed cap and temperature management, knowing that the tannins were going to release sooner this year.

Do vintage conditions, as they relate to extraction, vary between varieties?

Rodriguez: The behavior is more similar than dissimilar, but the scale is different varietal to varietal.

Bolkan: Remember, you're trying to coordinate the extraction with the ferment. We know Pinot Noir can race through a ferment. You can do what you can to try and slow that down: lower temperature, add less yeast to start. But at the same time, you want to extract optimum color and tannin, so it is a dance where extraction is optimal at press time and the sugar has been depleted. Pinot Noir can race through a fermentation, where Zinfandel

is slower as raisins release their sugars. The rate between varieties will be different, but you can capture a vintage's characteristics in the first week or so.

Olson: It's a compass. It is not a map. You need to know how your wine is going to behave from year to year, and you need to know that before you start using this tool. If you usually get a 5° Brix drop in your Pinot Noir and this year it is acting weird, that's the time to run your tests to figure out what is going on. You need to have your parameters so you can recognize an outlier and run a test to see what is happening. Then you can adjust your pump-over program or temperature. If more grapes are coming from that block, you can increase your yeast addition.

Rodriguez: The goal for every winemaker is to be at their perfect phenolic profile on a red wine, as they reach dryness, while the grapes are still on their skins. It would be nice if each block worked like that, but often, it doesn't work that way. That's where the winemaker's skill enters into it. Phenolics measurement is a tool to help guide these decisions more quickly.

What can do if you are not extracting as much color as you would like or expect?

Bolkan: The wonderful thing about having these assays is that we have created a history of all the blocks from all our growers. Right after harvest, we have grower feedback. We show them the tonnage, the climate patterns and the phenolics during fermentation. We also go into the history of what this block has given us and have a conversation about whether this is working for our company. We might need to explore a different block or handle the vineyard differently. That is how we can use these data to work with the grower. It is always better to take care of issues in the vineyard before it gets into your winery.

In the winery, we can do these skin transfusions to improve the color and tannin extraction instead of just sitting there. We are taking a proactive approach in making some improvement, but it is all documented; so when we have the grower feedback, we can let them know they were plateauing at this color and that we did all we could to improve the wine.

Olson: Once it's in the winery, it gets harder. Are the tannins getting there? Then you must make a decision: Is the wine going to market? Is it going to be a blending component? If I have a Pinot Noir that is already at 1,300 iron-reactive phenols, which is basically your total phenolic profile, then I need to back off already. If the color is not there, then I need to make decisions. It usually means going back to the vineyards to see what the berry sizes were, what they looked like, how much tonnage to the acre they are getting. You have to adjust in the vineyard. You need to know the history of what it should look like; and if it is not in there, then you have to reevaluate post-vintage in the vineyard.

Rodriguez: Color is a tricky one. If you can't get it out in the first third to half of your fermentation, there are just a few limited ways to get more out. If we are not seeing the color extraction we want early on in our cold soak, we will extend the cold soak and increase movement. Anthocyanins are more water-soluble. Since we have not yet started fermentation, we have a greater capacity to extract them in an aqueous phase in a cold soak. We can also add enzymes if necessary. When I started winemaking, we didn't have the tools to measure this. We could only evaluate color by sight. These measurements allow us to see how many anthocyanins we have been able to extract in our juice before we turn on that fermentation switch. The more color you have, the better your wine is going to be: it will be softer, rounder, more voluptuous. It seems crazy to think that color affects texture, but in this case it does.

Bolkan: We analyze from day one. For every anthocyanin you want a tannin. Those little chains of polymeric pigment start to bind and become large polymeric pigments. That is the stability of your wine and makes it dark, rich and supple. It all depends on your extraction. How you do it is up to you.

Has using this analysis ever caused you to make a wrong decision?

Olson: No, not yet.

Rodriguez: It's not like I am fermenting one tank of wine. I can run analysis on some of my tanks but not on every single tank, so I make judgement calls. There have been times I have noticed I might make an adjustment based on data early in the harvest. Then I make another adjustment and then continual adjustments until I notice I took things a little too far and have to ramp back a bit. It's not a wrong decision, but you want to see how far you can stretch things. Usually, I recognize that with my palate even before phenolics data come back.

Bolkan: We rely heavily on our laboratory. We not only ask for double confirmation when it is dry, but also on color-, tannin- and iron-reactive phenol numbers. If we are going to come off skins, we better be sure of the data. It is easier to ask for another data point than to risk taking something off too early. We'll do another pump-over mix, get another sample and run the test again. We know once you come off the skins, further adjustment is really difficult, and it's not fair to the cellar guys.

We have a planned number of tons we need to get through the winery each year. I'm trying to turn over tanks. I like phenolics because it gives me a quick assessment and confidence that we are making the right decisions, just like knowing the Brix drop, the pH and acid. It is just another tool to use to make your decisions, and they are expensive decisions. I couldn't live without it.

Olson: We have 13 clients at our custom crush facility; and if they are using this program, they all have different points at which they press off. You can imagine how tough this is logistically. They'll come in and say, "Press this tank now, otherwise it will get too rustic." People using WineXRay already know what points they want to hit. If they are tracking their data, we must be ready to drain and press a tank, even if it is not dry, because it will stylistically be out of the range they want for their program. Everyone has their ballpark numbers. It all has to do with the history.

Bolkan: Don't get us wrong. We are tasting alongside every single fermenter every single day. We are not making wine by numbers. We are tasting and looking and analyzing, using our senses. The numbers are used to confirm what we see and taste. I taste a wine that seems phenolic. We check the data, and it is phenolic, so we need to address that. Using these tools is more of a confirmation of our senses.

Olson: It is another tool in your toolbox; but as soon as you get dogmatic on anything, you are going to mess up. You won't make quality wine. It is so important to have that human factor to be reactive and dynamic. The test is used to confirm the decision you already thought you should make.

Rodriguez: At this point, I may run phenolics for just five tanks of wine. For me, it is just a way to touch base and confirm how my palate is working and how I am sensing the wines and the vintage. You will always have your stylistic goals. This is just a tool to help you get there.

Olson: Going back to Tondi's point about long chain polyphenolics, there is a point of interest on WineXRay, which is bound anthocyanins. It really affected how we handle fermentation kinetics. Draining our tanks and

Winemaker Roundtable:
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keeping that heat up during malolactic fermentation will increase your bound anthocyanins by so much. Those bound anthocyanins are a point of interest for body, fullness and softness.

That was a huge "Aha" moment for me, realizing how important it was to keep that consistent heat and not let it dip below 70° F. When you go to your malolactic fermentation tank, you want to keep the temperature above 70° F; you don't want to let it go down and then heat it back up. If you allow that to happen, the bound anthocyanins will be lower, and the wine will brown sooner.

Rodriguez: There are a lot of people who will tell you that is a very risky proposition, but many winemakers feel it is a risk worth taking. The risk is that higher temperatures are also attractive to other microbiological actors.

Bolkan: We have different winemakers on our team. Some of our winemakers do malolactic co-inoculation where they add malolactic bacteria mid-fermentation when it is hot and healthy. Others on the team are more cautious, so they inoculate after primary fermentation, sometimes even racking off lees before inoculation. You can have success both ways.

Does all the data ever create more questions than answers?

Rodriguez: It has been amazing to watch the industry evolve as we learn more and more about winemaking. We only get one chance a year to do this. All the new information I see sparks a lot of questions and productivity.

Bolkan: We like to say that data collection is a sport. Between our viticulture team and our winemaking team, having these phenolics has been so helpful in bringing both teams together. From those conversations we can develop practices to get the most out of everything. With this feedback, we also show the growers the climate data of the vintage and data from the most specific weather station to their blocks. We keep track of bloom to harvest dates, diurnal temperature fluxes and degree days. We capture all that information and put it side by side with the phenolic extraction and Brix depletion. This information is very helpful in looking back at vintages to see what happened and why.

Olson: The numbers keep you honest. There is a balance between that subjective human factor and when you can be objective. Making wine is still an art form, but the objective part of having the numbers in front of you keeps everybody honest about what is happening, especially in the vineyards.

At the end of the day, regardless of what the numbers say, we are tasting from vintage to vintage and deciding which is the best wine. You still want that spontaneity. You don't want to get too dogmatic and only go by the numbers. There has to be a balance. If you have 2,000 iron-reactive phenols and every previous vintage has been in a range of 1,300 to 1,500, then you are not being honest about something, and you need to re-evaluate what you are doing while putting your blends together. At the end of the day, you want to make the best wine but still have it match up to your last vintage. If you are blending and the numbers reveal you are in your normal wheelhouse, then it makes you feel good because you are tasting what your program is and you are making it consistently.

Bolkan: These small maneuvers to improve each lot—skin transfusions, increased pump-overs, higher fermentation temperatures—don't transform your wines. You are making small improvements, lot by lot, not changing the personality of a vintage.

Understanding Color

According to the AWRI color scale, 40 is a good, dark Petit Verdot. (By comparison, Pinot Noir averages 15, and a good, dark Pinot would be 20 to 22.) That is the color scale. Tannin is on a different unit of measurement. Across the board—no matter the varietal—as you get closer to 1.00 in tannin, you are tasting the phenols. Sometimes winemakers let the tannins go to 2.0 or close to 3.0 because it is more important to stabilize that color before draining it off the skins—it's a good indicator the winery got everything out of that particular lot of grapes.

The tank from Solano County plateaued its AWRI color measurement at around 40. In the tank from Lodi, by day 7 or 8, color plateaued in the mid-20s. Fermentation was finishing, a call had to be made. The color was okay, but not as good as the batch from Solano County. To remedy that plateau, the wine was pressed from tank and left on different skins; good skins increased the color scale from mid-20s to a solid 30 on color with tannin, indicating good stability and a dry ferment. It is not a vast improvement, but it produced a solid wine that will likely be a good blender in one of the winery's programs was made.

SOLANO PETIT VERDOT

Day	Brix	Temp (°F)	Color	Tannin	Phenols	Notes
1			0	0	0	
2	27	63	4	0	13	
3	27.5	62	7	0	17	
4	23.2	72	20	0.63	34	
5	18.1	76	28	1.11	45	
6	13	82				
7	8.5	79	35	1.83	59	
8	6.7	82				
9	3.2	82	38	2.48	72	
10	1.5	79	40	2.63	75	
11	0.1	81	40	2.91	80	drain leave skins

The tank from Solano County plateaued its AWRI color measurement at around 40.

LODI PETIT VERDOT

Day	Brix	Temp (°F)	Color	Tannin	Phenols	Notes
1			0	0	0	
2	28.3	57	0	0	0	
3	23.9	62	11	0.05	25	
4	22	74	17	0.22	31	
5	4.9	83	20	0.57	40	
6	-0.2	83	23	0.67	43	
7	-0.1	84				direct press onto different skins
1	-0.5	75	26	0.95	50	onto skins
2						
3	-0.9	76	29	1.08	53	onto skins
4	-1.1	72	32	2	61	onto skins

The tank from Lodi plateaued its AWRI color measurement by day 7 or 8. As a remedy, the wine was pressed from tank and left on different skins, which increased the color and tannin to the desired levels.

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Rodriguez: I would make a football analogy: Just because I can measure where the first down is doesn't mean I can always get there. Some blocks you can just get there, but with other blocks you can push it to 9 yards instead of 6, but you are not going to get that first down.

Even though you are trying to maximize quality lot by lot, it still comes down to the final blends. How does the analysis inform blending decisions?

Bolkan: You look at every single lot. With analysis, you can see where the wines end up. You can select which lots will be your reserve and which will hit different price points. You start making your selections for the different programs based on both the data and tastings. You categorize first then build up your blends.

Olson: It definitely comes into play. There is a point where the numbers tell you that this is not a quality wine. If you have Cabernet with total anthocyanins of 50 and the others are at 250, then that 50 wine is being sold off. The numbers, at some point, tell you a true story. Every winemaker worth his salt will taste that wine and say it is not good. The numbers will just support that.

Rodriguez: It is an objective way of telling all parties involved that this is why you are making the decision you are making. Certain wines may have great phenolics but still not taste very good. There are only a few lots of Cabernet that show that amazing dark-black, brambly character to be truly transcendent—not only in their phenolics, but in their flavor and aroma as well. The phenolic portion is just a part of it.

Winemakers need to balance science and nature to make good wine. As much as we would like to simply bring grapes into the winery and let the wine make itself, experienced winemakers have learned (the hard way) that a bit of science will likely produce better wine more consistently. New research and techniques are constantly coming our way. Each winemaker needs to ingest this new information and determine how to incorporate it into their winemaking regimens.

Phenolic assays provide a wealth of information. They can provide a map for winemakers seeking to travel the road of different vintages and fermentations. They can also serve as an early warning system for problems inherent in diverse vintages or lots of grapes. One problem is that it takes studying several vintages before winemakers can accurately use the data to help them achieve and maintain their stylistic goals. And then there's that temptation to over-use the data and start making wine by the numbers.

The more information we can get about what is going on with our fermentations, the better chance we have to make great wine. Just remember: science is only our ally, when balanced by nature, and data are only helpful when filtered through a winemaker's personal assessment and experience.

The winemakers in this roundtable seem to understand this dynamic. They are very clear that it remains their job to taste every tank and every lot of fermenting wine, assess that wine and then use the assays to confirm their judgement. With phenolic assays that allow winemakers to improve wines lot by lot, wines, in general, will only improve. **WBM**

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Barrel Building:
New Research Shows How Individual Cooper Variability Affects Barrel Composition

WSU researcher also tracks how compounds change through toasting process

Kerana Todorov

A FEW YEARS AGO, researchers began dedicating more time to fully understanding the barrel toasting process by analyzing the effects of the various toast levels on the wood grain and how that ultimately affects the wine stored in it. The goal has been to tailor the toasting process to consistently manufacture barrels with the aroma and flavor profiles that winemakers seek.

Tom Collins, assistant professor at Washington State University, began studying barrel toasting in 2009 and 2010 while working toward his doctorate at UC Davis. He presented the results of a series of studies on barrel toasting at the 2019 National Conference of the American Society for Enology and Viticulture (ASEV) and discussed the ongoing research on the Bourbon Pursuit Podcast.

SCOTT SUMMERS

Kerana Todorov is staff writer/news editor at *Wine Business Monthly*. She can be reached at *ktodorov@winebusiness.com*.

Research Indicates Protocol Does Not Ensure Consistency

There is variability in the chemical composition of barrels due to the toasting process, Collins explained during his presentations. The research indicates there is variability in how individual coopers manage their fires, even when they follow the same protocol set by the cooperage house.

"I think it's important for the industry to understand the extent of that variability so that we can work on ways to make our barrels more consistently," Collins said. "Some of this is communication between wineries and coopers—just to talk about what's possible and what's not possible."

In one four-day trial, his team of researchers followed the work of two coopers. They tracked fire temperatures during the toasting process by placing thermocouples on the barrel staves. One cooper worked a shift that started at 5:30 a.m. The other started later in the day. Each worked on their own barrels and managed their own fires. The two followed the same protocols.

At the end of the four days, the barrels produced showed variability in their chemical composition even though the coopers had followed the same protocol and ran the same number of fires for the same amount of time, according to the research.

Differentiating Coopers by Temperature

The researchers recorded day-to-day variations in the barrel making. "There are days when you know when things, for whatever reason, are running more smoothly, and other days when it's a little bit different," Collins said. "Again, this is the toasting protocol where a cooper is managing a number of fires, so it comes down, in part, to how they individually manage those fires to get a consistent look across all of those barrels."

There were also more significant temperature variations in the barrels made by the cooper who worked the later shift, Collins said. Furthermore, Collins noted that chemical analyses of the barrels could indicate which cooper made which barrel.

"We could always tell the two apart by their temperature profiles. We could also tell them apart by the composition of the barrels that they made, even though it's the same wood and the same toasting protocol," said Collins.

L'ESSENCE DE L'ART

Tonnellerie
Quintessence
Bordeaux

New Research into Toasting and Barrel Composition

Along the way, Collins' research evolved into a study of the compounds created during the toasting process. He is working with a computer graphic designer on 3-D models to visualize composition changes during barrel making.

The research indicated significant differences in the formation of the structural compounds during toasting. Every compound behaves differently, Collins said. After analyzing every stave at three-inch intervals from top to bottom in an experiment that included 40 barrels, Collins and his team found that compounds such as furfural, 5-methylfurfural and guaiacol vary, depending on temperature variations and other factors.

The bottom of the barrel, which is closest to the fire pot during the toasting process, heats up more quickly than the top end, Collins explained. The different formation and degradation of oak volatiles, combined with spatial variation in applied heat, results in complex patterns in the composition of the wood.

The team created maps of compounds such as 4-methylguaiacol and guaiacol—two compounds formed from the degradation of lignin. The more heat, Collins explained, the more guaiacol and 4-methylguaiacol. The maps indicated a greater concentration of guaiacol and 4-methylguaiacol toward the end of the staves, the area closer to the fire.

Compounds that produce vanilla, clove and spicy aromas are formed during the toasting process, but not at the same rate. If there is too much heat, some of these compounds volatilize and disappear.

Furfural, a product of the degradation of cellulose and/or hemi cellulose, behaved differently during the toasting process, the research indicates. For some unclear reason, more furfural was detected on some staves than others. The variation may be due to the wood density or wood moisture content, Collins said.

"There is definitely more to come. It is still ongoing work," Collins said.

Perfection in Imperfection

Phil Burton, a sales representative for Barrel Builders in the Napa Valley, said every barrel is a little different in spite of pyrometers and "exacting toasting regimes."

"Everything from residual moisture in the wood, to variations in grain between adjacent staves, and even what mood the cooper is in, all contribute to differing nuances of flavors and aromas," Burton said. "And, of course, different coopers have slightly different toasting styles, even though the cooperage strives for consistency," he added. "For instance, the cooperage we work with, Tonnellerie Marchive, is known for a slightly citrusy note that comes out, especially in Chardonnay."

"Why this happens is a bit unclear to me, although I've been working with barrels for more than 40 years and we've seen similar tasting notes from winemakers over and over with several different coopers doing the toasting," Burton said. "Since there are so many variables in the process—both the wood in the barrel and the wood being burned are natural products—there are always slight variations. And this is a good thing, much as the flavors in the grapes are slightly different every year in spite of similar climate and management conditions." **WBM**

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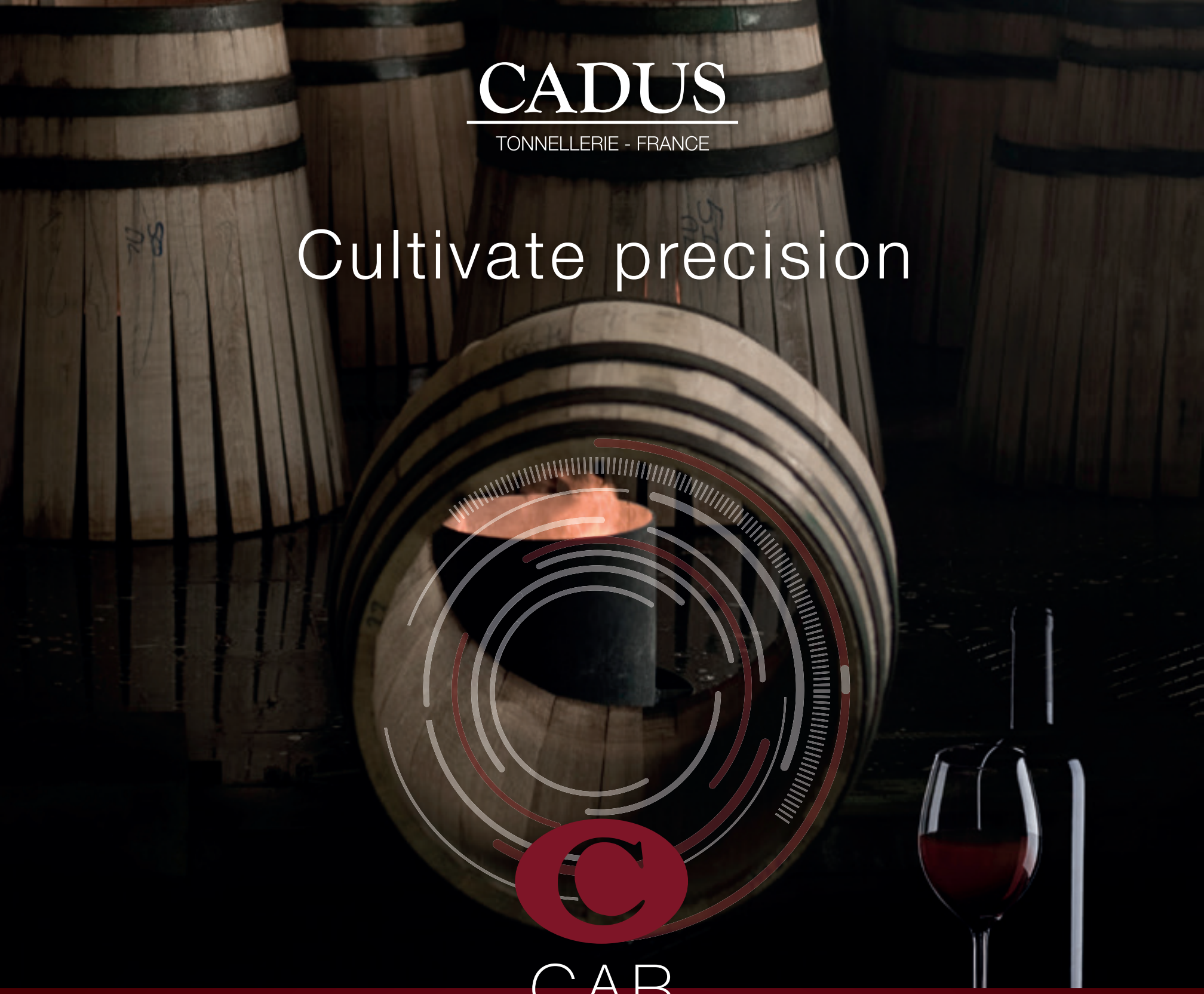

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Select Barrel Vendors

Listings identify types of barrels and other options.
Information submitted by barrel suppliers.

				Bordeaux			Burgundy			Other Barrel Options					
Page	Company Name	City	State	American Oak	Eastern Europe	French	American Oak	Eastern Europe	French	Demi-Barrique Half Barrel	Hogshead - American Oak	Oak Upright (foudre)	Oregon Oak	Puncheon	Stainless Steel Wine Barrels
	Adirondack Barrel Cooperage	Remsen	NY												
	Adour USA Tonnellerie	Glendale	CA												
	Alain Fouquet French Cooperage	Napa	CA		■	■		■	■						
	Allary Tonnellerie	Amity	OR												
	Amalé Oak Importers, LLC	Lafayette	CA	■		■	■		■					■	
	Ana Sélection	Trie Sur Baïse	France			■			■						
	Artisan Barrels & Tanks, Inc.	Oakland	CA	■	■	■	■	■	■	■	■	■		■	■
34	Barrel Associates International	Napa	CA	■	■	■	■	■	■	■	■	■		■	
	Barrel Blasting, Inc.	Napa	CA												
	Barrel Builders, Inc.	St. Helena	CA	■	■	■	■	■	■						
	Barrels Unlimited, Inc.	Seal Beach	CA	■			■							■	
	Bastos, LLC	Angwin	CA												
	Bayard Fox Selections	Napa	CA			■			■					■	
	Bend Barrels, Inc.	Bend	OR												
	Bernard Tonnellerie	Cloverdale	CA			■			■	■				■	
	Berthomieu Tonnellerie	Cloverdale	CA	■	■	■	■	■	■	■	■			■	
	Black Forest Container Systems, LLC	Greenville	SC												■
	Black Swan Cooperage, LLC	Park Rapids	MN												
	Blefa Kegs, Inc.	La Vergne	TN												■
33	The Boswell Co.	San Rafael	CA			■			■					■	
32	Bouchard Cooperages	Napa	CA	■	■	■	■	■	■	■	■	■		■	
32	Canton Cooperage	Santa Rosa	CA	■			■			■	■			■	
	Carolina Wine Supply	Yadkinville	NC												
	Cellar-Tek	Kelowna	BC	■	■	■	■	■	■			■		■	■
	CFP Winemakers	Pittsburgh	PA												
	Chêne & Cie	Paris	France												
	Charlois Cooperage USA	Cloverdale	CA	■	■	■	■	■	■	■	■			■	
	Classic Oak Products	Terrey Hills	NSW												
	Cooperages 1912 Napa	Napa	CA	■	■	■									
	Core Enology Group	McMinnville	OR												
	Country Connection	Oroville	CA												
33	Demptos Napa Cooperage	Napa	CA	■	■	■	■	■	■	■	■	■		■	
	DRMre.Coop	St. Catharines	ON												
	East Coast Wood Barrels	Medford	NY												
	Ermitage Tonnellerie	Cloverdale	CA			■			■	■				■	
	Five Star Barrels	Oroville	CA												
	Foudrerie Marc Grenier	Corberon, Bourgogne	France									■			
	France Chêne	Artiguelouve	France												
	Francois Freres USA	Napa	CA			■			■						
	French Cooperages	Portland	OR			■			■					■	
	Gamba USA/Botti Generazioni	Napa	CA												
	Garbellotto SA	Conegliano (TV)	Italy												
	Gibbs Brothers Cooperage	Hot Springs	AR												
34	Gino Pinto, Inc.	Hammonton	NJ	■	■										
	GW Kent, Inc.	Ypsilanti	MI	■											■
	H&A Barrel Management	Sonoma	CA												
	Heinrich Cooperage	Tanunda	Australia	■											
	IDL Process Solutions, Inc.	White Rock	BC												
	ITek Wine	Paso Robles	CA												
	Janszen Discount Products, Inc.	Cleves	OH												■
	Kádár Hungary	Sausalito	CA												
	Kalina Cooperage	Mad	Hungary												
	Kelvin Cooperage	Louisville	KY												
	KK International, LLC	Brooksville	FL												
	La Garde	Quebec	QC												■
	Le Grand USA	Walla Walla	WA	■		■	■		■					■	
	Leroi Tonnellerie	Cloverdale	CA			■			■	■		■		■	
	Les Tonnelleries De Bourgogne	Meursault	France												
	Louis Latour, Inc.	San Rafael	CA												
	Magreñán Toneleria	Cloverdale	CA	■	■	■	■	■	■	■	■	■		■	
	Mcginnis Wood Products	Cuba	MO												
	Mercier	Templeton	CA												
	Mio Vigneto Products	Loomis	CA							■		■		■	■
	Modern Cooperage	St. Helena	CA												
	The Morlet Selection, Inc.	St. Helena	CA												
	Nadalié USA	Calistoga	CA	■	■	■	■	■	■			■		■	
	Napa Valley Barrels, Inc.	Santa Rosa	CA												
	New World Winery Equipment	Springfield	MO												■
	North Coast Container - VitaCask & Barrel	Cleveland	OH												■
	Nuance Winery Supplies	St. Catharines	ON									■		■	

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	The Oak Cooperage	Higbee	MO												
	Oak Tradition	Walla Walla	WA												
	Oenowood International	Cognac	France												
	Oregon Barrel Works / Tonnellerie DeFerrari	McMinnville	OR	■		■	■		■				■	■	
	Pacific Winemaking, LLC	Sherwood	OR												
	Packaging Specialties	Medina	OH												■
	Paul Mueller Co.	Springfield	MO												■
	Petraea Plus	Lakeville	MI	■		■	■		■					■	
	Pickering Winery Supply	San Francisco	CA	■	■	■	■	■	■	■		■		■	■
	Premier Wine Cask, Inc.	Napa	CA	■	■	■	■	■	■	■	■	■		■	■
	Presque Isle Wine Cellars	North East	PA	■		■									
35	Quality Wine Barrels Cooperage	Santa Maria	CA	■	■	■	■	■	■					■	■
	ReCoop Barrels	Sebastopol	CA												
	ReWineBarrels	Salem	OR												
	Rich Xiberta USA	Cotati	CA												
	Santé Beverage Supply	Raleigh	NC	■		■	■		■					■	
	Santa Rosa Stainless Steel	Santa Rosa	CA												■
	Saury Tonnellerie	Cloverdale	CA	■		■	■		■	■	■	■		■	
	Seguin Moreau Napa Cooperage	Napa	CA	■	■	■	■	■	■		■	■		■	
	Skolnik Industries, Inc.	Chicago	IL												■
	Squarrel Barrels	Minnetonka	MN												
	TB Tonnellerie	Les Artigues de Lussac	France												
	Technologie Inovaweld Inc.	La Pocatiere	QC												■
	Titan Barrel Works	Pine Plains	NY												■
	TN Coopers	Sonoma	CA	■	■	■	■	■	■		■	■		■	
	Toneleria Intona	Monteagudo	Navarra												
	Toneleria Martin	Alberite - La Rioja C.P.	Spain												
	Tonnellerie Ô	Benicia	CA	■		■	■		■		■			■	
	Tonnellerie Atelier Centre France	Sancoins	France												
	Tonnellerie Baron ~ OXOline	St. Helena	CA												
	Tonnellerie Bel Air	Calistoga	CA			■			■					■	
	Tonnellerie Berger & Fils	Vertheuil	France			■			■						
	Tonnellerie Bordelaise	Martillac	France												
	Tonnellerie Boutes	Rodeo	CA		■	■		■	■	■		■		■	
29	Tonnellerie Cadus	Ladoix Serrigny	France			■			■	■				■	
	Tonnellerie Cavin	Bourgogne	France												
	Tonnellerie Claude Gillet	Saint Romain	France												
	Tonnellerie D'Aquitaine	Napa	CA												
	Tonnellerie de Jarnac	Napa	CA												
	Tonnellerie de Mercurey USA, Inc	Napa	CA			■			■	■		■		■	
	Tonnellerie du Sud-Ouest	Brens	France												
	Tonnellerie du Val de Loire	Napa	CA												
	Tonnellerie Garonnaise	Rodeo	CA		■	■		■	■	■		■		■	
	Tonnellerie Loureiro	Saint-Eugène	France												
	Tonnellerie Meyrieux	Beaune	France			■			■					■	
	Tonnellerie Millet	Galgon	France		■	■		■	■					■	
	Tonnellerie Montgillard	Saint-Nicolas-les-Citeaux	France												
53	Tonnellerie Orion	Napa	CA			■			■	■				■	
27	Tonnellerie Quintessence	Beychac et Caillau	France	■	■	■	■	■	■					■	
	Tonnellerie Radoux USA	Santa Rosa	CA	■	■	■	■	■	■					■	
	Tonnellerie Remond	Sonoma	CA												
	Tonnellerie Rousseau	Couchey	France			■			■	■		■		■	
	Tonnellerie Saint Martin North America	Paso Robles	CA												
	Tonnellerie Sansaud USA	Fairfield	CA			■	■		■					■	
35	Tonnellerie Sirugue	Santa Monica	CA			■			■	■				■	
	Tonnellerie Sylvain	Saint-Denis-de-Pile	France			■			■					■	
	Tonnellerie Taransaud	Cognac, Cedex	France			■			■	■				■	
	Tonnellerie Tremeaux	Beaune	France			■			■						
	Tonnellerie Vlad	Sighetu Marmatiei	Romania		■			■		■				■	
	Treuil Tonnellerie de Brive	Brive	France												
35	Trust Cooperage	Jupiter	FL	■	■	■	■	■	■	■	■	■		■	
19	TW Boswell	Napa	CA	■	■	■									
	Vadai Barrels / Vadai Wine LLC	San Gabriel	CA												
	Vicard Generation 7	Napa	CA	■	■	■	■	■	■	■	■	■		■	
	Vicard USA	Napa	CA	■	■	■	■	■	■	■	■	■		■	
	VinEthos	Sausalito	CA	■		■	■		■					■	
	The Vintner Vault	Paso Robles	CA	■		■			■			■		■	■
	Wine and Beer Supply LLC	Ashland	VA												
28	World Cooperage	Napa	CA	■		■									

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2019 *WBM* Winery Equipment Survey Report

Steady As She Goes

But where are we headed?

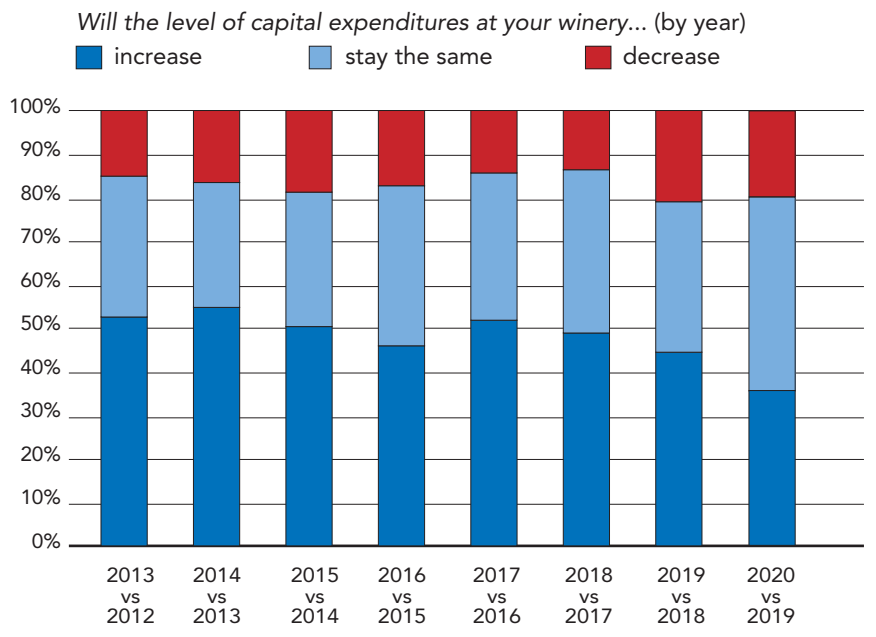
Curtis Phillips

Curtis Phillips, an editor for *Wine Business Monthly* since 2000, is a graduate of UC Davis, and has been a winemaker since 1984 and an agricultural consultant since 1979.

Key Points and Notable Results
from the 2019 *WBM* Equipment Survey

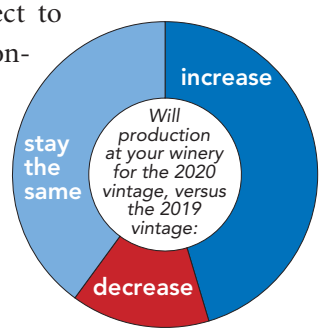
- Half of mid-sized or larger wineries expect to increase their levels of capital investment.
- Nearly three-quarters of wineries are without any back-up power generation.
- Two-thirds of wineries do not expect to increase their use of automation.
- Half of all wineries use steam to sterilize their bottling equipment.

OVERALL, WINERIES EXPECT TO spend about the same in 2020 as they did in 2019. However, the overall trend covers up an interesting divergence between small wineries (those producing less than 50,000 cases per year) and larger wineries. More than half of the respondents from mid-sized or large wineries expect to increase the amount they spend on capital investment in 2020 over the amount they spent in 2019. And, if they buy anything, wineries expect to buy tanks.



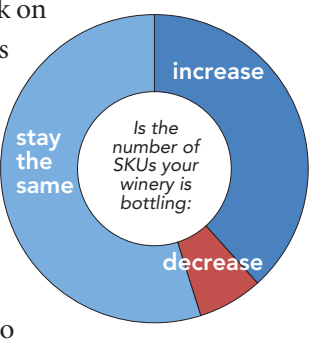
Expected Production Levels for 2020

Only 15 percent of all wineries surveyed expect to cut back production during 2020. Most respondents noted that they intend to purchase fewer grapes, juice or wine, rather than sell unneeded raw materials on the bulk market. Around 45 percent of wineries expect to make more wine in 2020, while the remainder (40 percent) expect to maintain the same level of production in 2020 as they had in 2019.



Trends in the Number of SKUs Bottled

Very few respondents (7 percent) expect to cut back on the number of SKUs in 2020. In fact, most wineries (55 percent) expect to maintain the same number of SKUs in 2020 as they had in 2019.



A SKU, or Stock Keeping Unit, refers to the total number of different wines and sizes sold by a winery. A winery's total number of SKUs may remain constant even when the total case production of the winery rises or falls due to seasonal variation. The number of SKUs sold by a winery hints at whether a winery is attempting to expand or curtail their production, whereas total case production is a reflection of the conditions of the previous couple of growing seasons. For example, a winery that is otherwise selling very well is still likely to produce less wine in a year with a light crop, but it is unlikely to cut back on the number of SKUs merely due to annual crop load variation.

Winery Capacity

A little more than half (55 percent) of the survey respondents noted that they expect to have insufficient production capacity at their winery in 2020. Several respondents from mid-sized and large wineries plan to buy or rent off-site temporary storage to address capacity issues.

Perhaps simply because of the smaller amount of grapes and wine involved, smaller wineries indicated they're planning a number of different solutions to their capacity issues, with several noting that they intend to get "creative" with inventory management.

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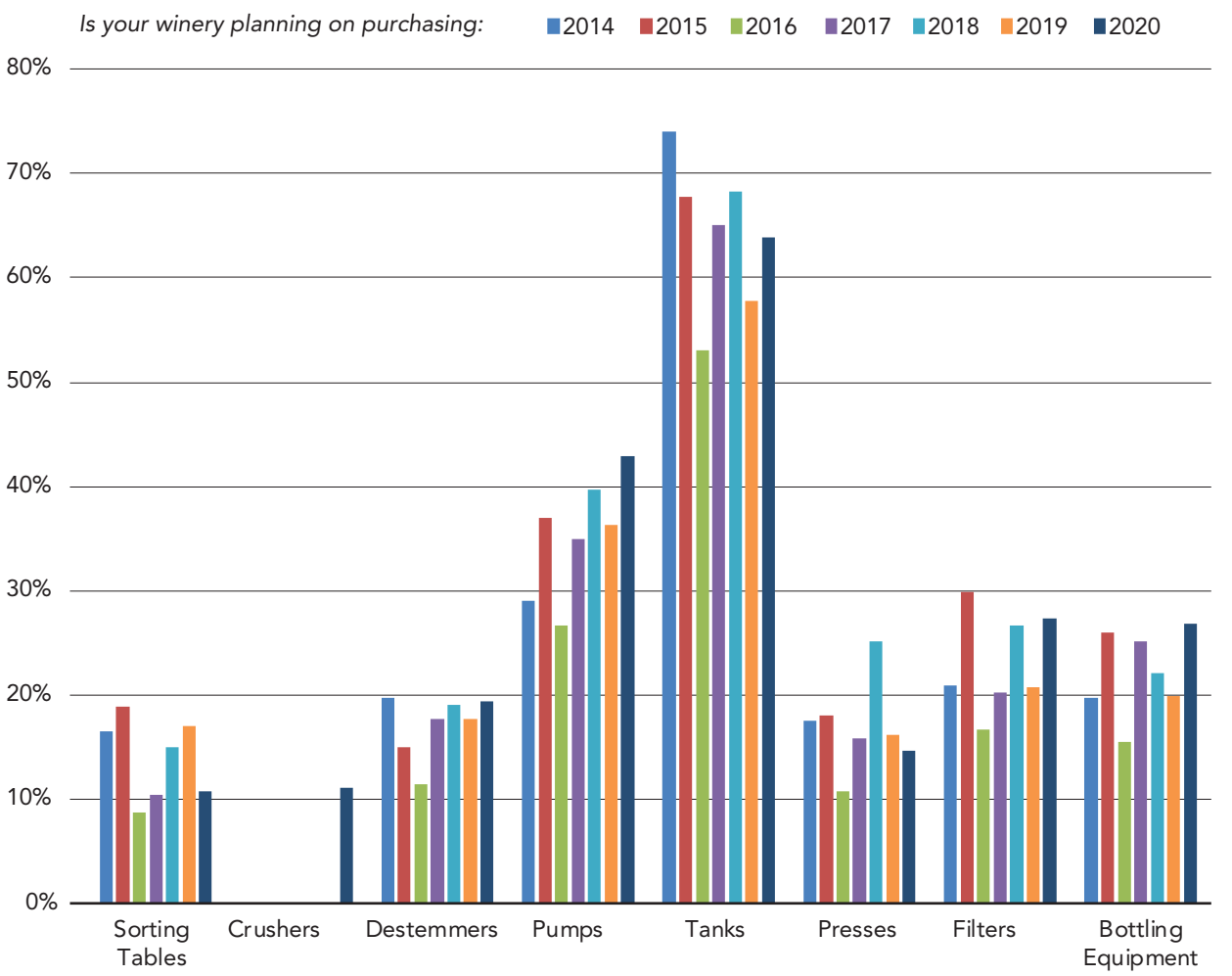
Planned Equipment Purchases

Most of the wineries that plan to buy equipment in 2020 are looking to buy tanks. This has been the case for as long as we have been taking this survey. Extrapolating from our historical data, we expect tank purchases to remain over 60 percent of winery purchases for both 2020 and 2021, unless there is a dramatic and unforeseen downturn in the U.S. wine market.

Excluding destemmers, which a relatively high percentage (20 percent) of respondents are looking to procure, the expected purchases of crushpad equipment looks a little soft compared to recent years, with fewer wineries reporting that they are looking to buy sorting tables and presses in 2020. It looks like wineries want to increase their post-fermentation winery capacity with expected upticks for pumps, tanks, filters and bottling equipment, in addition to destemmers.



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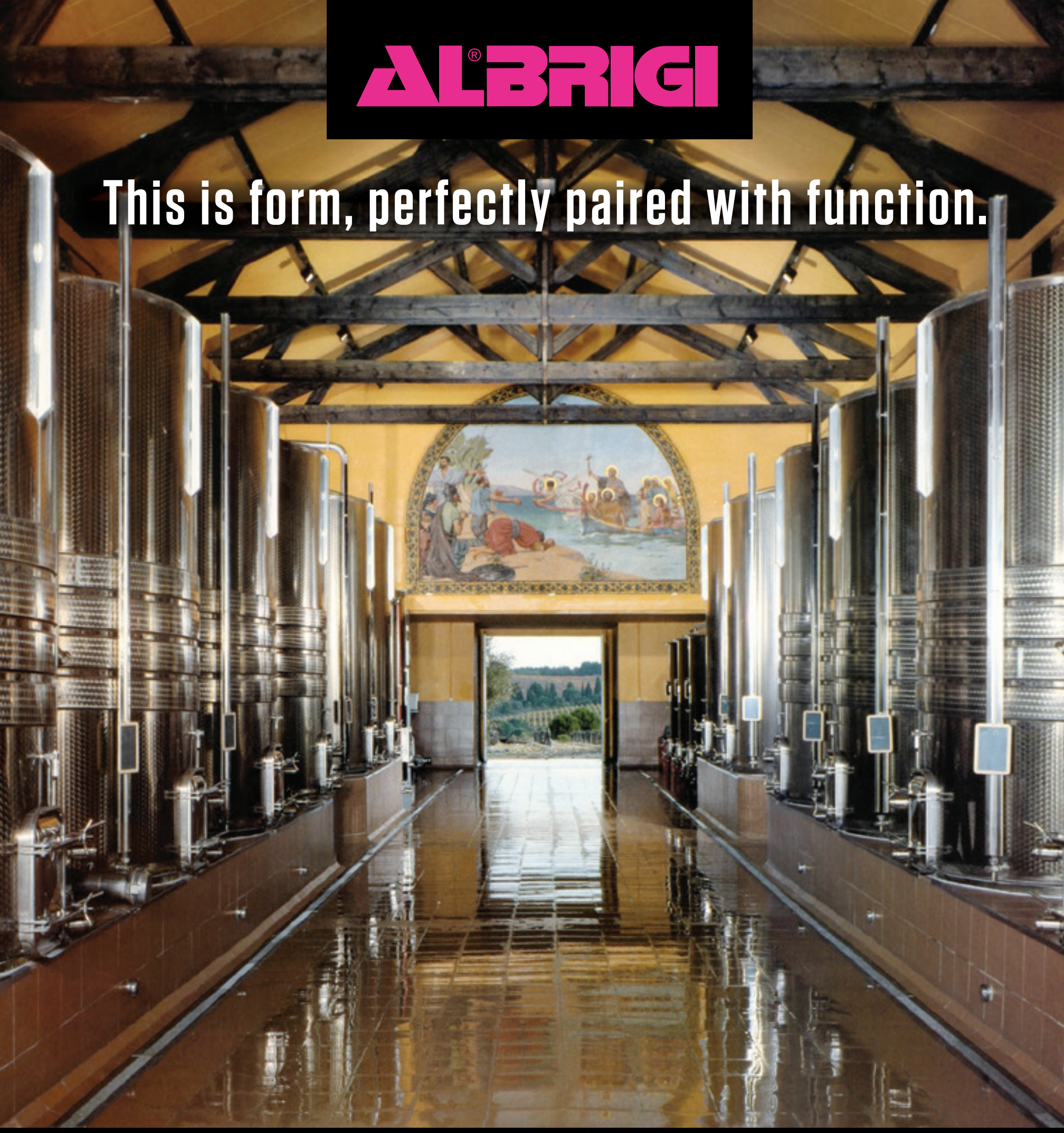

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EXPECTED TANK PURCHASES FOR 2020

About two-thirds (64 percent) of the survey respondents noted that they intend to purchase wine tanks during 2020. Within this group of expected wine tank purchasers, 69 percent of the survey respondents are planning to buy multi-purpose wine tanks. Thirty percent of the respondents, mostly from small wineries, are planning to buy open-top fermenters; 21 percent plan to purchase portable tanks. Three respondents, two from large wineries and one from a smaller winery, stated that they were looking to buy rotary fermenters.

Note that the total percentages exceed 100 percent because the respondents could mark multiple categories if they expect to buy more than one type of tank in the coming year.

Bottling

More than three-quarters (79 percent) of mid-sized and large wineries own their own bottling line(s), which is a significantly higher percentage than the 51 percent of small wineries that own their own bottling equipment.

Forty-four percent of small wineries reported they use a mobile bottling service. The respondents from larger wineries, however, noted that they are twice as likely to send their wine to a separate bottling facility or another winery than they are to use a mobile bottler, with 13 percent bottling outside of the winery and 6 percent using mobile bottlers.

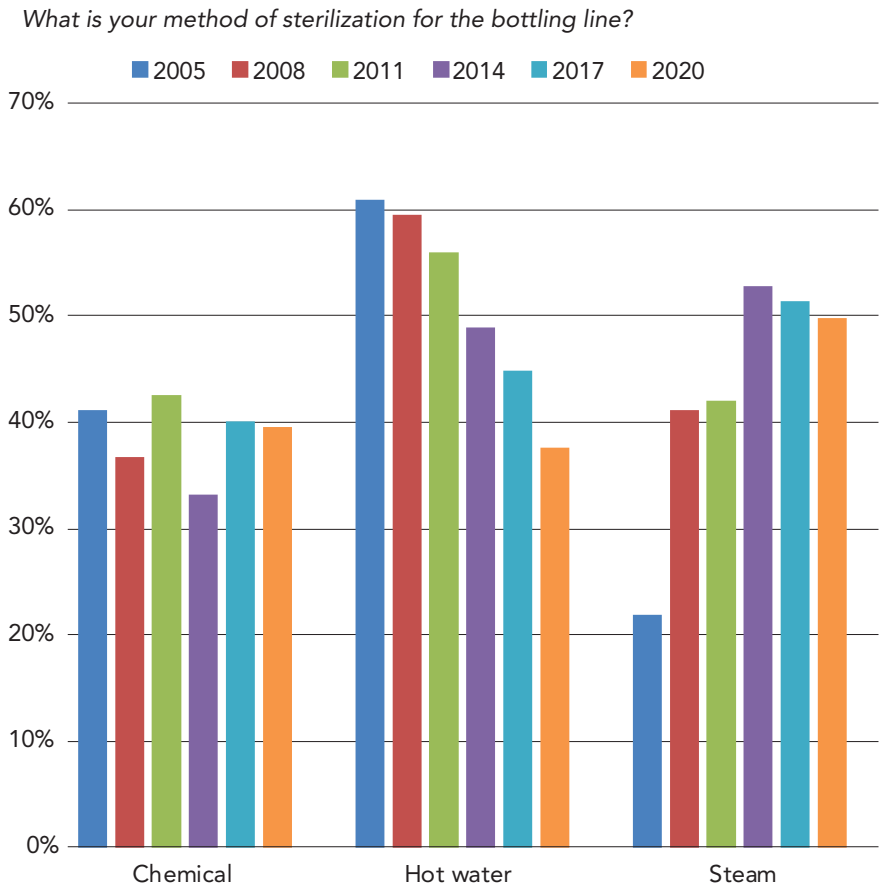
BOTTLING LINE OWNERSHIP

We asked those wineries that do not already own their own bottling line if they intend to purchase one in 2020. In keeping with previous years' responses, the number of wineries that plan to invest in their own bottling equipment is small: In this survey, only 4 percent of wineries that do not already own a bottling line stated that they intend to purchase one in 2020. When the query is limited to those wineries producing 50,000 cases per year or more, this percentage increases to 13 percent.

BOTTLING LINE STERILIZATION

We ask about the methods used to sanitize and sterilize bottling lines every few years. Half of the respondents from this year's survey use steam for sterilization, while roughly 40 percent use hot water and 40 percent use chemicals. That total adds up to more than 100 percent because most wineries use more than one method of sterilization. Usually, this means that a winery is using chemicals, typically caustic cleaners and sanitizers like TSP (trisodium phosphate), in conjunction with steam or hot water as a sterilizer.

We have been asking about bottling line sanitation for several years. The use of chemical cleaners and sanitizers has remained constant. The responses for hot water and steam suggest that hot water is being replaced by steam in roughly half of U.S. wineries.



Staffing

We asked the respondents how difficult they thought it was to find and train cellar staff. Unexpectedly, the distribution of the responses didn't follow any discernable pattern. We expected that respondents from regions with a strong and active wine industry would have an easier time training staff, since one could assume those areas would have a plentiful pool of experienced personnel. However, the differences in the responses from small and large wineries was statistically significant: large wineries view finding and training staff as slightly more difficult than smaller wineries, but the differences in the ratings from wineries of different sizes is very small. When asked to rate the level of difficulty in finding and training staff members, on a scale of 0 to 10, the scores from respondents from small wineries had an average (mean) of 5.8, while those from mid-sized and large wineries had a mean of 6.7.

TRAINING

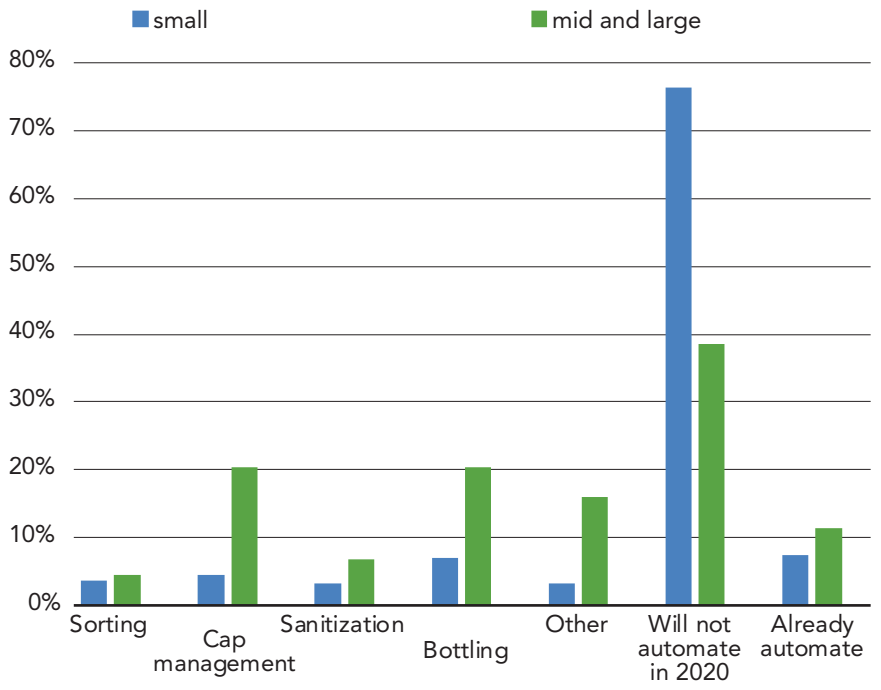
We asked about the methods of employee training for the first time in this survey. Almost nine-tenths (88 percent) of the survey respondents replied that they train their employees on the job. Five percent of the respondents, mostly from smaller wineries, noted that they only hire trained employees. Three respondents answered that they rely on outside, third-party, training programs.

AUTOMATION

As part of the larger issues of winery labor, we asked a couple of questions about automation. In general, winery automation can be thought of as a method to reduce the cost of labor or as a means to use the winery's existing labor force more efficiently by reducing the need to have a human perform repetitive tasks. Around two-thirds (64 percent) of wineries do not automate any of their operations. This is very much a case where the relatively small size of the average U.S. winery dictates the results. A little more than one-third (39 percent) of the survey respondents from wineries producing more than 50,000 cases per year noted that they do not automate their operations, which is almost a mirror image of the responses from smaller wineries.

Bottling lines and cap management systems were the two areas where those wineries that expect to deploy some form of winery automation in 2020 are most likely to automate.

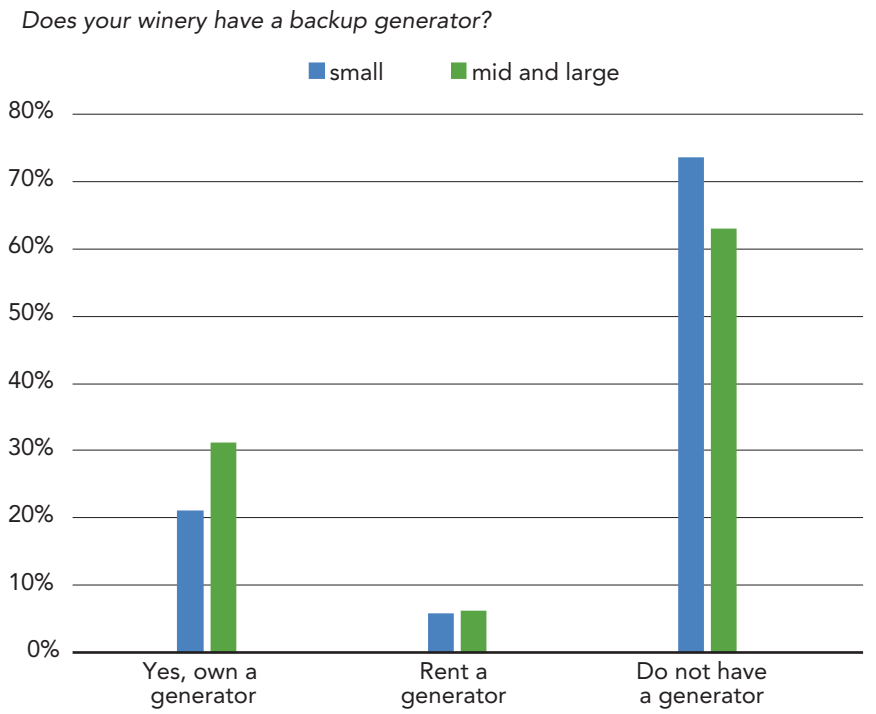
What do you plan to automate in 2020? (check all that apply)



Blackouts and Backup Power

In Northern California, PG&E has instituted a policy of "Public Safety Power Shutoffs" (PSPS), or preemptory blackouts, in order to lower the risk of wildfire. The season of highest fire risk, and therefore the most likely period of extended blackouts, occurs during the time of peak energy consumption for the wine industry. It is probably safe to say that the wine industry as a whole would rather put up with the inconvenience of week-long blackouts any time there is more than a gentle breeze across the state than they would like to deal with smoke-tainted grapes, unobtainable or extremely expensive wildfire insurance, the associated risk of having their facilities burned to the ground, as well as the non-wine industry specific risks of death and loss of property.

In order to gauge the industry's preparedness for unreliable access to electricity, we started asking about back-up power generation for wineries. Unfortunately, most wineries (72 percent) indicated that they are not prepared and are without any back-up electricity generation. There is a disparity between small wineries producing fewer than 50,000 cases per year and respondents from mid-sized and large wineries. Those from large wineries were more likely to note that their winery either owns or rents a



backup generator, but the difference is only 10 percent—a much smaller difference than one might expect. Only one of the respondents noted that they have solar and geothermal systems in place for on-site power generation and heating and cooling.

Most of the wineries with backup power are in California. California has about 70 to 80 percent of the wineries in the U.S., and California wineries seem to represent about 80 percent of those with generators. There are no apparent geographical anomalies in the distribution of backup power. I'm not really surprised since, despite the PG&E blackouts, having a generator probably has more to do with the perception of reliability over the long term than with the events of the past couple of years.

Concluding Observations

As noted above, around half of mid-sized and large wineries expect to increase their levels of capital investment in 2020 over 2019. Small wineries are more likely to keep the level of capital expenditures the same in 2020 as in 2019. Nearly three-quarters of wineries are without any backup power generation and are without any means to continue winery operations in the event of extended blackouts. The U.S. wine industry is expected to remain slow to deploy automation in any of their operation with two-thirds of wineries not expecting to increase their use of automation in 2020. Around half of all wineries moved to using steam to sterilize their bottling equipment. **WBM**

Methodology

Wine Business Monthly received 312 responses from wineries to this year's survey (additional respondents included four growers not listing themselves as wineries, and nine respondents listed as "other." This last category is usually comprised of consulting winemakers. Combined vineyard and winery businesses are considered wineries for the purposes of this survey. Eighty-four percent of the respondents were small producers with annual production of fewer than 49,999 cases per year. The next size category of 50,000 to 499,999 cases per year comprised about 12 percent, and 12 respondents had production over 500,000 cases annually. The survey was conducted via the internet.

Taking Control of Total Package Oxygen

Closure Parameters and Oxygen Audits are Key

Deborah Parker Wong

THE OXYGEN TRANSMISSION RATE (OTR) of a wine closure is just one of several factors that contribute to the total package oxygen (TPO) in a bottle of wine. According to Dr. Paulo Lopes, who conducts research and development at Santa Maria da Fiera-based Amorim & Irmãos, S.A. and has extensively studied the OTR of natural corks, closures are the least variable aspect when considering TPO. "We know precisely how much oxygen a closure will provide to the wine but only by accurately measuring oxygen during the bottling process are we able to make precision additions during winemaking," Lopes said.

Lopes' current research illustrates the oxygen release of natural cork over time, a measurement that is particularly relevant in the context of an oxygen audit designed to measure total package oxygen—the combination of the oxygen contained within the closure combined with the presence of atmospheric and headspace oxygen during bottling and the dissolved oxygen in the wine.

Oxygen Dynamics of Natural Cork

Not surprisingly, different grades of cork contain different amounts of oxygen; a longer, higher-quality Grade A cork with fewer lenticels will release less oxygen. "Longer corks are much more homogeneous in oxygen release," said Lopes. "Also, due to the [sloping] shape of the bottle neck, the cork is less compressed and thus releases less oxygen." To that effect, Amorim has created an online application which makes the OTR rates of its closures readily available. Lopes is also researching the contribution of cork phenolics to wine. "Phenols from cork in low amounts can help shape the oxygen reduction potential of a wine by polymerizing some compounds to reduce astringency and bitterness," he said. In effect, they provide extra protection against oxidation. "We're working to understand the relationship between cork length and different kinds of wine. By using the same approach as the barrel industry we'll be able to identify the optimal pairing between wine and cork."

On average, a natural cork will release up to one milligram of oxygen during the first six months in bottle and then continuously micro-oxygenate at just over one milligram from its cellular structure over a period of 60 months of storage. Although it's impermeable to atmospheric oxygen, oxygen from the cell structures of the cork travels through the plasmodems and lenticels into the wine.

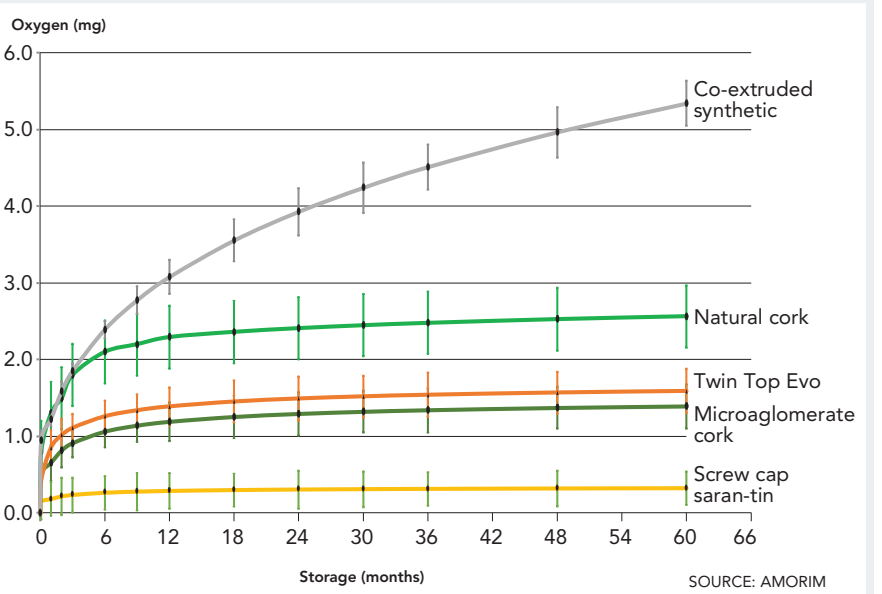
Corks used to seal wine bottles have a lifespan of about 25 years, after which they begin to lose elasticity and can start to let atmospheric air into the bottle along their sides. "After 10 years, a cork will lose only 1 to 2 percent of its elasticity," Lopes said. "And if stored in contact with the wine, it will absorb about three millimeters of wine. "

But it's the temperature and humidity of the storage space that ultimately dictate the lifespan of the cork, which initially consists of 80 to 90 percent air: an amount that decreases by 10 to 15 percent over time. Lopes explained that at temperatures below 20 °C (68 °F) and at 50 percent humidity, the head space in a wine bottle is as moist as vapor. According to Lopes, under these ideal conditions, there is no need to store bottles horizontally—that is, until the cork begins to lose elasticity.

Temperature has a significant impact on the properties of natural cork. When stored in temperatures above 20 °C, a cork will lose humidity faster than it can take in moisture from the headspace vapor or the wine and will eventually dry out. In the case of sparkling wine, corks absorb both liquid and gas as they pull carbon dioxide (CO_2) from the wine. The classic mushroom shape of a sparkling-wine cork is formed by its contact with CO_2. Lopes noted that when a sparkling wine is stored horizontally, the cork absorbs some of the wine and cannot recover the mushroom shape preferred by producers. While a straight-sided cork is the cosmetic result of horizontal storage, wine quality is unaffected.

Under Pressure

When comparing natural cork to other popular closures over a period of 60 months, Lopes has also determined that natural cork demonstrates better sealing capacity against atmospheric oxygen than manufactured and synthetic corks.



The cork stopper has a unique and unequaled sealing capacity providing an effective protection of the wine from the outside atmosphere and limited micro-oxygenation, from its cellular structure.

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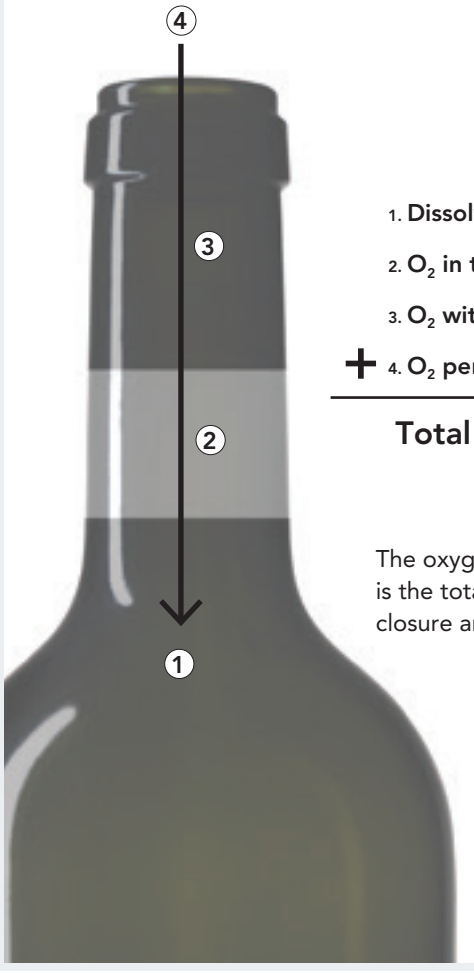
Taking Control of Total Package Oxygen

To further ensure the sealing integrity of each of its natural corks, Amorim has added a proprietary Sealing Verification System (SVE) technology to its production process that uses pressure to individually check the structural integrity of each cork. After being punched and sorted in the initial stages of production, corks are then pressure tested and either accepted or rejected by the system.

In an internal study of corks that were both approved and excluded by the SVE, Lopes found that SVE-approved corks maintained two mg/L more of free SO_2 in white wine after seven months of storage than corks that failed the pressure test. "With a good understanding of your TPO, the advantages of using a verified cork are two-fold: you can use lower levels of free sulfur, knowing that it won't be as variable over time, and your production will be more consistent as well," he said.

All the oxygen matters for bottled wine aging



1. Dissolved O_2
2. O_2 in the headspace
3. O_2 within the closure
+ 4. O_2 permeability through the closure

Total O_2

The oxygen that will impact the bottled wine is the total oxygen supply given by the closure and the bottling.

SOURCE: AMORIM

Despite the OTR of a natural cork closure, Lopes emphasized the need for a holistic approach to TPO, "The more we know, the less we have to intervene," he said. In studying TPO, he referenced the PreSens Precision Sensing GmbH analyzer to measure oxygen levels during winemaking and bottling. Don Huffman, director of sales and wine quality for North Carolina-based Vinventions, which distributes the analyzer in the United States under the tradename NomaSense O2 P300 and P6000, agreed. "Wineries fall short in having a complete understanding of their TPO," Huffman said.

According to Huffman, it's essential to measure the dissolved oxygen in a wine going on to the bottling line and to calibrate the line before each bottling run. He pointed out that the biggest variability for TPO can be found on a screw cap bottling line. "In a traditional screw cap line you're capturing air and you'll have a lot more potential headspace," he said. On average, headspace contains 65 percent of the TPO for a cylindrical closure and is as much as two to three times greater in a screw cap closure.

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Check Points and Inerting Practices Reduce TPO

Conducting an oxygen audit to determine TPO typically begins with measuring and calculating the average dissolved oxygen (DO) in a tank prior to transferring the wine. Huffman referenced Vinventions' NomaSense Oxymeter which uses luminescence-based dots that adhere to a sight glass or bottle to measure the emission of light by the wine. The NomaSense portable unit is equipped with a probe, built-in barometer and temperature sensor, while a smartphone application runs the analyzer and manages the data via bluetooth.

According to Huffman, for an accurate average, it's essential to measure a spectrum of DO from the top to the bottom of a tank beginning with a sight glass reading to measure the DO, if any, of wine coming in to the tank and measuring DO again at the bottom of the tank at the valve.

Key check points for monitoring potential DO pick up include post filtration, as wine exiting a filter will naturally have a higher DO, and during cold stabilization and racking or transferring wine. Huffman suggested installing a sight glass just before the filling head on the bottling line, which should be inerted of oxygen before each run.

In a trial designed to reduce TPO conducted at Bodegas Osborne in Spain, TPO was measured at the beginning, middle and end of the bottling run. Winemakers identified a greater oxygen pick up at the beginning of the line and addressed the problem by inerting the line before wine was pushed into the system. The winery now achieves a consistent TPO at a maximum of 1 mg/L per bottle and an average around 0.7 mg/L. "With these types of check points in place, it's fairly easy to identify any problems," Huffman said. "More often than not, it's a .99 gasket or O-ring that is failing."

Given that the majority of TPO occurs in the headspace, measuring the oxygen content there post-bottling requires a companion analyzer that pierces the closure. Huffman suggested measuring the DO of the first bottles off the filling line and adjusting for any elevated levels of DO. The Nomasense Piercing System is a destructive measurement for still, sparkling and bag-in-box wine.

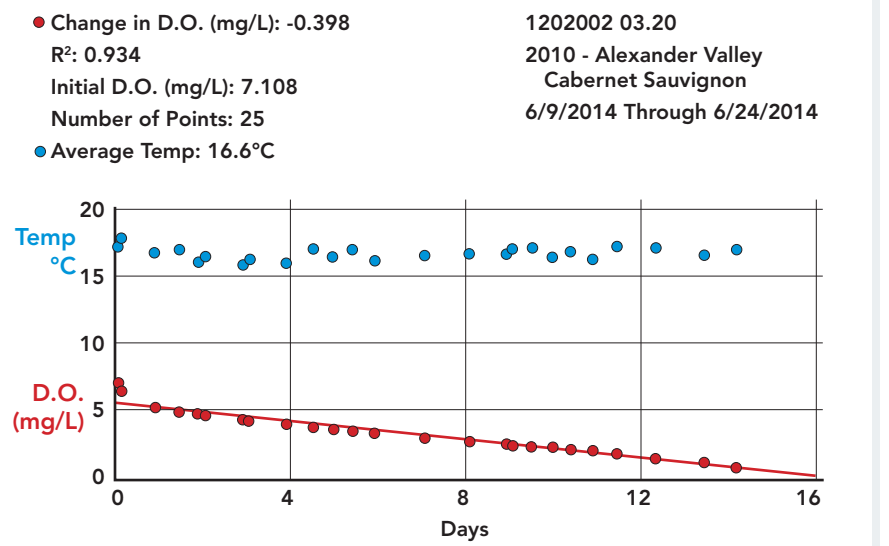
Assessing Reductive Strength

According to winemaker, chemist and author Clark Smith, who has used the NomaSense in his practice for five years, measuring TPO is all well and good but even more relevant is knowing a wine's "appetite for oxygen."

Using the NomaSense, Smith has developed an analysis to determine how robust or fragile a wine is based on how much oxygen it can consume before being at risk for detectable oxidation. He cited an example from a tasting presented at a recent conference that demonstrated the sensory differences that occurred in the same wine with a difference of 2 ppm TPO. Sample 1 was described by tasters as a classic, bright New Zealand Sauvignon Blanc and sample 2 as a fuller-bodied, richer Chardonnay.

"The scenario we see occurring in very reductive wines like the Sauvignon Blanc from this example is a rapid rate of decline in DO, resulting in a fragile wine that has no shelf life." Smith uses the NomaSense to measure a wine's appetite for oxygen by tracking the decline in the rate of its ability to consume oxygen, in effect measuring its reductive strength.

According to Smith, the dissolved oxygen in a delicate Sauvignon Blanc can decline at a rate of 10 ppm per day and reach zero within a few months. "In truth, the wine will have begun oxidizing long before the rate of decline has reached zero," he said.



SOURCE: WINESMITH CONSULTING

Report tracking the rate of decline of DO measured using the NomaSense in an Alexander Valley Cabernet Sauvignon.

Smith noted that different varietal wines have distinctly different oxygen appetites: even a light Pinot Noir can consume 7 mg/L of oxygen per day, while Petite Sirah can consume up to 14 mg/L over a period of 80 days with no adverse effects. "A big wine can gobble up its volume in oxygen and be all the better for it," he said.

In an effort to better manage the effects of dissolved oxygen, Smith developed a chart defining the oxygen appetite ranges for different varieties. He has further refined the procedure for accurately measuring dissolved oxygen using the NomaSense by eliminating the need to open a sealed bottle, which would introduce atmospheric oxygen. "We read the light-sensitive dot that's glued on the inside of the wine bottle (or sight glass) while putting the temperature probe in a bottle of water that's at the same temperature as the wine." For him, it's a nifty workaround that improves accuracy and avoids opening the sample repeatedly. Smith takes several readings, eliminates the outliers and averages the scores to achieve a very low margin of error. "I'm not aware of any better way of doing this type of analysis," said Smith, who charges $100 per 750 ml sample.

Another useful application Smith has found for NomaSense analysis is in determining the viability of older wines. Using a sample drawn from the bottle with a Coravin, Smith inserts the sample into a 30 ml test tube, seals it with a screw cap and uses the NomaSense Piercing System to determine the amount of DO. "From this analysis you can determine if the wine is viable or if it's dead." For collectors and those who invest to drink, this type of analysis can form the basis of purchase decisions.

In addition to identifying fragile or reductive wines, the incentives Smith has identified for determining a wine's oxygen appetite are many. Analysis provides winemakers the insight necessary to anticipate and proactively address any potential problems, guide blending decisions, forecast release dates, predict shelf life and, in relation to managing TPO, guide closure OTR selections. **WBM**

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Technical Spotlight:

Anaba Wines

Custom-built winery aids Anaba Wines' production, sales and succession planning

Stacy Briscoe

LOCALS AND REGULAR TRAVELERS through wine country know it as the busy (and often frustrating) intersection where Highway 121 meets Highway 116. Some know the crossroad for the deli, others for the gas station. So does that make it the best or worst place to own a winery and tasting room? "Both," said Anaba Wines founder and proprietor John Sweazey, who's owned this 16-acre parcel off Bonneau Road since 2006.

In fact, the hustle and bustle of passersby is one factor that attracted Sweazey to the property in the first place. That, and the anabatic winds (also the inspiration for the winery's name) that roll through the Petaluma Gap and down the coastal mountain range that create the backdrop for his Carneros AVA vineyard.

A Dream Deferred

Sweazey's wine story begins in the early 1970s, after he left a three-year job stint as a computer hardware salesman for IBM. Unhappy with a corporate career, he quit, dipped into his savings and spent nearly a year abroad in Europe. Sweazey had already developed an appreciation for wine in college, so he found himself drawn to Old World wine regions during his travels. His appreciation grew into infatuation. Upon his return to the United States, Sweazey began what would become a long-term career in real estate financing, though he never lost the wine bug.

Every summer for the next three years, following his return, Sweazey made it his mission to spend a month in France, where he connected with estate owners who would host him and his soon-to-be-wife. They taught him what

Stacy Briscoe is the assistant editor of *Wine Business Monthly*. She has been writing about wine professionally since 2015, freelancing for multiple publications including The *San Francisco Chronicle*, *Edible Communities* and *Napa Sonoma Magazine*, among others. Outside of wine writing, she also contributes as a freelance editor for the independent publisher She Writes Press. Stacy has a Bachelor of Arts degree in English-language literature from the University of California, Santa Cruz.

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OWNERS/PRINCIPALS

John T. Sweazey, Proprietor

John M. Sweazey, Estate Director

WINEMAKERS

Ross Cobb, Winemaker

Katy Wilson, Winemaker

Ian McClellan, Assistant Winemaker

VINEYARD MANAGEMENT COMPANY

Carneros Vineyard Management

WINERY INFORMATION

Year Bonded 2006

Winery Case Production (under own label) 7,800

Average Bottle Price $40

Direct-to-Consumer Sales 80%

Custom Crush Case Production 7,500

Winery Total Case Production 15,800

VINEYARD INFORMATION

Appellation Los Carneros

Vineyard Acreage 4, J McK Estate Vineyard

Varieties Grown Chardonnay

Additional Varieties Purchased Pinot Noir and numerous Rhone varieties

Vineyard Sourcing

1. Dutton Ranch, Green Valley sub-AVA, Russian River AVA
2. Sangiacomo Family Vineyards, Roberts Road Vineyard, Petaluma Gap AVA
3. Wildcat Mountain Vineyard, Sonoma Coast AVA
4. Las Brisas Vineyard, Los Carneros AVA,
5. Soberanes Vineyard, Santa Lucia Highlands AVA
6. Bismark Vineyard, Moon Mountain District AVA
7. Teldeschi Vineyard Home Ranch, Dry Creek Valley AVA
8. Landa Vineyard, Sonoma Valley AVA
9. Snow Vineyard, Sonoma Valley AVA

Tons Used vs. Tons Sold 100% used

Sustainability Certification In progress

Soil Type Haire clay loam

Climate Sonoma Coast/Carneros

Sustainability Practices Wind and solar power, wastewater treatment, water recycling

BUILDING THE WINERY

Year Built 2019

Size 25,000 square feet

Architect & Contractor Steve Martin and Associates, *smassociates.net*

Interior Design Cadence CXC, *cadencecxc.com*

Landscape Architect MacNair Landscape Architecture, *macnairlandscapes.com*

Cave No

Cellar Humidity Control Yes

WINEMAKING

Wines Made Petite Sirah, Syrah, Picpoul Blanc, Grenache Blanc, Grenache Rosé, Viognier, Grenache, Pinot, Chardonnay, Red Rhône blend, White Rhône Blend, late harvest Viognier, red and white "port style" wines

Vibrating Sorting Table Carlsen & Associates, *carlsenassociates.com*

Destemmer Single roller sorter, ROTOVIB, *rotovib.de*

Tanks 2- to 4-ton stainless steel open-top

Tank Heating/Chilling Systems Glycol

Punch-down Devices A plethora of differently shaped steel objects

Pump-over Devices LOTUS pump-over device

Pumps Positive displacement pumps with Waukesha pump heads; Air diaphragm pumps, Husky and Yamada

Racking Wands Rack-it-teer, *rackitteer.com*

Presses Proprietary basket press, 6-ton Willmes bladder press, *willmes.de*

Forklift Toyota, *toyotaforklift.com*

Barrels
François Frères Tonnellerie, *francoisfreres.com*; Tonnellerie Rousseau, *tonnellerie-rousseau.com*

Barrel Washing System Pressure washer and steamer, Aquatools, *aaquatools.com*

Ozone Yes

Winemaking Management System InnoVint, *innovint.us*

Winemaking Software InnoVint, *innovint.us*

Analytical Equipment DMA 35 digital density measure, Anton Paar, *anton-paar.com*

PACKAGING

Bottling Line Ultima Mobile Bottling Inc., *ultimamobilebottling.com*; Ryan Mobile Bottling, *ryanmobilebottling.com*

Glass Saverglass, *saverglass.com*

Corks M.A. Silva, *masilva.com*, Scott Laboratories, *scottlab.com*

Capsules Scott Laboratories, *scottlab.com*

Label Design Ana Field Creative

anafield.tumblr.com

Case Goods Storage Outside warehouse

POS Software WineDirect, *winedirect.com*

Compliance Software ShipCompliant, *shipcompliant.com*

Website Design Wine Works, *wineworks.co*

Lender/Financial Agency F&M Bank, *fmbonline.com*

PR Agency Studio 707, *Studio-707.com*

ROBERT WILCOX

LEFT TO RIGHT: John M. Sweazey, estate director; Katy Wilson, winemaker; Ross Cobb, winemaker; John T. Sweazey, proprietor

it meant to be a "vintner" and ultimately solidified for Sweazey that this was the lifestyle he wanted to live.

"This was in 1972 and 1973—Napa Valley was coming into its own, becoming a hot topic," Sweazey said. He began taking wine appreciation and winemaking classes through UC Davis, later to make his own wines at home. "When I told my wife I wanted to be a vintner, she gave me that look. You know, that look that wives give their husbands that kind of say 'You're crazy,'" he recalled. But her answer wasn't a hard "no," it was a "let's wait," he said. "She wanted to wait and not have to struggle during the early days. She wanted to wait until the kids' college was paid for…We didn't have any kids at the time. We weren't even married yet," Sweazey said.

But the Sweazey's did marry and have kids. Those kids did go to college. And, as promised, in 2002 when that education was secure, John Sweazey, with the support of his wife, sold his San Francisco-based real estate financing business and began looking for vineyard property in Sonoma, Calif.

"I knew I didn't want to make big Cabs. I always knew I'd make Pinot Noir and Chardonnay," said Sweazey explaining his preference for Sonoma County. Sonoma, long-famed for its cool-climate Chardonnay and Pinot Noir was one point of preference, but so was the familial culture. Sweazey recalled that it was the humble estate owners he met in Burgundy and the Rhône regions that drew him to the winemaking lifestyle. "I would go to these estates and they were all family businesses run by multiple generations. I wanted to paint that picture," he said.

In 2006, when Sweazey finally found his piece of Sonoma property, he knew he located a place he could call home and craft his Burgundian-inspired varieties. It was those anabatic winds, reminiscent of the mistral that defines France's Rhône region, that confirmed his vineyard-purchasing choice. It gave him the confidence that he too could produce elegant Rhône varieties. "My travels inspired this dream. The Sonoma County climate supports such a diversity," Sweazey said.

ROBERT WILCOX

LEFT TO RIGHT: John M. Sweazey, Katy Wilson, John T. Sweazey, Ross Cobb

Playing the Vintner Part

Sweazey bought the land from former owner and winemaker of Castle Vineyards & Winery, Vic Williams, who stayed on as winemaker for the first three vintages. At the time of purchase, the parcel included 4.5 acres planted to Pinot Noir. The business acquisition also included the downtown tasting room, located just off the Sonoma Plaza, where the Roche Winery & Vineyards tasting room is now located.

"We had that tasting room for the first three years, operating as Castle Wines while we were developing the Anaba brand. I hated it. It wasn't our demographic, not our customer base," said Sweazey, who reiterated that it was the atmosphere of the more intimate, family-style wineries he experienced back in France he wanted to create.

Due to the economic downturn of 2008, Sweazey wasn't able to immediately build the estate of his dreams, but that didn't stop him from taking baby steps. The Bonneau Road property also came with a 120-year-old farmhouse that Sweazey decided to transform into the Anaba offices and a modest tasting room. This is where guests have been sipping on Sweazey's wine for the past 10 years, until the 2019 opening of the all-new production and hospitality buildings, designed and built by Steve Martin and Associates.

Sweazey also made changes to the vineyard. In 2010, he decided, with the help of La Prenda Vineyards Management, to replant the original Pinot Noir vineyard with Wente Clone Chardonnay, which he was convinced would be a better fit. Today, the estate is completely planted to Chardonnay. The rest of Anaba's winegrapes are sourced from vineyards throughout the broader Sonoma Coast AVA. "I never wanted to be a farmer. I was always more interested in the 'vintner' part," Sweazey said, who defines the word as a "creator or producer, not just of wine, but the whole wine experience, including the selling."

Sweazey secured some prime fruit sources right away, including from Dutton Ranch's Mills Station Vineyard and Sangiacomo Family Vineyards' Roberts Road Vineyard. "It wasn't too hard back then in 2008," Sweazey said. "We were convinced people would want to work with us. We formed some great relationships and work with the same people every year."

Prior to the new build, winemaking took place in a small, 7,200-square-foot warehouse space on 8th Street East in Sonoma. Sweazey continued to work alongside McWilliams and then hired Jennifer Marion, formerly on the winemaking team at MacRostie Winery & Vineyards, as assistant winemaker and then director of winemaking for Anaba until 2014.

Katy Wilson and Ross Cobb took over winemaking operations after Marion. Sweazey credits much of the expansion of vineyard sourcing to Cobb, whose Sonoma Coast experience spans more than 20 years.

According to Cobb, what drew him to the winemaking vision at Anaba was the opportunity to work with Sonoma Coast Rhône varieties. "We've always known that this area is an outstanding place for Pinot Noir and Chardonnay," he said. "But I've always thought that it's also an outstanding cool Northern Rhône climate here. That's why I wanted to get involved with Anaba. There are so many Pinot and Chard-focused wineries I could have devoted my time on, but I love Rhône varieties—it's what makes us and keeps us more interesting."

Production: Modular, Customizable, Configurable

With the expansion of vineyard sourcing comes the inevitable expansion of case production. Today, Anaba Wines produces 7,800 cases annually with 15 different SKUs under its own label. Additionally, when Cobb and Wilson came on board, they brought their custom crush clients with them, as well as their own labels. Now, Anaba is responsible for 7,500 cases of custom crush wines from six different clients—bringing the winery's total case production to 15,800.

It's no surprise, then, that Anaba outgrew its little 8th Street East warehouse space. In 2018, Sweazey and his team finally broke estate ground for the winery and hospitality center—his ultimate goal.

The new 25,000-square-foot production facility, permitted for a 60,000-case production, was built with movement in mind. "The first thing to look at when designing a winemaking facility is that we need a lot of space so we can move around and lay out barrels and other equipment," Cobb said.

"Everything is very modular, customizable, configurable—that's the theme," added Ian McClellan, assistant winemaker.

The winemaking facility is, in fact, quite spacious in its layout design; the building is split up into five different zones. One of the most important things implemented in each of these zones is the ability to heat or cool down the space, depending on the specific needs of the winemaking production process taking place.

The main tank room is the largest space at 8,500 square feet and certainly the most utilized throughout the year. "If we need to lay out hundreds of barrels for tasting or racking, we can keep that room at a safe temperature for the wine while they exist in that space," McClellan explained. "We're also able

to bring bottling trucks all the way into that room and can set the temperature to about 60° F for bottling in either winter or summer."

The small barrel room (900 square feet) is used for both malolactic fermentation (MLF) as well as aging post-MLF; the middle tank room (2,800 square feet) also serves as a secondary barrel room and provides additional case storage for bottled wines waiting to be shipped; and the main barrel room, used specifically for aging wines, maintains a consistent 55° F and 75 percent humidity, according to McClellan.

But the modular design isn't confined to the architecture of the building, it also translates to the production equipment. The winery is home to 31 2-ton tanks that are easily forklifted and moved under the destemmer, lifted and tilted to transfer fruit into presses, and moved and stacked with pallet jacks. The 25 portable, closed-top tanks, which range from 250 to 750 gallons in size, can also be forklifted and moved around as needed.

"We also have a glycol quick connect station on wheels that can supply up to six portable tanks with hot or cold glycol anywhere we want to place them, without having to run 12 hoses across the floor to the walls," McClellan added.

Winemaking

Grapes are delivered to the 8,700 square-foot loading area, where roll-up doors leading into the production facility are large enough to accommodate trucks filled with fruit. The outdoor area also acts as an exterior storage space for leftover stems and pomace bins. Once inside the production facility, fruit is weighed and grapes that require it are destemmed. "It really depends on the variety, vineyard and vintage as to how much whole cluster we add to the ferment. Our Syrah typically has a whole cluster component every year," Cobb said.

All fruit undergoes primary fermentation in one of the eight 4-ton open-top tanks or smaller 3-ton tanks, depending on the size of the lot. All tanks are outfitted with glycol jackets for heating and cooling.

According to Cobb, winemaking for all red wines is very similar. The grapes are cold soaked between 45° F to 50° F for four to six days, then allowed to come to room temperature naturally. Once the yeast becomes active, the winemaking team begins their pump-over and punch-down routine. Primary fermentation takes about one to two weeks, with combination punch-down and pump-overs taking place one to two times daily, depending on the needs of the specific variety.

Once fermented to dryness, the free-run juices are drained into one of the portable tanks and the remaining is transferred into one of the two 2-ton basket presses. The brands and styles of the basket presses are proprietary, according to Cobb.

Cobb said he prefers to blend the free run and pressed juices immediately, as he finds this helps incorporate body and structure into the wine more effectively. "In my 20 years as a winemaker, I've never kept the press wine separate from free run—and that's for all varieties," he said. "Plus with this basket press, sometimes those press juices are even higher quality than the free run."

Those combined juices settle in tank together for two to three days before moving to barrel. Anaba's wines age in François Ferrer Cooperage and Tonnellerie Rousseau barrels; Cobb said he prefers to use barrels with medium to medium-long toast levels. "I prefer a lighter touch, less caramelized sweetness," he said.

STACY BRISCOE

Anaba uses 2- to 4-ton stainless steel open-top tanks for its program.

Red wine ages between 15 to 18 months in barrel; white wine ages 15 to 16 months in barrel. "The only varieties that are under vintage are the Riesling, Grenache Blanc, Picpoul and Rosé. Those varieties, sometimes they'll stay in all stainless steel. Some may see just a portion of neutral," Cobb explained.

Wines are racked "maybe once or twice" during aging.

Grapes for the white wine program are left whole cluster and fed into the 6-ton Willmes bladder press. Cobb noted that about 90 percent of the white grapes are hand-sorted.

Chardonnay is allowed to go through malolactic fermentation (MLF), but Cobb and his team constantly test the aromas and flavors during the process in order to decide just how much MLF should take place. "We may halt a batch at a certain point with temperature or sulfite," Cobb said. "Then we can always blend it with another lot that went through 100 percent MLF. As long as they're halted, you can blend them at different stages of malolactic."

When it comes to the blending process, Cobb said that he and his team start the discussion in December, as Chardonnays from the previous vintage are typically ready to bottle in February or March, and Pinot Noirs between May and July.

"We like to blend the barrels, get them as close to perfect as we can and rack them off the heavy lees about nine or 10 months before bottling. This allows us to get them closer to the final blend. Then they can settle and sit," Cobb

explained. "We'll still adjust any final tweaks closer to bottling, especially for something like the Sonoma Coast Pinot Noir, which has several components."

Bottling takes place on-site at Anaba Wines using mobile bottling companies Ultima Bottling and Ryan Mobile Bottling. According to Cobb, the winery does not utilize any fining agents.

A Dream Realized

Vineyard property, an estate production facility, a full portfolio of his favorite wines—these things only portray a portion of the picture Sweazey painted for himself back in the 1970s. The last piece of the puzzle: his son, John Michael Sweazey, who decided to join the family business in 2017.

Like his father, John Michael entered the tech business after college, working for the Silicon Valley-based LinkedIn as a software salesman. It was a career, though lucrative, that he couldn't see himself spending the next 20 years of his life in. "I woke up one morning to learn that Microsoft purchased LinkedIn," John Michael said. That was the turning point and John Michael, along with his soon-to-be-wife, quit their jobs and decided to travel.

His tour of Europe was not intended to be wine-centric, but a few chance encounters changed the trajectory of John Michael's trip, and his life.

So, he decided that instead of visiting major cities and ports of call, he would seek out wine regions—specifically smaller wine regions not inundated with American tourists. John Michael called his father, Cobb, a few former interns and other acquaintances he knew had wine industry connections in Europe and mapped out a tour of Old World wine regions. Like his father, he was most inspired by the small estates of the Rhône region.

"We kept meeting multiple generations at once. I'd see the grandfather, the sons or daughters who were now running the estate, little kids running around the property—and this would happen everywhere we'd go," John Michael said. "And I realized that I have an opportunity a lot of other people don't have. I can step in, work with my dad and build something new. I can have input, take a vision and combine it with his."

Today, John Michael is the Anaba Wines estate director, working with Sweazey to realize the vintner vision they each share. Though they say they agree 100 percent on the wines and wine styles, leaving day-to-day operations in the hands of the winemaking team, where they differ is in how to present those wines to the modern market.

"He (Sweazey) had a vision 45 years ago. Times have changed," John Michael said. But, he added, part of his job is figuring out how to mix those two visions together—retain the essence of the Old World family estate, while simultaneously providing the experiences today's consumers are looking for.

"We always want to be wine-centric. But we want to be one of the rare places where it's a super fun place to be and the wines are really good," John Michael said.

The new hospitality center is home to different spaces that cater to different occasions—from a tasting bar, to intimately-sized tables and a dedicated room for larger parties. The space incorporates an indoor-outdoor design with large, floor-to-ceiling windows and doors that look out onto their scenic vineyard view and lead to the outdoor lounge area, complete with a bocce ball court. The father-son-team admitted that bocce was a point of design disagreement, as Sweazey thought it would attract the wrong crowd and detract from the wine education experience. But he has to admit that John Michael was right when he sees the delight of his clientele as they enjoy both the wine and the atmosphere he and his son have created.

There's more to come. New developments in the works at Anaba Wines include new plantings of Picpoul Blanc and, potentially (if John Michael can convince his dad), a paddle tennis court. **WBM**

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Montana Wine Industry Starts its Expansion

Efforts underway to increase production in the Big Sky state

Michael L. White

Michael L. White retired from Iowa State University Extension & Outreach on July 1, 2019. He served as their viticulture specialist and worked closely with ISU MWGWII.

IN MARCH 2019, I was invited to represent Iowa State University's Midwest Grape & Wine Industry Institute (MGWII) at the Montana Grape and Winery Association's (MTGWA) fifth annual convention. Growers and winemakers in Montana wanted to learn how the winegrape industry in Iowa had grown so rapidly over the past 20 years and gain insight on methods they could use to grow their own state's industry.

The three-day convention in Helena, Montana, started out on March 21 with a wine social; and as part of the evening's event, MTGWA members and the legislators were invited to participate in the "People's Choice" wine competition, a blind tasting and judging of both amateur and commercial Montana-made wines.

Some of the Best of Class wines included:

Mead—Hidden Legend Winery, Victor (Ken Schultz, winemaker)

Naughty Nectarine Peach (blended fruit wine)—Flathead Lake Winery, Polson(Larry Robertson, winemaker)

Haskap (fruit wine)—Tongue River Winery, Miles City (Josh Thaden, winemaker)

Perfect Kiss (semi-sweet hybrid blend)—Tongue River Winery, Miles City (Josh Thaden, winemaker)

Petite Pearl (dry red)—North Slope Vineyard, Billings (Sam Bergman, amateur winemaker)

MICHAEL L. WHITE

Members of the Montana Grape and Winery Association and state legislators participated in a blind tasting of amateur and commercial wines during the People's Choice Wine Competition.

The agenda for the next two days consisted of talks given by a number of speakers from around the United States: Tom Plocher, Minnesota grape breeder; Dr. Terry Bradshaw, research assistant professor at the University of Vermont; Michael Jones, fermentation specialist, Scott Labs; Larry Robertson, MTGWA research liaison and owner of Flathead Lake Winery; and Brian McGuire, co-owner and manager of Willow Mountain Winery, Corvallis.

At Friday's evening banquet, Ben Thomas, director of the Montana Department of Agriculture, spoke about the wine tasting he had attended the night before. In his speech, he commented that the tasting reaffirmed the fact that Montana wines are very good and there is positive movement within the industry. He also said that he thinks the Department of Agriculture "needs to get involved and help the Montana wine industry grow."

Bob and Marilyn Thaden, owners of Tongue River Winery in Miles City, and their son Josh Thaden, the winery's primary winemaker, received the Dedication and Service Award for their time spent in the Montana wine industry. The Thadens started their winegrape vineyard in 2004, opened Tongue River Winery in 2010 and the winery is now the largest in Montana, making wine from local fruit. Bob Thaden has been doing all he can to help both the North Dakota and Montana native wine industries grow for many years. He has been a member of the North Dakota Grape and Wine Association for 10 years and was a founding member of the MTGWA. Currently, he is on the boards of both organizations.

Montana's Developing Wine Industry

The entire Upper Midwest winegrape industry, centered around cold- and disease-tolerant hybrid winegrapes, has grown exponentially over the last 20 years. At the center of this growth are those varieties developed at the University of Minnesota, Cornell University in New York and by a few private breeders, such as Tom Plocher in Minnesota and Ed Swanson in Nebraska. North Dakota is a newcomer onto this scene with the 2011 establishment of the North Dakota Cold Hardy Grape Initiative, a germplasm enhancement program at North Dakota State University aimed at developing grapes suitable for cold-climate environments, such as are found in North Dakota, Montana, Manitoba and Saskatchewan.

According to Dr. Harlene Hatterman-Valenti, professor of high value crop production at North Dakota State University and director of the North Dakota Cold Hardy Grape Initiative, it normally takes 10 to 15 years of breeding before a program, like the one in North Dakota, can release new cultivars. As a result, it will probably be another two to seven years before the North Dakota program has new varieties available for growers to test.

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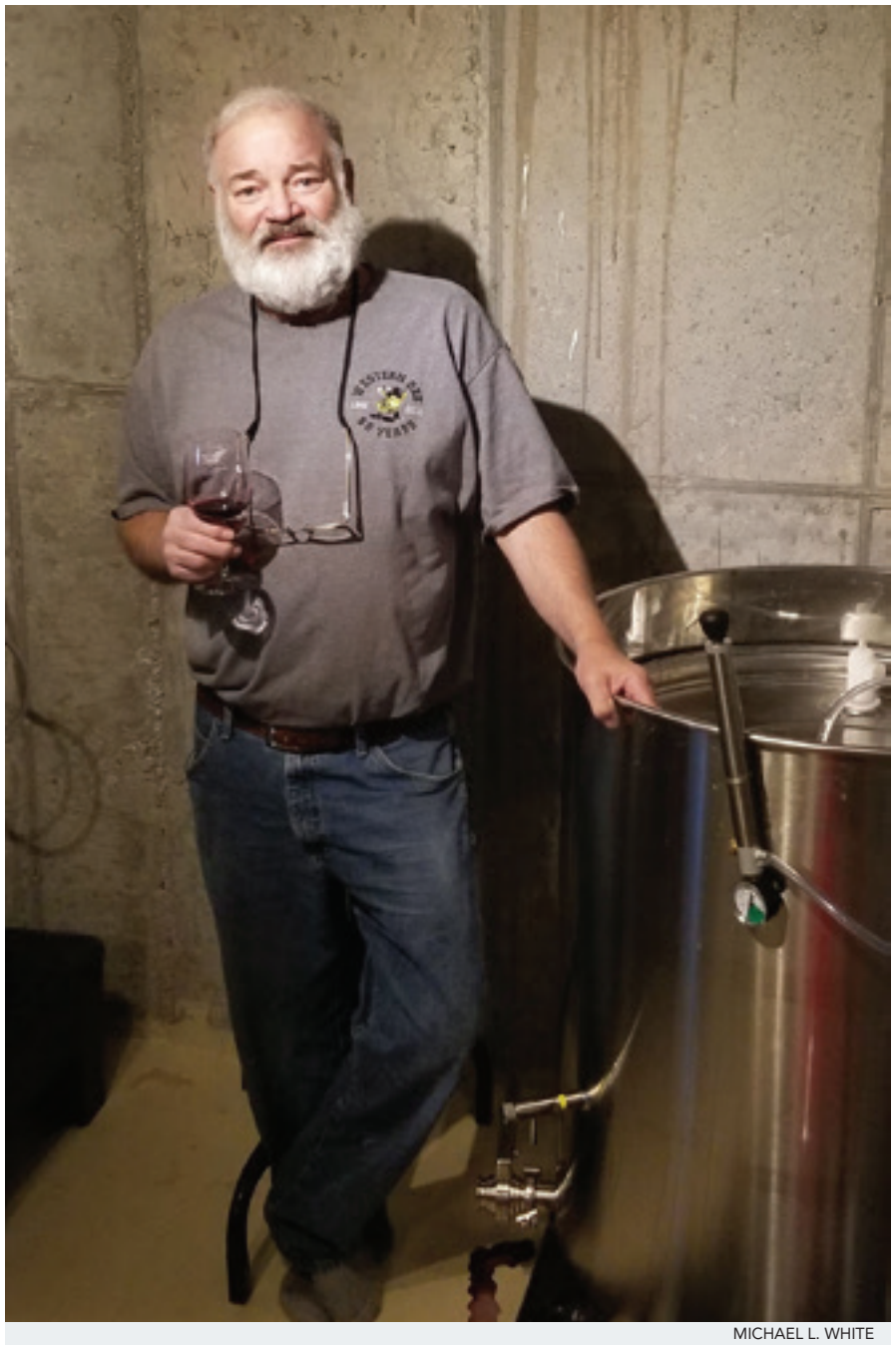

MICHAEL L. WHITE

Larry Robertson beside a tank of Petite Pearl wine.

There are now 18 operating wineries in Montana, and about one-third of these wineries are making wine from local fruit. The other wineries bring in *vinifera* grapes and juice from out of state. Several vineyard owners commented that they have tried to grow *vinifera* cultivars in Montana, but these grapes often fail to ripen or are winter-killed. Consequently, they now bring in *vinifera* juice, often from the West Coast, and the movement to plant more cold-hardy hybrids has increased.

A 2017 survey showed that Montana is home to approximately 44 small winegrape vineyards, with a total of about 50 to 60 acres. The president of the MTGWA, Rich Torquemada, said that Montanans value their privacy, so not everyone participated in the survey. He thinks that there are about 60 vineyards today, with about half of the newly planted vineyards not yet producing. More vineyards and vines were planted in spring 2019 to varieties such as Marquette, Frontenac, Frontenac Gris, Léon Millot, Maréchal Foch, Petite Pearl, Verona, Crimson Pearl, Frontenac Blanc, St. Pepin and LaCrescent.

Most vineyards are in the western part of the state. Many are near Flathead Lake, a 197-square-mile freshwater lake known for its clean water and trout fishing. Located about 30 miles south of Glacier National Park, the region attracts many tourists. With an average depth of around 165 feet, the lake

For the past 20 years, I have watched the cold-climate winegrape industry expand in all the Upper Midwest states. When a few good producers deliver high-quality wine from well-grown winegrapes, the rest of the industry starts to step up. The Montana cold-climate winegrape industry has been simmering for the last five years, and I believe production in the state is about to expand rapidly.

Here are some of the attributes I think will fuel this expansion:

1. A semi-arid climate that deters fungus diseases.
2. Excellent water resources for irrigation.
3. A variety of well-drained mineral soil associations well adapted to cold-climate hybrid winegrapes.
4. Overall growing season temperatures and length similar to much of the North Central states where cold-climate hybrid winegrapes flourish.
5. A variety of micro-climates that provide those warm days and cool nights that enhance the production of intense flavor compounds.
6. A strong national and international tourism industry.
7. A deep basket of cold-climate hybrid winegrape cultivars available now, with more to come.

– Michael L. White

moderates the climate, allowing vineyards, as well as cherry and other fruit orchards, to thrive. There may be an effort to make this area an American Viticultural Area in the near future.

Some very high-quality fruit wines are made in Montana. Apple, huckleberry, haskap, cherry, blackberry, currant and plum wines are some of the most notable from the state. Montana is second only to North Dakota in honey production, providing a source for a plentiful mead industry—melomels in particular.

Larry Robertson, owner of Flathead Lake Winery, recently retired from the USDA Natural Resource Conservation Service and has been a major advocate and mentor for those planting winegrapes in Montana. He is one of the founding members of MTGWA and serves on the board. He continues to provide the industry with technical assistance and participates in lobbying and networking efforts to expand the winegrape industry. His efforts, along with those of the rest of the MTGWA, are starting to pay off.

Robertson's 1-acre vineyard next to Flathead Lake is planted with Marquette, Petite Pearl, Verona, Crimson Pearl and several of Tom Plocher's unreleased cultivars. He opened his Flathead Lake Winery for sales in Sept. 2019.

Conclusion

New and improved cold-climate winegrape cultivars over the last 20-plus years have ignited an immense growth of local vineyards and wineries across the cold-climate states. Montana, with its mineral soils, dry climate, scenic views and many microclimates, is beginning to see the growth in its local wine industry. It takes some time to get all the major players—growers, winemakers, government, universities and the wine buying public—on board, but I believe that Montana now has all these players on its team. Their local cold-climate winegrape industry should grow dramatically over the next decade. **WBM**

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World of Pinot Noir

Winemaker Trials

Scheid Family Wines Experiments with In-Vineyard Fermentation of Pinot Noir

Editor's Note: At the time of this interview, the experiment was in its early stages. The answers published here are a reflection of an in-progress trial.

Stacy Briscoe

Stacy Briscoe is the assistant editor of *Wine Business Monthly*. She has been writing about wine professionally since 2015, freelancing for multiple publications including The *San Francisco Chronicle*, *Edible Communities* and *Napa Sonoma Magazine*, among others. Outside of wine writing, she also contributes as a freelance editor for the independent publisher She Writes Press. Stacy has a Bachelor of Arts degree in English-language literature from the University of California, Santa Cruz.

CASEY DI CESARE ATTENDED the University of California, Los Angeles and majored in political science. His career in wine began at Cinquain Cellars in Paso Robles, Calif., where he worked weekends. Di Cesare went on to earn his master's degree in enology from Cornell University in the Finger Lakes AVA, under advisor Dr. Gavin Sacks. He returned to California in Jan. 2017 and took a job at Scheid Family Wines as the assistant winemaker/enologist. He designs and executes all experimental wine trials (of which there are many), as well as implements and assesses new lab procedures.

Casey Di Cesare

TRIAL OBJECTIVE: To observe the effects of non-*Saccharomyces* native yeast application during an in-vineyard fermentation.

TRIAL DESCRIPTION: Post-harvest, a portion of a block of Pinot Noir from the Scheid Family Wine's Riverview Vineyard was left in the vineyard to ferment with native yeast in a refrigerated trailer. The rest of that same block was processed in the winery with house yeast. Each batch received the same punch-down routine and additives throughout the process.

Lot 1: Riverview Vineyard Pinot Noir, fermented in-vineyard with native, non-*Saccharomyces* yeast

Lot 2: Riverview Vineyard Pinot Noir, fermented in-house with traditional *Saccharomyces* yeast culture

Winemaker Progress Report

Why is in-vineyard fermentation of interest to you?

Di Cesare: This project began because we wanted to preserve the intrinsic character and truly show the terroir from our Riverview Vineyard. We also want to better understand native fermentations, along with the potential byproducts of incorporating non-*Saccharomyces* yeasts at the start of fermentation. We felt minimalistic winemaking and native fermentation would help us achieve these goals. Recent research has concluded that native yeast fermentations at established wineries that have used commercial yeasts aren't necessarily native because the native microflora found in the vineyard can be flushed by commercial inoculum in the winery from previous harvests. To ensure that our fermentations weren't influenced by established, in-winery commercial strains, we set up a refrigerated trailer in our Riverview Vineyard to receive and process the fruit directly.

Native yeast fermentations encourage non-*Saccharomyces* yeast to initiate fermentations and give them a chance to impart beneficial byproducts, such as mannoproteins, polysaccharides, glycerol and precursors to fruit aroma compounds. Depending on the non-*Saccharomyces* strain, they usually don't survive past 5 to 10 percent alcohol, at which point *Saccharomyces* must take over fermentation. There is also a risk of certain non-*Saccharomyces* yeast and other bacteria in the vineyard creating off-aromas. We wanted to see if our wines could benefit from the character of non-*Saccharomyces* yeast and mitigate the risks of off-aromas.

Why did you decide to try this with Pinot Noir?

Di Cesare: We found a lot of success doing in-vineyard fermentations with our Chardonnay. Each fermentation from the past two vintages had a unique makeup of yeasts that achieved dryness. The native fermentations added a level of complexity and uniqueness to our Chardonnay that we really loved, so we wanted to see if we could capture some of that magic with our Pinot Noir grown on the same site. Logistically, it also worked out great this harvest as our Pinot Noir ripened a few weeks earlier than our Chardonnay. This allowed us to, in theory, complete our Pinot Noir fermentations before transitioning to Chardonnay.

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Week of August 6	All Regions	ROC Report released for Aroma Modification Enzyme Applications trial
Week of December 3	All Regions	ROC Reports released for Cap Management and Color Enzymes trials

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Thus far, are there any notable differences between how the two varieties are reacting during the fermentation process? Any similarities?

Di Cesare: So far, the Pinot Noir fermentation is much faster than the Chardonnay. The Pinot Noir appears to reach dryness in about 10 days when our Chardonnay from the past two vintages took, on average, anywhere from three to six weeks to ferment. We even had one outlier fermentation that took nearly four months to achieve dryness. We find our native fermentations give the wines weight with a round mid palate, coupled with higher levels of minerality and salinity. Although it is still early with the Pinot Noir, we have found some of those same characteristics shining through.

How do you plan to collect data?

Di Cesare: We are tracking fermentation kinetics, as well as doing Variable Number Tandem Repeat (VNTR) Analysis during the start, middle and end of fermentation to gain an understanding of what microbes are doing the fermentation.

Have there been any complications during the trial process so far? Are there any issues you're trying to avoid?

Di Cesare: So far so good! There is always a risk of increased volatile acidity (VA) as well as stuck fermentations when using native yeast, but for now the fermentation has been going smoothly and has been tracking well. If the rate of fermentation continues as expected, and no off-aromas are detected, then we will not need to mitigate. If the fermentation slows, we will start tracking VA daily and potentially bring the must back to Scheid and inoculate if needed.

Do you/your colleagues have any predictions about the conclusion of this trial? Are there have any results you'd like to see?

Di Cesare: From the team's experience with native fermentations, predictions range from hot and fast to slow and sluggish. There is a consensus that the native wines will make a differentiated product from our other fermentations. We hope that we have a slow start in order to get an ambient soak with non-*Saccharomyces* initiating fermentation and then a steady march to the finish with native *Saccharomyces*. Overall, we expect an increased understanding of our Riverview Vineyard, native fermentations and maybe a bit of "noble funk" to help create a distinguished product. We would love to see if the fermentation in the vineyard is completed by non-commercial yeasts native to our site!

Based on the results of the in-vineyard fermentation of Chardonnay, did you actually change any of your white winemaking routines?

Di Cesare: Yes, with the success of our first two vintages in the vineyard, we have begun to incorporate some native fermentations at Scheid, as well as bring in commercial non-*Saccharomyces* yeast. We have found native yeast and non-*Saccharomyces* yeast can add an extra level of complexity and bring a unique component to the resulting wines. Both vintages of native in-vineyard fermentations of Chardonnay have become a main component in our Metz Road Chardonnay—our small-lot, single-vineyard brand named after the road that runs alongside our Riverview Vineyard. We are looking to potentially bottle our in-vineyard fermentations individually in the future.

Based on the results of the in-vineyard fermentation of Pinot Noir, do you foresee any changes to your red winemaking processes?

Di Cesare: We will see! We will evaluate all aspects of the fermentation and, ultimately, the finished wine. If the resulting wine is of higher quality or brings a desired character, we will consider bringing more native yeast into our larger production. We have begun to experiment in the winery with commercial non-*Saccharomyces* mixed yeast, non-*Saccharomyces* yeast and native fermentations in the winery to see if we can emulate what we predict would happen out in the vineyard. I foresee a mixture of these practices to continue to be evaluated alongside our traditional practices.

Though the Pinot Noir is currently fermenting, what kind of data have you collected and what have you learned?

Di Cesare: So far, we have core juice analysis, fermentation curves and are waiting for the results from our VNTR samples. I was expecting, at the start of fermentation, to potentially pick up more off-aromas—VA and ethyl acetate—but so far, so good. We had a nice period of ambient soak with a cap forming on the third day of fermentation. Punch-downs have been easy, and the fermentation has not been very vigorous, just chugging along.

Do you think you'll repeat this trial with Pinot Noir again as you repeated with Chardonnay? Would you consider running the experiment on a third grape variety?

Di Cesare: Yes, we will run this trial again. We learned a lot from year one to year two with the Chardonnay, and I look forward to learning more from our repeats of this trial. Each year brings a potentially different microflora, so it will be interesting to see what differences we get from vintage to vintage.

We are always open to trying these techniques with more varieties. Last year we did a native fermentation at Scheid with Sauvignon Blanc that was bottled on its own as Scheid Vineyards Reserve Sauvignon Blanc. We will see if another trial pops up in another one of our vineyards soon!

Doing trials like this can be a large investment by a winery in time and capital. Continuous improvement and innovation are two of our core values at Scheid Family Wines. We find great value in doing trials on a production scale in order to learn more about our vineyards and winemaking. Not every trial is a success, but we always learn something. We have 4,000 acres and 12 unique vineyard sites along a 70-mile stretch of Monterey County, and based on the results of this and previous trials, going native looks to be another winemaking tool to use to express our distinctive terroir. **WBM**

Vineyard Mechanization:
Economics and Reality

Balancing economics against practicality and perception for high-end wine growing

Mark Greenspan

Dr. **Mark Greenspan** has more than a quarter-century of scientific viticulture research and viticultural field experience. He specializes in irrigation and nutrition management, yield and canopy management, vineyard climate and microclimate, vineyard design and vineyard technology. He is the founder of Advanced Viticulture, Inc. based in Windsor, California (*www.advancedvit.com*), providing consulting, technology, vineyard management and vineyard development for wineries, winemakers and wine growers devoted to producing premium wines. Please direct queries to *mark@advancedvit.com* or 707-838-3805.

EVERYONE ASSOCIATED WITH THE wine industry knows that labor has become more expensive, and it seems that wages are accelerating upward. The pool of largely unskilled or untrained labor is drying up, while those who remain available want more money for their work—and are getting it. Hence, there is absolutely no doubt that vineyards will increasingly adopt mechanical means to replace operations traditionally done by hand. Fortunately, necessity drives invention and innovation, and there are better versions of vineyard machines available all the time. Buying this equipment requires a significant cash investment, so growers will be willing to do so only when the return on the investment makes good business sense. But it is a little more complicated than simply substituting a machine for a human, especially in the fine-wine production sector. We have convinced ourselves that hand-farming is better than machine-farming, and wineries and winemakers are often reluctant to yield to the growing need for mechanization. In some cases, this is justified, but in others, it's not.

In June 2019, the Oregon Wine Research Institute (OWRI) hosted a webinar featuring Clark Seavert, professor of applied economics at Oregon State University. Seavert conducted a study on the economic benefits of replacing farm labor with mechanical methods. He did his studies on real vineyards, with real equipment and with real numbers, using Pacific Northwest regional vineyards. His labor rates seemed a bit higher than ours in California, but not all that different; he also seemed to use reasonable assumptions of future overhead costs and wage projections. Of course he did—he's an economist. Though he targeted Oregon and Washington vineyards for his study, I found his study to be well thought-out, and his results can readily be applied to vineyards in California.

One thing I appreciated is that he used four different vineyard size scales: 20- and 40-acre vineyards in Oregon and 100- and 500-acre vineyards in Washington. For all but the 500-acre vineyard, the study had the participating grower purchase add-ons to be used with existing tractors, including a harvester. For the 500-acre vineyard, however, a harvester was purchased from Pellenc Americas, Inc. for harvest and some of the other mechanical operations. The results are quite detailed, and so I will not cover each and every outcome here. I urge you to take a half-hour of your time and view the webinar that is available online.[1]

Pre-pruning

Cane-pruning was looked at for the two Oregon vineyards, as it is a common practice in northwestern Oregon. Seavert found that pre-pruning machines did not present a savings over hand work for cane-pruning. I might suggest that this is because cane-pruning using a pre-pruning machine is not really machine pre-pruning. Rather, hand-pruners must go through and make the main cuts to the vines, and the pre-pruner serves as no more than a brush puller and chipper. While pulling brush is slow, the fact that cane-pruned vines cannot be truly pre-pruned results in no savings. It actually ends up being more costly than traditional methods.

On the other hand, pre-pruning is quite possible and feasible with cordon-trained, spur-pruned vineyards. Trimming canes to long spurs is rather easy to do and has the added benefit of making the final pruning pass using hand labor quick and, therefore, inexpensive. The late pruning has been shown to reduce susceptibility to trunk fungal pathogen infections. There was a small benefit to even the 20-acre vineyard, with a savings of about $140 per acre, per year. There was a 10.9-year payback on the equipment for this small vineyard, which casts doubt on its benefit. However, jumping to only a 40 acre vineyard reduced the payback on the equipment purchase to just 3.7 years. Of course, pre-pruning larger vineyards makes even more sense, with payback periods on the equipment at one year and a cost saving on the order of $400 per acre, per year.

There is really no downside to pre-pruning spur-pruned vineyards because there is absolutely no downside to wine quality, and there is a disease management benefit. It's not a slam-dunk, however, in wet climates like northwest Oregon or California's North Coast. Climates like these have wet conditions in late fall and winter, so getting a tractor, especially a wheel tractor, into many vineyards can be difficult, if not detrimental, to the vineyard. This can sometimes be remedied with crawler tractors, but driving any tractor in wet conditions and clay-based soils might nevertheless be inadvisable. On the other hand, drier climates, like those found in eastern Washington, southern and eastern Oregon, as well as the Central Coast and Central Valley of California, are perfectly amenable for pre-pruning.

1. *https://media.oregonstate.edu/media/t/1_twc0q2zw*

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Suckering and Shoot-Thinning

These two practices were grouped together in the study, but they are quite different practices. Suckering is relatively mindless and requires the removal of trunk, crown and head suckers. This often requires no more than a gloved hand wiping off the suckers, so its mechanization can be done easily with nylon brushes. Cordon-suckering is more demanding, as one must discern suckers from desired shoots. Likewise, shoot-thinning, or removal of the undesired shoots (not necessarily suckers), requires skill that is difficult to replicate by machine. Current suckering machines consist of flexible paddles that brush off shoots at intervals, depending on the rotational speed of the paddle rotor, as well as the translational speed of the tractor they are mounted on. Those suckering tools are fine for fully mechanized vineyards, or at least those that have been fully machine-pruned. But hand-pruned vineyards are unlikely to adopt the mechanical suckering implement anytime soon.

In fact, suckering and shoot thinning provided the least attractive payback of all those studied. Seavert found a 25-year payback on suckering/shoot thinning for a 20-acre vineyard and a 6.2-year payback for a 40-acre vineyard and for a 100-acre vineyard. The payback interval was less than a year for the 500-acre vineyard, though the costs saved were modest—mainly because the larger vineyards do not typically shoot-thin their vineyards. Personally, I see a reasonable attraction to machine-suckering, as it is relatively easy to do, and the machines are inexpensive. Shoot thinning is a painstaking process requiring great skill. For high-end vineyards, I don't see a rush into mechanical shoot thinning, and the study shows that this category is only of marginal benefit anyway. That said, there will be a point when skilled labor is so expensive that even shoot thinning may be adopted by high-end vineyards. I just don't see that happening in the foreseeable future.

SCOTT SUMMERS

Leaf Pulling

Here is a practice that could make a lot of sense to mechanize, even though our thoughts about leaf removal shifts from year to year. We shudder at the thought of fully exposed fruit on a scorching hot day or during an excessively warm growing season, but we shudder just as hard when our fruit becomes infested with mildew due to insufficient light getting into the fruit zone. A lot of us are moving to very selective leaf removal now, removing only modest amounts of leaves and laterals, sometimes leaving "umbrellas" over the fruit or "tunneling" out leaves from the interior of the canopy. While leaf removal machines are continually improving, most cannot produce the finessed leaf removal that we require in some of our vineyards. But most vineyards are not farmed with such finesse, and mechanical leaf removal provides an excellent replacement for hand labor. New machines can produce a fruit zone that looks almost identical to a hand-pulled job, with little leaf residue and minimal damage to berries.

Seavert found good savings enjoyed by mechanical leaf removal. Even for small vineyards, the savings ranged between $250 and $275 per acre, per year. Payback interval on the machines was between three and five years, with smaller intervals for the larger vineyards. But for the 100-acre vineyard, the payback was reduced to only 1.5 years and for the 500-acre vineyard only 0.3 years. For those Washington vineyards, the savings was smaller, at about $200 per acre, per year—but still seemingly worthwhile.

Aside from its more brute-force leaf removal, mechanical leaf removal provides the benefit of getting the job done in a timely manner. As leaf removal is usually conducted during the time of year when shoot thinning and other canopy management is also in high gear, oftentimes labor is in temporarily short supply. Delaying leaf removal can result in disease, high pyrazine levels and poor light- and heat-acclimated fruit, so the benefits of mechanical leaf pulling may be greater than the labor savings alone.

SCOTT SUMMERS

Harvest

The mechanization first widely adopted by high-end growers and wineries, mechanical harvesting is no longer only for production growers. Seavert's study found the greatest savings in mechanical harvesting, which is not a surprise to me. For even the smallest vineyard there was a savings of about $775 per acre, per year, and as much as about $1,300 per acre, per year for the second-smallest vineyard studied. Payback on the machinery was a long 13.5 years for the 20-acre vineyard but only four years for the 40-acre vineyard, and just under two years for the 100-acre vineyard. The largest vineyard, the 500-acre vineyard, saw paybeck in less than one year, even for the larger, over-the-row Pellenc machine it utilized. A savings between $1,100 and $1,200 per acre per year was realized for the larger vineyards, which is nothing to sneeze at.

We still find some winemakers resist machine harvesting. While I can understand their reluctance to mechanically harvest varieties, like Pinot Noir, Zinfandel and Chardonnay, why there is reluctance to machine-pick Bordeaux varieties boggles my mind. Those varieties pick well without extensive juicing and skin breakdown, and destemming them in the vineyard provides one less source of vegginess to the wines. There is no doubt that more wineries and winemakers (as well as growers) will get on board with machine-harvesting and will plan vineyards with that in mind from the beginning.

Overall, Seavert found a 1.5 year payback on the machines purchased for the vineyards under study that were 100 acres or less. For the 500-acre vineyard, the payback period was less than one year. I find that to be astounding and compelling and a motivation to acquire some or all of these tools. While the slightly lower labor costs in California would make these numbers a little less attractive, they're not that far off as to change the decisions.

They have put together an online tool at *www.agbizlogic.com*. Their tool is intended to aid growers in determining if some of these mechanization practices should be adopted into their own operations by plugging their own numbers into the economic model. I suggest taking a look at it. **WBM**

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Case Study:

Pacific Coast Farming Uses SIP-Certified Practices

Reducing environmental impact and creating healthy vines

Craig Macmillan, Hunter Francis and Mike Lynch

Craig Macmillan, Ph.D. is a wine industry educator and consultant. Previously, he was technical program manager for the Vineyard Team in Atascadero, Calif., where he shared 25 years of experience in viticultural research, education and farming.

Hunter Francis is founder/director of the Center for Sustainability, College of Agriculture, Food & Environmental Sciences, California Polytechnic State University, San Luis Obispo, Calif., and serves as a part-time lecturer.

Mike Lynch is a partner in Big Bang Wine, a public relations and marketing agency dedicated to the wine industry, based in San Francisco, Calif.

ERIN AMARAL HAS USED Sustainable in Practice-certified (SIP) viticultural practices at the Paragon Vineyard (approximately 700 acres) in the Edna Valley AVA for 12 years. She works for Pacific Coast Farming, a vineyard management and development company that oversees more than 1,500 acres in the Edna Valley region of San Luis Obispo County, Calif.

Amaral grew up on a farm in Crows Landing, Calif. and earned a Bachelor of Science degree in plant protection science with a focus on viticulture from California Polytechnic State University, San Luis Obispo.

Paragon Vineyard, owned by Niven Family Wine Estate, is a cool-climate site located 5.4 miles east of the Pacific Ocean. Chardonnay, Pinot Noir, Syrah, Sauvignon Blanc, Albariño, Pinot Gris, Grenache Blanc and Grüner Veltliner vines have historically provided fruit for wines such brands as Baileyana, Tangent, True Myth and Zocker, as well as winery grape buyers.

Below are some of Amaral's solutions to common viticultural challenges, including irrigation, nutrients, erosion, cover crops, canopy management, trellising, bird management, mildew, mealybugs, Red Blotch and weeds. By using SIP-Certified practices, she feels that Paragon Vineyard can enhance vine health, grape quality and the integrity of the local ecosystem.

KRIS BEAL

Erin Amaral oversees more than 1,500 acres in Edna Valley.

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Sustainability in Practice (SIP) Certified is one of the wine industry's oldest sustainability programs and utilizes a block-to-bottle, integrated approach to management, enabling grape growers, wineries and winemakers to preserve the environment and protect human resources. SIP Certified has strict, non-negotiable requirements and standards based on science, expert input, independent verification, transparency and the absence of conflict of interest.

SIP Certified launched its pilot program in 2008 with 3,700 acres of vines between Monterey and Santa Barbara counties. Today, there are 43,600 acres of vines in California and Michigan, two wineries and more than 40 million bottles of wine that have been SIP Certified.

In January 2020, WX Brands bought the four Niven Family brands: True Myth, Zocker, Baileyana and Tangent. When the Niven Family Wine Estate owned the brands, they incorporated their sustainable certification throughout their branding—from websites to sell sheets. They were one of the first to certify wines in 2008. Of the 40 million bottles certified with the SIP Certified logo, nearly 8 million have come from Niven labels.

Irrigation

One challenge for Central Coast agriculture in recent years has been water quality. Relatively low rainfall, coupled with intensive agricultural practices, has resulted in the build-up of nitrates in groundwater, which has then led to more stringent water quality regulations.

To assist growers in water protection efforts, SIP Certified requires growers to complete a nutrient budget that accounts for nitrates in irrigation water, plus those added as fertilizer and/or contributed by compost.

For the past four years, Amaral has used sensors from Tule Technologies to help determine seasonal irrigation requirements at Paragon Vineyard. These sensors measure the total evapotranspiration of a field that includes any vegetative ground cover and vine canopy growth. The tool generates weekly irrigation recommendations based on pre-set canopy and fruit development goals. This technology has been a key component in saving water in blocks with quadrilateral trellis systems, yielding as much as a 40 percent reduction in some blocks and fostering better balanced vines.

Another important factor in conserving water is to select clones and rootstocks that require little or no irrigation. For example, Paragon Vineyard selected a Syrah clone that is primarily planted on 101-14 rootstock. With the vineyard's clay soils and cool climate, the canopies tend to be quite vigorous and do not need irrigation. Paragon's Chardonnay is primarily planted on 1103 Paulsen (1103P) rootstock, which is water-efficient in clay soils and has a low nitrogen requirement.

TULE TECHNOLOGIES

One of 10 Tule sensors at Paragon Vineyard that provide measurements of vineyard water use, vineyard water stress, applied irrigation and irrigation recommendations.

Nutrients

Soil analyses are conducted to monitor soil nutrient status both pre- and post-planting to ensure that fertilizers are only applied to meet vine requirements. Soil samples are taken from 12-inch and 24-inch depths, or within each distinct soil horizon down to 36 inches during pre-plant investigation.

After planting, soils are sampled at a depth of 12 inches every three to five years. Vine nutritional status is monitored with leaf blade and petiole analysis from samples taken at bloom. Information from annual tissue analysis and semi-annual soil analysis is used to calculate macro- and micro-nutrient fertilizer requirements to achieve healthy vines.

KRIS BEAL

Dwarf cover crop mix in the vine row includes Dundale peas and UC142 oats.

Erosion and Cover Crops

SIP Certified requires an erosion control plan to be put in place to foster best management practices and minimize off-site movement of soil. To facilitate this requirement, cover crops are seeded in tractor rows, and filter strips of natural vegetation grow beyond the vine row end posts. Sensitive areas are planted with a blend of seeds to protect them from erosion during the winter months. Cooler spring conditions warrant the need for early mowing as a form of passive frost protection in the tractor rows. This has led to seeding dwarf cover crop mixes, including UC937 barley, Dundale peas and UC142 oats.

To maintain cover crops in tractor rows during the growing season, it is common to combine tractor jobs to minimize vineyard passes. A Radius weed knife from Clemens Vineyard Equipment is used, which is mid-mounted on a tractor with a mower or chisel on the rear of the tractor. This helps reduce compaction and fossil fuel consumption. When ripping alternate tractor rows every year after harvest, a yeoman's plow is used that only penetrates up to 18 inches and is less disruptive to the soil profile. Amaral finds the yeoman's plow is good for the heavy soils found in the area, Cropley clays, Los Osos Diablo Complex, Diablo clays and Tierra sandy loams.

KRIS BEAL

A 7-foot wide Farmax rotary spader operating at a ground speed of 2 to 3 mph and a depth of 12 inches is used in lieu of one or two disking passes, greatly decreasing soil compaction by a reduction in passes. The spader's action breaks up pre-existing, compacted soil to the working depth.

Canopy

Vine canopy is managed to increase light penetration, air flow and improve spray coverage. The primary trellis is vertical shoot positioned (VSP). Canopy management operations include shoot-thinning, shoot-positioning, wire moving, leaf removal and hedging. Older blocks have traditionally been spur-pruned, but newer blocks are cane-pruned to achieve better bud fruitfulness.

An early spring shoot-thinning pass around the crown increases light infiltration and pushes healthy growth for next year's cane selections. After fruit set, a manual basal leaf removal pass exposes clusters early to sunlight and air movement in all grape varieties. This improves fungicide penetration and disease prevention. A second leaf removal pass is done on the Sauvignon Blanc 10 to 14 days prior to harvest to help reduce any methoxypyrazine character in the grapes.

Trellising

Chardonnay and Pinot Noir are primarily cane-pruned on a VSP trellis system to achieve proper balance of vine vigor with crop load and improve bud fruitfulness in the cool climate of the Edna Valley. The height of the trellis is sized to grow a taller, balanced vine canopy panel that captures enough light for photosynthesis without having to be hedged to control vigor. The Chardonnay cordon height is approximately 28 to 30 inches above ground, with the top of the stake reaching 70 to 72 inches. Pinot Noir is similar, with the cordon height at approximately 32 inches above ground and the top of the stake at 72 inches.

Leaves are removed around the sides of the clusters, leaving a slight umbrella on top to avoid over-exposing the fruit during peak sun hours. This pass is performed on the "morning sun" side of the vine. For Pinot Noir, a green drop is performed at 90 percent *veraison* to encourage uniform ripening within the blocks.

A quadrilateral trellis system is used for Sauvignon Blanc to achieve balanced vine vigor and the ability to carry a bigger crop load. In new plantings, vine rows are oriented on a north-south axis to promote even ripening on both sides of the vine.

Like Chardonnay and Pinot Noir, Sauvignon Blanc receives an early spring shoot-thinning pass. After fruit set, a manual leaf removal pass exposes clusters to sunlight and air movement to improve fungicide penetration and disease prevention. Within two weeks before harvest, an additional manual leaf removal pass is performed, if needed, to help reduce methoxypyrazine components in the fruit.

Phylloxera

Phylloxera has been an issue for all of the own-rooted vines planted in the 1970s. Phylloxera pressure on those vines has increased in recent years due to extended drought conditions. This has necessitated vine removal from a large portion of the acreage. Those acres are typically replanted with 1103P or 101-14 rootstocks after lying fallow for one to two years. No cover crop is planted. These blocks are farmed to SIP Certified standards although they are not certified during the fallow period.

Bird Management

Starlings and house finches are problematic during the ripening period leading up to harvest. At Paragon, a falconer deters these birds from settling in the vineyard with both a flying Gyrfalcon, which simulates predation, and general hazing. This method has proven to be very effective, according to Amaral.

Mildew

Sprayers must be calibrated, and regular scouting of pest hot spots in the vineyard must be recorded. One of the worst pest problems is powdery mildew, which is common in the temperate climate of the Edna Valley. Given the high pressure of this pest, a 14-day preventative spray schedule is maintained, starting at bud break and continuing into *veraison*.

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The fungicide program begins with a stylet oil and copper tank-mix application at bud break. The mode of action of synthetic fungicides is alternated to ensure that four to eight weeks pass before the same material is applied again. Wettable sulfur is introduced into the program in combination with other materials mid-season, stopping prior to *veraison*.

Mealybug and Red Blotch

Vine mealybug and Grapevine Red Blotch-associated Virus (GRBaV) present ongoing pest management issues at Paragon Vineyard.

Vine mealybug produces multiple generations in just one growing season. It is particularly a challenge with vines that have Grapevine Leaf Roll-associated Virus-3 (GLRaV3), which is easily transmitted vine-to-vine by vine mealybugs. In infested blocks, chemical control practices are assisted by parasitism of vine mealybugs by *Anagyrus pseudococci* that were released over several years. Releases were discontinued for several years because of the continued presence of parasitized mealybug mummies being found.

In 2018, supplemental releases of *A. pseudococci* began again and will continue, as needed, to maintain the established parasitoid population. Pheromone-mating disruptors are placed in parts of the vineyard where there is a low-moderate presence of the vine mealybug. It not only disrupts the mating cycle of the pest but also keeps the *A. pseudococci* around. *Scymnus* beetle larvae are found feeding on the mealybug nymphs under the bark.

Red Blotch virus is an increasing challenge for growers as they plant vineyards. Amaral's team is doing their due diligence by only purchasing vines from a nursery that offers Certified 2010 Protocol rootstocks and scions that have been propagated on virgin ground.

Weeds

Weeds are a constant challenge in Paragon Vineyard. SIP Certified encourages the use of cover crops to out-compete undesirable weeds. Seeding of cover crops was successful in reducing the population of noxious Russian knapweed. In the early summer, the cover crop will get knocked down with weed whackers to reduce competition with the vines while still maintaining a weed barrier. Herbicide application has been discontinued on 40 percent of the acreage through use of weeding implements, such as the Clemens weed knife. With additional implements, Amaral hopes to increase that acreage significantly in the future.

Weed control in the vine row is primarily done with a Clemens cultivator. Amaral has observed more manageable grasses since the elimination of herbicides and also improved water penetration during irrigation. For Albariño and Syrah blocks, unwanted weeds do not germinate or grow as readily due to lower irrigation requirements.

Impact of SIP-Certified Viticultural Practices at Paragon Vineyard

According to Amaral, the SIP Certified experience has proven to be a positive one for both the health and prosperity of the Paragon Vineyard and Amaral's professional development. It has provided an excellent framework for improving efficiency, tracking quality and trouble-shooting challenges—all while increasing consumer recognition of the vineyard's sustainable growing practices. WBM

Evaluating Grapevine Rootstock Performance in Field Trials

Lodi Field Day looks at rootstock issues and trial data

Ted Rieger

Ted Rieger, CSW, is a wine journalist based in Sacramento, California and a writer for wine trade media since 1988.

GRAPEVINE ROOTSTOCKS ARE AN important consideration when planting new vineyards and replanting existing vineyard blocks. Choosing rootstock for a particular vineyard involves evaluating factors such as pest and disease pressure, soil characteristics, irrigation management and water quality, scion selection, trellis design, yield and fruit composition targets.

Growers are encouraged to test new and different rootstocks in small trials in their own vineyards when planting new blocks, in order to evaluate the rootstocks' performance in specific sites and with specific management practices.

A Lodi Rootstock Field Day organized by Lodi Winegrape Commission research, education and sustainable winegrowing director Dr. Stephanie Bolton, and E. & J. Gallo Winery grower outreach specialist, Keith Striegler, was held in July 2019. The field day featured rootstock breeders and researchers discussing newer rootstocks and current field trials that compare rootstock performances under different site conditions and grafted to different scion varieties.

Background and Overview

Dr. Peter Cousins, a research scientist with E. & J. Gallo specializing in plant material evaluation, was formerly a grape breeder with the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS), where he developed the Kingfisher, Matador and Minotaur rootstocks that are resistant to root-knot nematodes.

"We're still using rootstocks today that are among the first ever used in viticulture, such as St. George and Riparia gloire," Cousins said. "Rootstocks were originally developed as protection from soil pests, such as phylloxera and nematodes, and these issues are still important major reasons to use them. In addition, rootstocks have also been developed related to issues, such as soil chemistry and water availability."

Speaking in general about rootstocks available through UC Davis (UCD) Foundation Plant Services (FPS) and rootstocks he has worked with, Cousins said, "I'm confident in their performance, but they should be evaluated for your growing conditions related to site, trellis, management practices and scion combinations." Cousins suggested growers experiment with new and different rootstocks when they replant vineyards, by planting five in a row of each type at the end of a vine row and training them, along with the rest of the block, to evaluate their performance at a given site.

He also provided background on the current National Science Foundation (NSF) Plant Genome Research Program, which evaluates rootstocks for vine performance, fruit composition and yield with trials in California, Michigan, Missouri and South Dakota. In addition to the Liberty Vineyard trial in Lodi, there are other NSF trial sites in California's Merced and Madera counties.

Rootstocks react differently to soil water content as it relates to rooting depth and water uptake. The studies will compare how rootstocks behave in a humid, continental climate, such as Missouri, and in an arid, Mediterranean climate, such as California.

The NSF study intends to increase understanding of the interactions of rootstocks with their environments and how gene expression changes in response to environmental conditions. "By understanding what parts of a rootstock's genome drive plant size, resistance to pests and diseases and other factors, this will allow geneticists to breed new rootstocks with those desired traits," Cousins said.

NSF Research and Lodi Liberty Rootstock Trial

The Lodi Liberty Vineyard rootstock trial is a long-term study in cooperation with E. & J. Gallo and San Joaquin County Cooperative Extension viticulture advisor (now emeritus) Paul Verdegaal. Planted in 1990, the trial plot is 30 rows with vines in 7-foot by 10-foot spacing. The trial includes 15 rows planted to Chardonnay as the scion and 15 rows planted to Cabernet Sauvignon as the scion, each on the following 15 rootstocks: 039-16, 101-14 MGT, 775 Paulsen, 1103 Paulsen, 140 Ruggeri, 420A, 110 Richter, 3309 Couderc, K51-32, Kober 5BB, SO4, Teleki 5C, Freedom, Ramsey and Schwarzmann.

Striegler emphasized the significance of the Liberty trial, which spans a 30-year period—a typical vineyard's lifetime. "The Lodi Liberty Rootstock Trial provides a unique opportunity to further elevate rootstock performance and understanding during the life of a planting," Striegler said. "Our plan is to

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E. & J. Gallo's Liberty Vineyard trial block was planted in Lodi in 1990 to study 15 different rootstocks grafted with Cabernet Sauvignon and Chardonnay.

collect and analyze data from the 2017 through 2020 seasons. Data collection will include yield, components of yield, fruit composition, dormant pruning weights and vine nutritional status by analyzing both petiole and leaf-blade tissue samples at bloom and *veraison*."

Zoe Migicovsky, a postdoctoral fellow at Dalhousie University in Nova Scotia, Canada, leads an NSF research team to evaluate results from the Liberty trial and collect and evaluate data from two other California commercial vineyard sites. The team has visited California every year since 2017 to design and execute work that assesses root-shoot communication, measured in different rootstock-scion combinations. Team members sample vines for traits such as leaf shape, mineral composition, vine physiology, fruit composition, gene expression and soil microbial diversity, at the trial sites from June through August.

Migicovsky has compiled and graphed existing data for five years (1995 to 1999), which was then collected by Verdegaal to compare variation in crop size and berry chemistry for Chardonnay and Cabernet Sauvignon across the 15 rootstocks for eight data points: berry weight, degrees Brix, cluster number, yield, pH, titratable acidity (TA), pruning weight and Ravaz index.

Significant variation occurs based on the year (growing season), and the variety plays a major role in variation for the eight data categories. But Migicovsky said the data indicate the most variation across rootstocks seems to be growth-related and occurs for yield, berry weight, pruning weight and Ravaz index. Overall yields for both varieties were higher on Ramsey, 110R, Freedom, K51-32, 420A and 1103 Paulsen.

Rootstocks that produces high berry weights and yields are known to be drought-tolerant. All vines in the trials are irrigated with the same timing and with the same amount of water. But as Migicovsky explained, "One of the drivers of variation is the vines' access to water, and variation occurs by how much water the vines are getting based on the rootstock."

More information and updates on the NSF Plant Genome Research Program 1546869 and rootstock trials can be found at *www.vitisunderground.org*.

GRN Rootstock Trials at Fanleaf Virus Sites

UC Davis viticulture and enology professor and grape breeder Dr. Andrew Walker discussed the development of five Grape Rootstocks for Nematodes (GRN) rootstocks that were released in 2009 and are all now available. The five rootstocks resist three strains of root-knot nematodes and the dagger nematode (*Xiphinema* index)—a vector of grapevine fanleaf virus. In varying degrees, these rootstocks also offer resistance to other species of nematodes found in vineyards, such as citrus, ring, lesion and pin nematodes, in addition to good phylloxera resistance.

Beginning in the mid-1970s, Freedom and Harmony rootstocks were standards to address sites with nematodes and fanleaf virus. In addition, 039-16 became a choice for dagger nematode and fanleaf virus resistance, but it was not as good with other nematodes. There are concerns about these three rootstocks because they have some degree of *Vitis vinifera* parentage. Additional rootstock choices were needed for nematode resistance.

"Once you pull a vineyard, you should never follow with a new planting, using the same rootstock. That's one reason we developed the new GRN series," Walker said, adding the GRN rootstocks were released to address vineyard sites with high and diverse nematode populations and where fallowing and crop rotation practices are difficult to use.

A Lodi GRN trial was planted at an E. & J. Gallo vineyard in 2012 that has heavy fanleaf virus pressure from dagger nematodes, in addition to root-knot and other nematodes. Malbec is grafted onto the following rootstocks: GRN-1, GRN-2, GRN-3, GRN-4, GRN-5, 039-16, 101-14, 1103 Paulsen, 3309 Couderc, RS-3, RS-9, Harmony and St. George.

Another trial was planted in 2012 in Geyserville in Sonoma County with cooperation from Vino Farms Inc. on a fanleaf site with eight vine replications on 11 rootstocks that also included Schwarzmann and 1616 Couderc.

Walker provided the following general observations for both trials to date: Fanleaf is expressing at both sites on controls, but St. George is weak to very weak and symptomatic; GRN-1 is performing with low vigor but high fruitfulness; Foliar fanleaf symptoms are observed on a few GRNs; RS-3 and RS-9 vines are very weak; and 101-14, 1616 Couderc and Schwarzmann vines are weak.

Walker noted that there is not a lot of genetic diversity in current rootstocks. Three species account for more than 75 percent of the parentage of hybrid rootstocks: *V. berlandieri*, *V. riparia* and *V. rupestris*, and the same accessions of those species. "We need to produce more alternatives with different genetic diversity," he said. "St. George is incredibly tolerant to viruses but has little to no resistance to nematodes." One issue with some GRN rootstocks, such as GRN-1 and GRN-5, is that they can be difficult to propagate.

San Joaquin Valley Rootstock Trials

Dr. Karl Lund, UCCE area viticulture advisor for Merced, Madera and Mariposa counties, is coordinating two trials in the San Joaquin Valley to evaluate GRN and other rootstocks for nematode resistance, vigor, yield and vine uptake of soil nutrients. Lund said these trials indicate that rootstocks can make a difference in which nutrients the vine takes from the soil based on petiole analyses at bloom and *veraison*.

A large rootstock trial in Northern Merced County is evaluating Malbec grafted to 1103 Paulsen, RS-3, RS-9, GRN-2, GRN-3 and GRN-4. Lund said GRN-1 rootstocks are missing from this trial because they were unavailable from the nursery. GRN-5 rootstocks had an 82 percent failure rate, after the first year, due to apparent rooting problems and were removed from this trial.

TED RIEGER

This GRN rootstock trial block was planted in Lodi in 2012 to compare 13 rootstocks grafted with Malbec for fanleaf virus symptoms and resistance.

After one year of data (2018), overall results from the Merced trial indicate there is no obvious vigor difference between rootstocks. Nitrogen (N), phosphorous (P) and iron (Fe) showed no differences in uptake among the rootstocks. Since N and P are two plant nutrients needed in the largest quantities for metabolism, the fact there is no difference between the new rootstocks and the standard 1103 Paulsen is important information for nutrient management practices.

GRN-2, GRN-3 and GRN-4 rootstocks appear to take up more potassium (K) and calcium (Ca), but less magnesium (Mg). GRN-2 appears to take up more chloride (Cl) although it has not shown negative symptoms to date. Cl can be a problem in some areas with lower quality irrigation water, and it may be advisable to test GRN-2 and other new rootstocks under Cl and general salt stress before use in these areas.

Lund is also managing a rootstock trial in Madera planted on a high-wire trellis with Petit Verdot grafted onto Freedom, 1103 Paulsen, RS-3, RS-9, GRN-1, GRN-2, GRN-3, GRN-4 and GRN-5 rootstocks. This trial began producing a crop to provide yield and berry chemistry data.

Overall results from the Madera trial to date:

- Freedom has produced the highest yield, followed by GRN-2, GRN-3 and then GRN-1, GRN-4 and GRN-5, with all producing competitive yields.
- Freedom, GRN-4, GRN-3, GRN-5, GRN-1 and RS-3 are producing berries above 24° Brix; and GRN-2 and RS-9 above 23° Brix.
- Freedom's pH was in the middle (4.12); GRN-4, GRN-5 and RS-3 had higher pH (4.15 to 4.19); GRN-3, GRN-2, GRN-1 and RS-9 had lower pH (4.01 to 4.06); and 1103 Paulsen had the lowest pH (3.76).

Although these trials are young, Lund said initial results indicate that growers can start planting GRN-2, GRN-3 and GRN-4 rootstocks in the Central Valley.

UCCE Fresno County viticulture advisor George Zhuang is conducting a field trial to evaluate seven rootstocks under saline soil and water conditions in western Fresno County. The 15-acre trial block was planted in 2015 with Pinot Grigio grafted onto 1616 Couderc, Schwarzmann, 140 Ruggeri, Ramsey (Salt Creek), 1103 Paulsen, GRN-2 and GRN-3.

Composite soil samples were taken at depths of 1-, 2-, 3- and 4 feet at the start and end of the growing season. Both surface and well water for irrigation were sampled during the season for pH, boron (B), sodium (Na) and Cl. Grapevine nutrient chemistry was analyzed from petiole and blade samples at bloom, *veraison* and harvest for B, Cl, K, N and nitrate-nitrogen (NO_3-N). Harvest data were collected for yield, and grape juice chemistry for Brix, pH, TA, and juice NA and K.

Zhuang summarized data based on the 2017 and 2018 growing seasons:

- 140 Ruggeri and Ramsey had higher N uptake across two years.
- 1103 Paulsen, 140 Ruggeri and Schwarzmann had lower chloride uptake.
- GRN-2 and GRN-3 had the highest yield in 2018.
- Na had more impact than K on juice pH.
- High B reduced yield and berry size.

Zhuang said irrigation groundwater was high in B. "More than 1 ppm of boron can cause problems with yield and show as leaf symptoms. Compare boron content in the petiole analysis to see if it correlates to berry size and yield," he said. Zhuang expected to begin making wine from this trial with the 2019 vintage to start evaluating sensory impacts of the different rootstocks.

Newer Rootstocks to Consider

Cousins provided a brief description of some newer, lesser-known rootstocks that could provide benefits in certain situations. Some of these are being evaluated by researchers for specific resistance characteristics.

- IAC 572, also known as Jales, is from Brazil. Cousins said it is considered the most vigorous rootstock in the world. This rootstock is of interest because of its reported resistance to mealybugs in Brazil. It is a cross of *Vitis caribaea* and 101-14 and is being evaluated by USDA ARS research horticulturist Rachel Naegele, based in Parlier, Calif. Cousins recommended this rootstock for inclusion in the FPS collection in 2013, and it currently has provisional status.
- Demko 10-17A is one of three rootstocks, along with IAC 572 and RS-3, that is demonstrating some level of resistance to the vine mealybug, *Planococcus ficus*, in recent experiments performed by Naegele, Cousins and UC entomologist Kent Daane. Although these rootstocks show promise for mealybug resistance, they do not necessarily confer this resistance to the grafted scion.
- RS-3, provided to FPS by UCCE emeritus nematology specialist Dr. Mike McKenry of the Kearney Ag Research and Extension Center, shows broad resistance to root-knot nematodes with a moderate vigor level. Its pedigree comes from two other rootstocks—Ramsey crossed with Schwarzmann.
- A4 is a low vigor selection of 039-16 believed to provide the same level of pest and disease resistance, without the same high vigor issues that 039-16 has under certain site conditions. This rootstock was propagated by Cousins and colleagues at USDA ARS in 2011, but it has not been field-tested. A4 has parentage of *V. vinifera* and *V. rotundifolia.* Plant material is at UCD FPS.
- *Vitis cinerea*—Two rootstocks developed at Geisenheim University in Germany have high phylloxera resistance and are hybrids of *V. riparia* crossed with *V. cinerea*. One is a proprietary rootstock called Boerner. Two other *V. cinerea* hybrids with very strong phylloxera resistance are Rici and Cina.

The UCD FPS Grape Registry has more information about rootstocks and their availability at: *fps.ucdavis.edu/fgrabout.cfm.* WBM

Vineyard Sensor Technology Highlighted at NGRA Workshop

GRAPEX, OpenEt Projects Seek to Develop Irrigation Scheduling Tools

Ted Rieger

Ted Rieger, CSW, is a wine journalist based in Sacramento, California and a writer for wine trade media since 1988.

THE NATIONAL GRAPE RESEARCH ALLIANCE (NGRA), in cooperation with the United States Department of Agriculture (USDA) Agricultural Research Service (ARS), held a workshop in Sacramento on Nov. 13 that presented current sensor knowledge and applications by research scientists working throughout the U.S. and representing academia, industry and government agencies.

Much of the current vineyard sensor technology available and in use today is made to monitor meteorological conditions and soil and vine water status for efficient water use and irrigation management. As several speakers pointed out, this will become increasingly important for California vineyard owners as groundwater monitoring and management regulations are implemented under the Sustainable Groundwater Management Act.

Proximal and In Situ Sensors

Dr. Andrew McElrone of the USDA-ARS and the University of California, Davis (UCD) Department of Viticulture and Enology provided an overview of current proximal and in situ sensor technologies used in vineyards, as well as directions for the future. McElrone and his lab have focused on water balance in vineyards, energy balance related to weather conditions and evapotranspiration (ET) that contributes to water flux in vineyards. This led to the development of surface renewal monitoring technology, now commercially applied and sold by Tule Technologies Inc. for irrigation management.

Soil moisture sensors have been used for many years as indicators of soil water content and water use by plants and vines to assist with irrigation decisions. Examples include neutron probes, Time Domain Reflectometry (TDR) sensors, capacitance sensors, soil tensiometers and granular matrix soil sensors.

Vine or plant water stress sensors are direct measurement tools and include pressure chambers, leaf porometers and infrared sensors. McElrone mentioned a promising new sensor being field-tested, the FloraPulse microtensiometer—a device that can be attached to a vine's trunk to continuously measure stem water potential in real-time.

McElrone said the costs of sensors are going down and sensor manufacturers and service providers have improved designs and pairing techniques, and McElrone said, "They are doing a better job of data packaging, transmission, processing and delivery so growers can make decisions. The sensors themselves have not changed so much, but there has been more focus on managing data," he said.

Examples of companies that provide integrated sensor and data management systems for vineyards and other crops are WaterBit and Arable. In addition, more work is being done in the areas of machine learning, artificial intelligence (AI) and neural networks that can analyze data and create models for decision making.

McElrone said a more recent development is the potential use of autonomous vehicles and vineyard monitoring robots to allow the use of mobile proximal sensors to collect data from more sample locations.

Dr. Terry Bates, senior research associate at Cornell University and project director of the national Efficient Vineyard Project, works with available off-the-shelf sensors and identifies other needs for developing new sensor technologies. The goal is to "Measure, Model and Manage."

"A vineyard is not just a block; it's a population of individual vines," Bates said. "The problem with vineyard management is that we're trying to do uniform management in a non-uniform system." One goal of the Efficient Vineyard Project is to enable variable-rate management. Bates believes technology will be heading toward more direct measurements on vines to enable individual vine-to-vine management. The Efficient Vineyard Project works with Bloomfield Robotics, a startup company that uses prototypes developed by Carnegie Mellon University in Pittsburgh, Penn., to develop a self-contained mobile sensor platform that can gather vine-by-vine data to monitor and evaluate individual vine growth and characteristics—and take berry counts for crop estimation.

Light Sensors and Imaging Technology

Kaitlin Gold, assistant professor in plant pathology and plant-microbe biology with Cornell University and a National Aeronautics and Space Administration (NASA) researcher, discussed agricultural light sensors (imaging cameras and technologies)—technology more commonly used to monitor canopy growth and stress but has the potential to monitor and manage vineyard pests and diseases. "How light reflects off leaves and plants can tell us something about plant health and stress before we can see it visually. Sensors can see more types of light than we can see," she said.

Gold compiled a "cheatsheet" of five light sensor technologies and their operational light ranges, applications, cost ranges, and practical considerations and uses, summarized below.

- **Digital cameras** operate with visible light range (red, green, blue) and serve as "eye extenders." They are relatively low cost, readily available, easy to use and small, yet powerful, but provide limited information. They are best for looking at properties over a wide range: greenness, growth, weeds, pests and visible disease. They have potential integrated pest management (IPM) uses for vine training, crop/canopy management and disease management.
- **Multispectral sensors** operate using discrete segments of visible and near infrared (NIR) light and are good for general crop stress detection and indirect problem identification. They can be imprecise and provide limited information, but are budget-flexible as they are available in a wide price range. They can be used for normalized difference vegetation index (NDVI) and general crop stress from multiple causes, such as nutrient deficiency, water stress, weeds, pests and diseases. Potential IPM uses are vine training, crop/canopy management, vine nutrition, irrigation and disease management.
- **Hyperspectral sensors** operate with a light range of continuous visible to shortwave infrared (SWIR). They have potential applications for direct problem identification and trait quantification. They are currently very expensive, and need more commercial development and require expert interpretation. They can be used for specific biotic and abiotic stress detection and quantification.
- **Thermal sensors** operate using longwave infrared light with applications for temperature monitoring and properties that change plant temperature. They are available at a moderate to high cost. High-resolution technologies are heavy, and data collected can become "noisy." Used for properties that change plant temperature, including water content, water stress and diseases that impact plant vascular activity. Potential IPM uses include soil management, vine nutrition, irrigation and disease management.
- **LiDAR (Light Detection and Ranging)** operate in a very specific light region, either NIR or SWIR. Applications include laser, plant structure, plant height and biomass. These technologies can be high cost and are best for use in the sky, rather than on the ground. They can be used for measuring elevation, plant height, leaf volume and canopy density. Potential IPM uses include site selection, vine training and crop/canopy management.

"Decide what information is important to you then look for a sensor that can get you that. Much like fungicides, knowing how sensors work or don't work is crucial to using them effectively," Gold said. She noted that commercially available sensors, most commonly digital and multispectral, are useful in vineyards for crop growth stage determination and general crop health and are available as services through companies, such as VineView Imaging and Ceres Imaging. Research, validation and development are still needed for other sensor uses and technologies. Specific stress detection and differentiation are not yet commercially available. Hyperspectral sensors still need major commercial development before they are ready for real-time, in-field use.

GRAPEX

The Grape Remote-sensing Atmospheric Profile & Evapotranspiration eXperiment (GRAPEX) is a project coordinated by the ARS Hydrology and Remote Sensing Lab (HRSL) based in Beltsville, Md., in cooperation with E. & J. Gallo Winery to develop irrigation scheduling tools for California vineyards.

ARS research hydrologist Dr. Bill Kustas of HRSL said that California vineyards are increasingly being scrutinized for water use and groundwater regulation, in addition to experiencing variable precipitation and water availability related to drought conditions. "Our goal is to evaluate and refine a multi-scale remote sensing evapotranspiration (ET) model and integrate these tools and data into a vineyard irrigation scheduling and water management tool for improving water use efficiency," Kustas said.

Using a wide range of sensor technologies, data from two vineyard blocks at Borden Ranch in the Lodi American Viticultural Area (AVA)—each planted to Pinot Noir, one an older, 60-acre block planted in 2009 and the other a 40-acre block planted in 2011—have been collected since 2013. The project has collected micrometeorological and biophysical data during the growing seasons. In addition, ground, airborne and satellite remote sensing data were collected, during intensive observation periods (IOPs), by the GRAPEX team at different vine phenological stages.

Continuous measurements of surface fluxes, including ET and environmental conditions, using eddy covariance micrometeorological systems with sensors on 8-meter high "flux towers" in each vineyard block are collected. Each tower is equipped with an infrared gas analyzer from Campbell Scientific Inc., and a three-dimensional sonic anemometer to measure concentrations of water, carbon dioxide and wind velocity. During the growing season, three additional sonic anemometers are mounted at different heights on the tower to investigate the effects of canopy structure on near-surface turbulence. Other tower measurements and sensors include: the full radiation budget, using a four-component net radiometer; incident and reflected photosynthetically active radiation (PAR), measured with quantum sensors from LI-COR Biosciences; air temperature and water vapor pressure, measured using three temperature and humidity probes; and precipitation, measured using a tipping-bucket rain gauge from Texas Electronics Inc. Both vine canopy and inter-row surface temperatures are measured with a pair of Campbell Scientific thermal infrared thermometers.

Subsurface measurements have included soil heat flux, measured with a cross-row transect of five plates buried at a depth of 8 cm; soil temperatures, measured with thermocouples; and soil moisture content, measured with soil moisture probes. Profiles of soil water content and temperature have also been measured under the vines at different locations with HydraProbe and Decagon sensors.

Flowmeter sensors were placed in the irrigation driplines to monitor irrigation and estimate the amount of water applied in both vineyards during the growing season. Vine canopy and cover crop development is visually tracked and recorded with a "PhenoCam"—a digital camera mounted along the road on the east side of each block, which takes a daily photo.

Aerial imagery and remote sensing data are collected through three different methods at different heights: imagery from NASA Landsat satellites; fixed-wing aircraft flyovers that use commercial vineyard imaging service providers; and unmanned aerial vehicle (UAV) imagery provided by AggieAir from Utah State University, a GRAPEX team member.

"Satellites give us snapshots of conditions at different times during the season—budbreak, bloom, fruit set, pre-*veraison*, *veraison* and harvest. UAVs could complete the picture for times when we don't have satellite data," Kustas said.

TED RIEGER

A "flux tower" equipped with multiple sensors to collect micrometeorological data for the GRAPEX project was installed at the Borden Ranch vineyard in the Lodi AVA.

During the IOPs, at the different phenological stages, ground measurements were collected of leaf area index (LAI), leaf stomatal conductance and photosynthesis, using multiple sensor technologies, and of leaf water potential, using a pressure chamber. These measurements were taken along transects across the vineyard to determine variability in vine biomass, water use and stress. In addition, ground level micrometeorological measurements were taken during the IOPs to evaluate conditions between vine canopies and below canopy turbulence.

More recently, two other GRAPEX vineyard sites have been established, using similar sensor systems in Gallo-managed vineyards: Ripperdan Ranch, in Madera County, planted to Chardonnay and Merlot, and Barrelli Creek Vineyard in Sonoma County, planted to Cabernet Sauvignon. The Borden Ranch GRAPEX vineyard blocks are scheduled to be grafted over from Pinot Noir to Cabernet Sauvignon this year. While this will result in an interruption in data collection for at least one year while the new scion vine material becomes established, it should benefit the project over the long-term with additional data for another variety at this site.

TED RIEGER

LEFT: Bill Kustas of the USDA-ARS Hydrology & Remote Sensing Lab discusses the GRAPEX project.

RIGHT: Forrest Melton, a NASA researcher and faculty member at CSU, Monterey Bay, discusses the OpenET project to develop a website that uses satellite data to assist growers with irrigation management.

OpenET

Forrest Melton is a senior research scientist at the NASA Ames Research Center at Moffett Field, Calif. and a faculty member at California State University, Monterey Bay. As a member of the GRAPEX team, Melton also works with the NASA Applied Sciences Program and the Western Water Applications Office to develop another agriculture irrigation tool, OpenET. The goal of OpenET is to produce reliable ET data at field scale in real-time and make it available online at a low cost as well as easily accessible for irrigated agricultural operations in the western U.S.

Melton said that 10 percent of NASA's budget is devoted to earth science applications, and part of this is focused on understanding, measuring and monitoring the water cycle, which includes precipitation, snow properties, ET, soil moisture, groundwater and plant chlorophyll. He said 35 years of Landsat imagery and data are freely and publicly available.

The OpenET project development team of government agencies and industry representatives includes NASA Earth Sciences, California Department of Food and Agriculture (CDFA), California Department of Water Resources, University of California, E. & J. Gallo Winery and the Almond Board of California, among others. Project development began in 2018 to develop user requirements and, as Melton explained, all projects and actions are driven by user input.

Melton said beta testing of the OpenET website is planned for 2020, and the final phase of the project in 2021-2022 will be to refine custom website applications and provide user training, outreach and training materials.

Information and data management are collected and integrated from Landsat satellites, ground stations, NASA/U.S. Geological Survey/European Space Agency (ESA) Data Centers, Google Earth Engine, and other databases and models. Melton is also integrating work he has been involved with from NASA Satellite Irrigation Management Support (SIMS), and the UC-developed CropManage system. **WBM**

The Future of Half Bottles: Boon or Bust?

Half bottles still have a pulse in the on-premise market, but wineries cite rising production expenses and diminishing returns as reasons to not use the format.

Michael S. Lasky

Sonoma-Cutrer has found success in half-bottles both on- and off-premise—and even in the tasting room and online.

ABOUT 20 YEARS AGO, entrepreneurs Gordon Uhlmann and Wendy Van Dyck, two wine-loving San Franciscans who eventually founded *Half-WitWines.com*, noticed that most wine retailers offered a negligible selection of half bottles. Uhlmann, whose motto is "Drink less and enjoy more," relished a dinner at the renowned restaurant, The French Laundry—each course was paired with a different half bottle.

"After that fabulous meal, we started to look in grocery stores and liquor stores to find half bottles for ourselves and quickly realized that half bottles were really hard to find," Van Dyck said. "The internet was just starting to perk up so why not create a website that would exclusively sell half bottles from around the world. Sure, it was a niche market, and *HalfWitWines.com* became the only site that specializes in just half bottles."

When the site first launched, it boasted more than 1,000 labels acquired directly from wineries and distributors. Van Dyck said that this ambitious inventory has shrunk over the years, however, because availability has diminished, and they only want to stock what sells well.

"As we've discovered over the years, half bottles are basically not a popular format—from a winery perspective. It costs them just as much to put wine in a half bottle as a full bottle," Van Dyck said.

The Law of Diminishing Returns

The success of this SKU depends on its value to a winery's sales: Is bottling wine in 375 ml glass worth the labor-intensive production costs, just to have those brands on restaurant wine lists? What's more, wineries have found that more distributors are carrying fewer half bottles.

"There's no arguing that today the bulk of half bottle sales are mainly for on-premise accounts," said Mick Schroeter, winemaking director at Sonoma-Cutrer Vineyards. "There are still a good number of consumers that just like having a half bottle at the table, and I think that's definitely the benefit of having a 375 ml in our portfolio. It's not a massive volume by any means, but it's still a good, steady business for us in the tasting room and online as well."

But Schroeter cautioned that maintaining a 375 ml bottle in its portfolio does come with a significant additional cost. "The cost of the 375 is definitely not half of a 750 because most of the fixed costs are very similar. So, milliliter for milliliter, a 375 is always going to be proportionally a more expensive proposition than a 750 ml," he said, adding that the cost of glass for 375 ml bottles is only marginally less expensive than that for a 750 ml bottle.

For him, the real money burner is the bottling line. "It's a bit of a major change-over on the bottling line for us. You've got to alter all of the equipment, and then all of the conveyors, all of that railing has to be tightened up for 375," Schroeter said. "Accordingly, we usually only bottle 375s twice a year because it is a major change-over on the lines."

Jason Haas, partner and general manager of Tablas Creek Vineyards in Paso Robles, Calif. agreed. "It's definitely expensive to do: you still pay for a bottle and a capsule and a label and a cork, so your costs of producing a half bottle are not half of your costs of producing a full bottle, but the market basically expects it to be half or only slightly more than half, so we end up eating that extra cost," he said.

Half Bottles?

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In addition, he sees that many distributors are not willing to take them on. Tablas Creek has distribution in 50 states, but only four distributors stock half bottles of the brand's Esprit de Tablas line. "Ten years ago, I would estimate that maybe 20 of our distributors stocked our half bottles," he said.

Haas also pointed out that today many states allow their patrons to take home any unfinished 750 ml bottles from restaurants. This also reduces restaurant incentives to stock the size— and for customers to order them. It's one of many reasons wineries continue to decrease production of half bottles. "We're down to producing just 75 cases of each of our Esprit de Tablas wines [one red and one white], an 80 percent drop over the past decade," Haas said. "We had to make a call recently, whether we were going to give the 375 production one more year and add a little more personalized focus with our distributors. If we can reach an equilibrium, we will continue producing half bottles; but if the demand continues to go down, I don't see us continuing with 375s beyond this year."

There isn't much demand for them in the tasting room or online either. "It doesn't seem to be a particularly big category in direct-to-consumer (DTC). It's not that you can't sell it: we always sell some, but it doesn't seem like that is what people want to buy these days," Haas said.

SMALLER BOTTLES AGE WINE QUICKER

The smaller the format, the faster the wine ages. But Schroeter said that Sonoma-Cutrer's solution is to bottle 375s under screw caps. "I think the key for us is, quite a few years ago, we transitioned to screw caps on the 375s, just like all of our 750s. The screw cap definitely preserves the freshness and the longevity of those wines."

High-end Restaurants and Somms Still Enthusiastic

"We sell a lot of half bottles. We sell several a night. It's a really great way for a guest to experience multiple different wines in one sitting," said Amanda McCrossin, wine director at Napa Valley's Press Restaurant, who said she pours from several different bottle formats for her wine-by-the-glass program. "When I can find half bottles, I generally try to buy them for the restaurant because they just make complete sense if guests really seem to enjoy them."

Press specializes in steak, which marries well with its vast collection of Napa Cabernets—including more than 40 in half bottles, some dating back to 1975. Although the majority of these half bottles come from recent vintages, McCrossin said she applies the appropriate tools to assure the wines are served without flaws—be it decanting or the application of the Coravin.

As *WBM* first reported in Sept. 2016, the Coravin saw rapid success at restaurants and tasting rooms. But today the Coravin's pour and preserve technology has the potential to erode half-bottle sales.

Coravin allows drinkers or sommeliers to pour individual glasses without opening the bottle. Instead, a hollow needle extracts the wine while keeping the cork intact. Ostensibly this gadget lets restaurants and wine bars offer glasses of high-end wines without opening the entire bottle. Numerous sommeliers have pointed out that in the short term (about a month to six weeks), this theoretically is fine, but it really depends on how well the cork holds up and if the argon preservation gas does its duty.

That doesn't mean that the appreciation of half bottles is lost completely.

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Jennifer Estevez, owner of consulting food and sommelier firm OMvino, is, like McCrossin, an enthusiastic half bottle proponent. "Half bottles are really great for restaurants and consumers alike because they do offer a diversity without the commitment to a full bottle, and I think that restaurants can also utilize them on their pairing menus," she said.

Petra Polakovicova, wine director at San Francisco's Epic Steak restaurant, agreed, saying, "I love and recommend half bottles, particularly for customers who cannot commit to a full bottle or for others who don't agree on one varietal of wine. We sell a lot of them to guests who want a different wine with each course."

Half Bottles' Competition: Cans and Other Single Portion Containers

In Dec. 2019, *WBM* reported that within the last year, canned wine saw $69 million in sales based on nearly 739,000 cases sold in retail outlets, as tracked by Nielson, not including on-premise transactions. With this data in mind, our editors posited that this trending success may encourage even more wineries to join the canned-wine market.

Where does this leave the future existence of the 375 ml glass bottle? At this point, it's debatable. "I feel like the climb of cans and the decline of 375s aren't really related because, in general, cans are kind of competing with by-the-glass-priced wines while the glass 375s are generally higher-end wines, and I don't think there are enough examples of high-end wines in cans yet to feel confident that half bottles are going away too soon," Haas said.

Erica Harrop, founder and CEO of Napa Valley's Global Package LLC said she is confounded by the status of half bottles now. "I realized that the half bottles have never really been cost-effective, but we thought it's still a great way for restaurants to get guests to try more wine. From our perspective, sales of half bottles are basically static. They are not increasing or decreasing.

"Restaurants are still the prime customer for half bottles, and wineries that still produce the 375s do so because they have a good foothold with the restaurants," Harrop continued. "The premium category I sell in, I would assume would show more movement. But today, that is not the case. This is unlike the strong half bottle sales of 20 to 30 years ago."

Harrop feels there is no doubt newer technology and containers have certainly affected half bottles sales. "Wines in kegs and other containers have, in one way or another, affected the 375 business. I'm always looking for 375 bottles. I am finding that it's harder to find them now," she said.

Saverglass' president, Franck Collet, has had a similar experience. "Despite the wide range of 375 ml bottles that Saverglass has developed, the sales remain marginal. The premiumization of the packaging for the 375 ml is not a priority. Customers focus on the premiumization of their packaging for the main capacity, which remains the 750 ml," he said.

"Some of them ask us to develop the same shape or the same personalization than of 750 ml for their 375 ml, but the cost of development is often too high for the small volume of bottles customers need," Collet continued. "Therefore, they prefer to use a standard 375 ml available in our stock. The percentage of 375 ml bottles represents between 5 and 8 percent of the sales, depending on the year."

So it seems that when it comes to half bottles, some love them, and some don't. While winemakers, restauranteurs and sommeliers may appreciate what the half bottle has to offer, sales of the glass 375 ml bottles continue to, at best, remain static. But tastes change as do generational preferences. How the half bottle fares today is a reflection of this—but tomorrow is another day. **WBM**

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Retail Sales Analysis
Wine Sales Slip as Half-Bottles Grow

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Sales Value Slips in December

Off-premise table wine sales slipped 1 percent to $1.5 billion in the four weeks ended Dec. 28, according to scan data tracked by Nielsen. This stood in contrast to activity in the latest 52 weeks, which saw sales rise 1 percent to $14.4 billion.

Sales Volume Drops 4 Percent

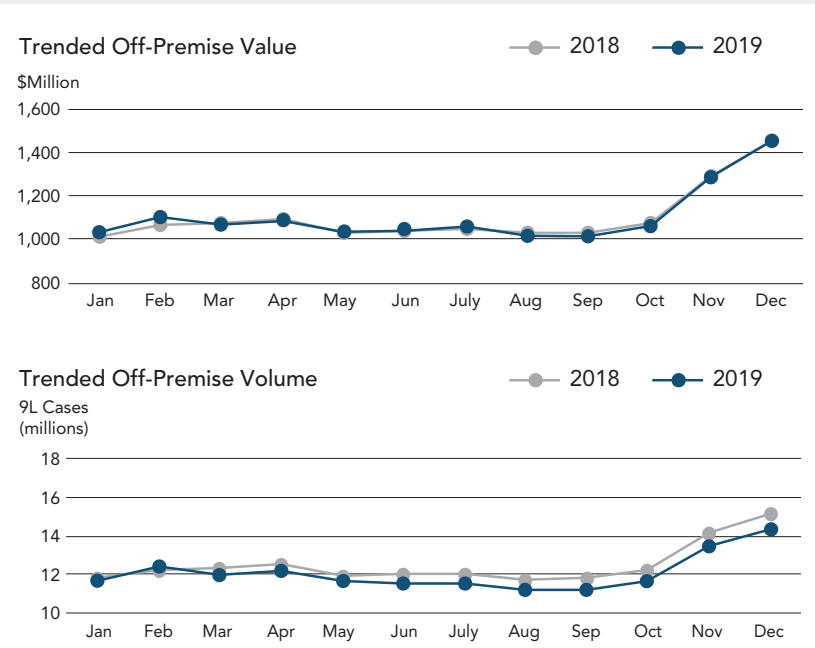
Off-premise table wine volume fell 4 percent to 14.6 million 9 L cases versus a year ago in the four weeks ended Dec. 28. The decline was an acceleration of movement in the latest 52 weeks, which saw volume drop by 2 percent to 158.4 million 9 L cases.

Half Bottles Remain Robust

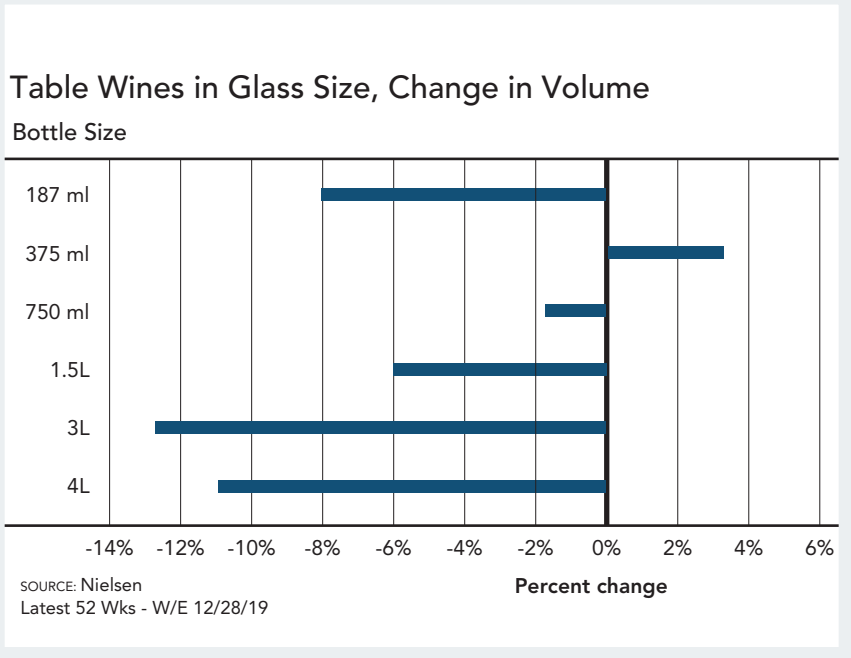
Shifts in consumer purchasing haven't impacted all wine formats equally. The most resilient segment of table wines in terms of both value and volume has been 375 ml glass packages, which saw sales exceed $20 million in the 52 weeks ended Dec. 28 on a volume of 73,572 9 L cases. The segment was alone in seeing sales value grow versus a year earlier. It also continued to post volume growth as all other packaging formats saw volumes sold decline.

Consumers' shift toward more moderate drinking patterns is a common reason cited for the popularity of smaller formats, including half-bottles. However, it comes at a cost: the average unit price of more than $11.45, or $22.91 per 750 ml, is the highest of any size of glass packaging. That's more than twice the average cost of the standard 750 ml bottle ($10.67), and more than triple that of 187 ml bottles (just $1.73 per unit, or $6.93 per 750 ml). Moreover, the average price of half bottles posted the strongest increase of any glass packaging format, rising 4 percent, or 47 cents a unit (94 cents per 750 ml).

While all formats of glass packaging saw average prices increase in the latest 52 weeks, those seeing the most significant gains were the 375 ml and 750 ml formats. Adding in shifts in volume, Nielsen data indicate that consumer interest is consolidating around these two formats for table wines in glass. **WBM**



SOURCE: Nielsen. Latest 4 Wks - W/E 12/28/19



SOURCE: Nielsen
Latest 52 Wks - W/E 12/28/19

Methodology

Sourced from Nielsen, these figures represent off-premise retailer wine sales to the consumer aggregated across a variety of channels nationwide, including grocery, drug, mass merchandisers, convenience, dollar, military, as well as a selection of warehouse clubs, and liquor channel geographies and liquor channel retail chains. Nielsen figures are updated and released every four weeks.

Nielsen Table Wine Category Segments **MARKET:** Total US xAOC+Conv+Military+Liquor Plus **PERIOD:** Week Ending **December 28, 2019**

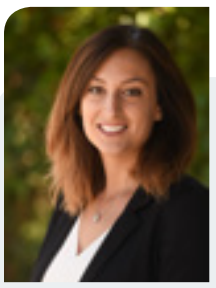
		Dollar Value		Dollar Value % Chg YA		9L Equivalent Volume		9L Equivalent Volume % Chg YA		Avg Equivalent Price Per 750ML	
		Latest 52 Wks - W/E 12/28/19	Latest 4 Wks - W/E 12/28/19	Latest 52 Wks - W/E 12/28/19	Latest 4 Wks - W/E 12/28/19	Latest 52 Wks - W/E 12/28/19	Latest 4 Wks - W/E 12/28/19	Latest 52 Wks - W/E 12/28/19	Latest 4 Wks - W/E 12/28/19	Latest 52 Wks - W/E 12/28/19	Latest 4 Wks - W/E 12/28/19
	TOTAL TABLE WINE	**14,438,999,196**	**1,454,399,697**	**0.6**	**-1.1**	**158,423,691**	**14,611,962**	**-2.2**	**-4.1**	**7.59**	**8.29**
PRICE TIERS BY CONTAINERS	BOX	1,427,835,459	117,598,364	5.3	3.4	33,997,444	2,768,431	1.6	-0.7	3.50	3.54
	$0-$3.99	575,952,056	46,534,032	-1.2	-2.1	19,832,746	1,585,728	-2.9	-4.8	2.42	2.45
	$4+	850,913,782	70,603,996	10.2	6.7	14,152,833	1,177,244	8.5	4.9	5.01	5.00
	Total Table Wine Glass	12,730,989,762	1,314,793,216	-0.2	-1.6	121,101,866	11,584,393	-3.4	-5.0	8.76	9.46
	Value Glass $0-$3.99	636,254,531	52,042,412	-6.8	-8.2	15,746,616	1,291,054	-8.6	-9.2	3.37	3.36
	Popular Glass $4-$7.99	3,082,680,511	271,267,089	-5.5	-8.0	46,557,066	4,108,691	-6.4	-9.2	5.52	5.50
	Premium Glass $8-$10.99	3,267,145,413	317,029,445	-3.2	-5.9	28,742,359	2,808,463	-3.8	-6.7	9.47	9.40
	Super Premium Glass $11-$14.99	2,868,170,044	299,437,866	5.4	3.3	18,974,715	2,006,225	5.3	3.5	12.59	12.43
	Ultra Premium Glass $15-$19.99	1,441,806,926	167,703,235	6.7	4.5	7,063,699	829,817	7.0	5.3	17.00	16.84
	Luxury Glass $20-$24.99	596,542,051	71,364,995	6.1	4.2	2,278,534	274,338	5.4	3.5	21.81	21.67
	Super Luxury Glass $25+	792,460,281	126,155,035	2.8	2.4	1,638,003	244,391	1.3	0.8	40.30	43.00
IMPORTED	IMPORTED	3,820,476,453	378,213,455	0.2	-1.8	39,473,285	3,671,636	-2.0	-4.3	8.06	8.58
	ITALY	1,211,794,506	138,810,373	1.6	-0.8	10,393,386	1,106,167	-1.1	-3.8	9.71	10.46
	AUSTRALIA	716,867,053	64,866,007	-2.1	-2.1	11,716,768	1,017,614	-2.7	-3.4	5.10	5.31
	FRANCE	484,607,915	43,064,147	2.6	2.4	2,915,681	244,714	-2.5	-2.8	13.85	14.66
	CHILE	253,863,524	22,373,414	-1.7	-7.1	3,840,191	329,328	0.0	-6.3	5.51	5.66
	SPAIN	158,611,559	16,086,506	-5.9	-6.2	1,985,301	181,319	-5.3	-6.0	6.66	7.39
	GERMANY	75,505,558	8,840,736	-7.8	-8.7	714,235	83,691	-8.7	-10.1	8.81	8.80
	NEW ZEALAND	505,947,847	43,559,817	8.3	5.9	3,625,188	309,076	7.7	4.7	11.63	11.74
	ARGENTINA	323,255,790	31,872,676	-6.3	-9.1	3,506,173	325,021	-7.7	-9.8	7.68	8.17
	SOUTH AFRICA	22,809,196	2,041,501	-7.9	-12.7	193,268	16,800	-9.3	-13.7	9.83	10.12
	PORTUGAL	38,253,666	3,551,176	-8.2	-22.4	392,907	35,736	-14.0	-27.5	8.11	8.28
DOMESTIC	DOMESTIC	10,618,522,743	1,076,186,242	0.7	-0.8	118,950,407	10,940,325	-2.2	-4.1	7.44	8.20
	CALIFORNIA	9,560,937,253	965,850,360	0.7	-0.8	110,361,895	10,059,772	-2.3	-4.2	7.22	8.00
	WASHINGTON	608,081,353	60,620,318	-2.4	-3.2	5,032,239	498,999	-3.3	-2.3	10.07	10.12
	OREGON	218,670,566	23,961,493	12.4	9.2	1,112,617	118,156	12.2	9.9	16.37	16.89
	TEXAS	32,176,298	2,971,843	-0.7	-8.9	379,175	32,562	-4.4	-14.7	7.07	7.60
	NEW YORK	37,141,483	3,405,561	1.9	-1.6	474,578	46,615	-5.7	-5.0	6.52	6.09
	NORTH CAROLINA	40,569,807	5,058,945	0.4	0.0	422,078	50,603	-0.3	0.4	8.01	8.33
	INDIANA	23,279,243	2,595,141	-0.7	-7.1	255,488	28,263	-2.0	-8.1	7.59	7.65
	MICHIGAN	22,154,040	2,419,140	-0.5	-6.2	236,382	25,410	-2.6	-9.4	7.81	7.93
TYPES	RED	7,427,023,807	835,112,080	-0.3	-1.6	72,439,128	7,268,423	-3.2	-5.0	8.54	9.57
	WHITE	5,891,876,905	529,500,781	1.1	-0.5	69,886,533	6,005,032	-1.2	-2.8	7.03	7.35
	PINK	1,119,191,092	89,220,797	3.8	0.9	16,088,099	1,332,174	-1.8	-5.3	5.80	5.58
VARIETALS	TOTAL CHARDONNAY	2,548,611,548	222,733,606	0.2	-1.3	29,530,781	2,448,328	-2.3	-3.8	7.19	7.58
	TOTAL CABERNET SAUVIGNON	2,712,375,837	317,671,293	2.8	1.7	24,743,025	2,509,227	0.2	-1.6	9.13	10.55
	TOTAL PINOT GRIGIO/PINOT GRIS	1,344,404,899	119,398,299	3.2	1.3	17,358,094	1,478,690	2.0	0.4	6.45	6.73
	TOTAL PINOT NOIR	1,103,399,934	125,298,029	1.9	0.5	8,321,963	877,747	-1.6	-3.3	11.05	11.89
	TOTAL MERLOT	696,156,889	68,364,628	-7.3	-9.1	9,515,066	856,739	-9.4	-11.6	6.10	6.65
	TOTAL SAUV BLANC/FUME	999,545,527	86,717,664	6.7	6.2	8,721,795	744,373	5.5	5.4	9.55	9.71
	TOTAL MUSCAT/MOSCATO	631,697,229	64,906,068	-2.6	-5.2	9,504,448	937,066	-4.5	-7.2	5.54	5.77
	TOTAL WHITE ZINFANDEL	265,179,467	23,077,609	-8.1	-11.2	5,310,119	456,757	-9.5	-12.2	4.16	4.21
	TOTAL MALBEC	248,940,782	25,376,334	-6.7	-8.9	2,314,544	222,652	-8.0	-10.4	8.96	9.50
	TOTAL RIESLING	230,629,592	24,494,363	-6.7	-7.5	2,503,952	259,282	-8.8	-10.2	7.67	7.87
	TOTAL ZINFANDEL	221,075,679	22,796,190	-3.9	-5.3	1,551,685	152,085	-6.0	-6.6	11.87	12.49
	TOTAL SHIRAZ/SYRAH	142,528,019	13,497,947	-8.5	-9.8	1,591,455	141,584	-11.1	-12.2	7.46	7.94
	WHITE BLENDS (ex. 4/5L)	224,442,537	21,934,442	-2.6	-1.9	2,709,731	244,910	-2.8	-2.7	6.90	7.46
	RED BLENDS (ex. 4/5L + CHIANTI)	1,873,111,178	215,622,445	0.0	-1.2	16,924,456	1,813,179	-1.7	-3.0	9.22	9.91
	ROSE BLEND	572,490,682	39,831,359	14.5	14.8	4,838,469	350,381	12.7	10.7	9.86	9.47
GLASS SIZES	750ML	10,450,520,711	1,115,719,783	0.9	-0.6	81,569,642	8,160,338	-1.7	-3.7	10.67	11.39
	1.5L	2,011,520,035	176,018,943	-4.7	-6.5	34,327,352	2,990,737	-5.9	-7.7	4.88	4.91
	3L	58,906,729	4,931,574	-8.6	-12.7	1,484,639	120,936	-12.7	-16.8	3.31	3.40
	4L	74,593,760	6,445,914	-8.8	-7.5	2,349,726	201,688	-10.8	-8.4	2.65	2.66
	187ML	101,625,183	8,008,136	-5.6	-6.3	1,222,955	96,184	-8.0	-8.6	6.93	6.94
	375ML	20,206,349	2,124,801	8.1	12.6	73,572	7,518	3.7	21.7	22.91	23.57
BOX SIZES	ex. 4/5L	946,651,700	78,658,223	9.3	6.8	16,729,555	1,386,418	7.4	4.5	4.72	4.73
	1L	30,982,733	2,317,616	8.1	1.1	461,758	34,224	5.9	-0.8	5.59	5.64
	1.5L	26,948,395	2,125,907	1.7	0.8	529,096	41,470	1.0	-1.7	4.25	4.27
	3L	676,463,000	56,866,983	8.4	4.6	12,991,946	1,090,398	7.5	3.8	4.34	4.35
	5L	481,181,161	38,939,795	-1.7	-2.8	17,267,820	1,382,004	-3.5	-5.5	2.32	2.35
	TETRA	243,720,178	19,712,138	12.9	14.4	3,213,323	255,033	8.2	9.1	6.33	6.45

Source: Nielsen

The Long Road Ahead: The State of the Bulk Wine Market

We're at rock bottom, but how long will we stay there?

Erin Kirschenmann



Erin Kirschenmann is the managing editor for *Wine Business Monthly* and has been with the company since 2012. In addition to production responsibilities for the monthly trade magazine, she writes about wine industry trends, including business, technology, sales and marketing topics, and oversees content for WBM's eight conferences. She has spoken on industry trends at numerous conferences, including the Unified Wine & Grape Symposium and the World Bulk Wine Exhibition and guest lectures on wine, media and public relations. Erin has served as a judge in the Concours Mondial de Bruxelles since 2016 and at the Central Coast Wine Competition. She earned her Bachelor of Arts from Sonoma State University in communications with a journalism emphasis.

IF ONE HAPPENED TO drive along any road in any of the major winegrowing regions of California in December 2019, it wouldn't have been difficult to find remnants of unpicked grape clusters ripening—or raisining—on the vines. From Central Valley to Napa, and just about every region in between, the effects of an oversupply were visually evident. In some cases, entire rows of harvested vines stood in stark contrast to unpicked fruit just one row over.

Jeff Bitter, president of Allied Grape Growers, showed a video at the Unified Wine & Grape Symposium of a mechanical harvester picking through rows, dumping loosened berries straight onto the ground and not into bins.

"I have been doing this for well over 20 years and I can honestly say, you don't see these kinds of pictures very often in the industry. We are in a unique position right now, and not a favorable one," Bitter said.

The straightforward reality is that the grape and bulk wine market hit the bottom of a cycle immediately following the 2019 harvest and the industry exists in a state of oversupply. The million-dollar question remains, "How long will it last?"

Where We Are Now

In some ways, it's difficult to pinpoint exactly what this market is, or rather, what it could have been. The 2019 Preliminary Grape Crush Report confirms a smaller-than-average harvest at just 3.9 million tons but, importantly, that number does not include any tonnage left on the vine. Bitter said that as much as 200,000 tons could have been left unharvested. The hardest hit varieties: Cabernet Sauvignon and Pinot Noir.

In prime Cabernet areas, like Napa Valley and Paso Robles, growers sold their fruit for astronomically low prices. This year, it was not uncommon to hear of Paso fruit at $200 per ton, or Napa Valley Cabernet available for $700 per ton. These are the rock-bottom prices: the average price per ton of Napa Cabernet Sauvignon has decreased since 2016 and continues to decline, according to Steve Fredricks, president and partner at Turrentine Brokerage.

"The spot market price dropped some 30 percent to 50 percent from the year before, which was already down from the year before and was well below the district's average price," Fredricks said. "As we got through last year, the spot market price for old wine [from 2018 and prior harvests] dropped drastically, which it does after a very large harvest, with the challenging supply situation, and slower demand. If you needed to move Cabernet before

Variety	Total Tons Crushed		Avg. Brix Crushed		Total Purchased Tons		Avg. Brix Purchaes		Wtd. Avg. Dollars Per Ton	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Cabernet Sauvignon	574,285.9	679,476.0	25.5	25.2	415,021.8	515,165.8	25.5	25.3	1,720.61	1,683.27
Pinot Noir	263,310.8	313,848.2	24.8	24.4	182,735.4	225,652.8	25.0	24.6	1,544.54	1,675.43

CALIFORNIA GRAPE CRUSH REPORT Preliminary 2019

harvest, because it turned up a larger volume or even just to get it out of the tanks, you were competing at a California-appellated price."

It's much the same story for Pinot Noir, and Fredricks said that one cause for such surpluses is new acreage that has come online. Statewide, the average price per ton for the two main red varieties dropped to new lows: The Crush Report shows the weighted average dollars per ton for both Cabernet Sauvignon and Pinot Noir were lower than that for Cabernet Franc or Mourvédre, for example.

How Did We Get Here?

It would be easy to say that premiumization was the main driver of the oversupply, and that would be fair—to a point. Over the last decade, a great deal of effort was made on behalf of the largest wine companies to acquire prime vineyard land to secure sourcing for top-tier brands. In 2016, *Wine Business Monthly* reported extensively on moves made by E. & J. Gallo, Jackson Family Wines and other major players to buy land that, for the most part, would produce grapes suitable for $15 and up brands. The grabs were made, presumably, with the notion that the premiumization trend would continue for years to come. We entered into an undersupply situation, and grape and land prices were some of the highest ever seen.

It dovetailed with existing growers and landowners who were already increasing their plantings, and now new entrants were putting in acreage in order to capture those high prices. Those who were replanting were moving to Cabernet Sauvignon, Pinot Noir and Chardonnay—if they weren't already planted to those varieties—and the use of new technologies and better rootstocks, clones and trellising meant that those additional acres bore more fruit than ever. In addition, Bitter reports, acres were not being removed at the proper attrition rate.

Instead, the lives of some vineyards were extended, and vines stayed in the ground longer than necessary to take advantage of favorable market conditions. As a result, wine companies shifted sourcing to the Northern Interior of California and found value—the quality of the wine was much higher than the price would have suggested in this market. But the grape glut was exacerbated in California's interior, where there was little to no attrition in some of the highest-yielding acres.

To make matters worse, 2018 was an abundant harvest—the largest seen since 2013, when the results of more abundant planting and new bearing acreage came online. This all culminated in a record 4.28 million tons crushed, according to the California Department of Food and Agriculture and National Agricultural Statistics Service's annual crush report.

Then signs that the off-premise market may not be as stable as hoped started to show. Consumer demand began to fall off.

Wineries had a lot of inventory to sell through, but heading into harvest, Nielsen reported that off-premise wine sales increased just 0.9 percent in value and 0.3 percent in volume. Sales growth was slowing. Competition from spirits, beer and other beverages—even non-alcoholic beverages—developed and matured and the conversation shifted from uninhibited growth for wine to the threat of alternative beverages.

Worried about sales, wineries didn't pick up new grower contracts, or renew existing ones, hoping to first offload inventory. Tanks—and shelves—were full, and it was becoming increasingly difficult to move wine, even at the previously coveted higher price points.

This all culminated in the "Great Grape Glut" of today. However, the good news is that the state of the grape supply is cyclical.

Where Does the Industry Go From Here?

Bitter said the only way to solve the issue, particularly in the short-term, is to start pulling out acres. "This isn't a one-time 200,000 tons long situation," Bitter said. "We're potentially going to be 200,000 tons long each year if we don't make the acreage correction." That acreage correction amounts to about 30,000 acres in the state, but he also pointed out that those acres need to come off the top of a normal attrition each year in order to bring supply and demand into balance. This should be the peak, he said.

The market has survived oversupply cycles before, and evolved out of them, Turrentine's Fredricks added. "We're always in evolution. Even through the good times, it's an evolution of quality, style and variety that goes on. We have adapted and innovated throughout these cycles, and especially during these oversupply cycles, to attack the marketplace."

One of the most obvious ways to take advantage of opportunities presented by the oversupply is to work strategically with retail and restaurant partners to establish private label or special edition brands. Fredricks has seen small-volume businesses making these moves, though this solution will take a long time to pan out and affect the overall wine market. In a previous cycle, particularly the bottoming out in the mid-2000s, wineries did much the same, but with varying degrees of success: Fredricks noted that at that time, when wineries had no tank space left at their facilities, they established custom crush partnership agreements to create low-priced, one-off brands for retailers.

Walter Clements, founder and CEO of Meta Wine, developed a supply chain that sources from wine producers around the world, then packages the wine at his Chicago-based facility in an effort to bring quality wine at an affordable price to local wine consumers. Though he does source international wines for his brands, the majority of his offerings are made in the United States. For him, quality and price are top of mind when looking to build partnerships.

"We buy finished wine that is produced with fruit grown locally in the region with which the varietal is indigenously associated. We believe that wine is best when made from the freshest grapes that are picked locally and vinified immediately where the fruit is grown. So quality is our number-one focus," he said. "Our efficient supply chain ensures value—wine that over-delivers on quality for the price. We look to create an extraordinary rapport between price and quality."

That said, he's also looking for something that lasts more than one year of oversupply. "Then, it's the people. Do we want to work with them for decades? The answer has to be yes. One indicator of a strong prospective partner is a multi-generational winery with a multi-generational team of employees."

Looking to consumer needs, and meeting them where and how they want to drink, could be another solution. Putting wine into cans has been touted as a popular option but isn't necessarily the most straightforward.

"If the wine is produced as an afterthought, which is a way of saying if you purchase bulk wine, that wine has been produced; it hasn't been produced thinking it's going to be canned. It's been produced as a regular bulk wine," said Artesa Winery winemaker Ana Diogo-Draper. "If your intention is to can that wine, you really need to have a technical approach."

For the wine to be successfully canned, it must be properly treated, Diogo-Draper said. Sulfur dioxide use must be reduced as much as possible because, not only does it lead to reduction, it will create pits in the can's liner. In addition, if copper levels are too high the liner will further degrade.

International Market Potential?

Unfortunately, there will most likely not be a great deal of interest in our excess wine from international markets. At the World Bulk Wine Exhibition, the focus of discussion revolved not around how to take advantage of low-priced American wine, but rather how to capture the American consumer and increase sales of foreign-made wine.

Though prices for California fruit and wine are at, what we consider, extremely low levels, those prices are still higher than what international buyers and retailers would see from the wines of Chile, Argentina and other grape-producing regions. Though Europe experienced its own abundant harvest in 2018, a shortage in 2019 evened out their market, Fredricks reported, and overall the long-term supply forecast is even with demand.

The problem, at least for this oversupply cycle, is that quality continues to grow worldwide, and without high costs of business (such as land and labor prices, among many others), foreign wines are very appealing. Consumers in the United States, particularly younger legal drinkers, see that value.

Tariffs aren't necessarily stopping the flow of wine from other countries, either. Spurred on by the 25 percent tariff levied on many European wine producers, Clements looked to the World Bulk Wine Exhibition to work with suppliers to continue to bring their offerings to American drinkers, while protecting margins through his co-packing program.

"The quality very often over-delivers for the price. Many producers that we work with are not selling in the U.S, so have not been shouldering, over time, the marketing expense of operating in the U.S. market, so the wine doesn't carry an inflated price-tag," he said. "Fundamentally, we want to expose U.S. wine lovers to new wine discoveries that excite them and lead them to seek new wine experiences. Albariño could be the new Pinot Grigio, and Grignolino and Schiava should be the new red patio pounders this summer."

However, variables change, Fredricks said. Australia, devastated by wildfires, could look to purchase bulk to bolster programs; China, the greatest buyer of Australian wines, could look elsewhere if it's needs aren't met. Civil unrest in Chile could upend that market and producers could look elsewhere for supply.

Proactive Measures are the Only Line of Defense

All this said, sitting around and waiting for the cycle to return to a high isn't the right strategy. "If you, as a participant in the wine business, aren't thinking 'What can I do differently? What actions can I take?' and are sitting around waiting for others around you to make their moves … then you're falling behind and you're going to feel the negative effects of these downward cycles," Fredricks said. "This market we're in, of excess and challenge, is also a market of opportunity in terms of new things that can be developed for consumers."

Until then, Bitter returned to the vineyard for the solution. "We can't wait to grow into, or for the market to grow into, our supply. We simply, if we want to correct the balance of the market, have to pull vines out. That's the only answer in terms of a short order fix," he said. Meaning, proactive measures need to be taken, by either the growers or wineries—pinning hopes on increased demand from the consumer is not a strategy Bitter encourages. **WBM**

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How Silver Oak's new Alexander Valley winery dramatically reduces, reuses and recycles

Jim Gordon

Jim Gordon, editor at large for *Wine Business Monthly*, writes and edits articles on grape growing, winemaking and wine marketing. He has been covering wine and the wine business for more than 35 years, notably as the editor of *Wines & Vines* from 2006 through 2018. A role as contributing editor for *Wine Enthusiast* magazine began in 2014, in which he reviews California wines and reports on various California wine regions. He was executive director of the annual Symposium for Professional Wine Writers at Meadowood Napa Valley from 2008 to 2015. Dorling Kindersley (DK Books) of London published his first book as editor-in-chief, *Opus Vino*, in 2010, which was chosen as a finalist in the James Beard Awards. In 2002 he was co-creator and managing editor of the long-running Wine Country Living TV series for NBC station KNTV in San Jose/San Francisco.

A WINERY FIRE, A brewery design and a grade-school environmental club were a few of the diverse inspirations that led to the building of one of the most sustainable wineries. Silver Oak Cellars' new facility near Healdsburg, Calif. showcases a dream fulfilled for CEO David Duncan, his family and staff members.

The dream came to life with the 2017 opening of a gleaming winery, spacious offices and contemporary tasting room set among 75 acres of vines. These occupy Silver Oak's 113-acre property in the Alexander Valley AVA of Sonoma County, where it produces 80,000 cases of wine—all of it Cabernet Sauvignon.

The original Silver Oak winery is in Napa Valley, and both facilities have made highly sought-after wines under separate appellations for decades. The Duncan family also owns several vineyard properties in both Napa and Sonoma, and the Twomey Cellars in Healdsburg.

Duncan's priorities for the Alexander Valley winery site and vineyard, which Silver Oak bought in 2012, were energy and environmental sustainability, high-quality wine production and economic viability. As it turned out, these were not conflicting concerns if given time to bear fruit, Duncan said.

It became the first commercial winery in the world to earn LEED Platinum status for building design and construction and also incorporated numerous innovations that improved conditions for the wine and for the employees.

Aftermath of Fire

Duncan, whose father co-founded Silver Oak in 1972, said he became interested in sustainability long before it was a buzzword. His older brother, Tim Duncan, helped start a grade-school club called Clean Land, Air & Water (CLAW). David joined too, and still has a certificate from the school principal dated in 1978 to prove it.

In 2001, Tim and David Duncan took over ownership and management of Silver Oak from their father. Perhaps their biggest challenge as business owners came in 2006, when a fire destroyed the original winery in Oakville.

While rebuilding that winery, David began in earnest to implement sustainability measures. When construction was completed in 2008, the Leadership in Energy and Environmental Design (LEED) organization awarded the winery a Platinum Certification for an existing building, operations and maintenance.

But it was a 2014 presentation from the founder of Sierra Nevada Brewing Co. that galvanized Duncan's determination to out-do the Oakville winery at the new Alexander Valley winery. Ken Grossman addressed a meeting of the Napa Valley Vintners' trade association at about the time Silver Oak acquired the property. The pioneering craft brewer laid out his ambitious plans for a new brewery in North Carolina that he was convinced could earn LEED Platinum status, the highest certification level.

PHOTOS SILVER OAK CELLARS

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Duncan said, "I walked up to him afterward and said, 'If you can do it with beer, then I can do it with wine.'" Haley Duncan, Tim's niece, became the project manager for the construction and a specialist on sustainability measures in the process.

Silver Oak embraced the concept of "reduce, reuse and recycle" in this winery. Goals included becoming net positive for energy and net positive for water, which means producing more energy and water than consumed. The energy goal has been achieved largely through solar panels that produce more than 1 megawatt of electricity per year, which employ massive batteries to store the electricity, and other efficiency measures.

Water use in the winery has been pared down to 1 gallon of "new" groundwater per gallon of wine produced, thanks to rainwater capture and a membrane bioreactor. Situated in its own building, the bioreactor uses microbes and oxygenation to neutralize the wastewater from the cellar so it can be reused infinitely for anything that doesn't touch the wine directly. Carbon filters and ultraviolet radiation finish the process.

All these measures resulted in Silver Oak becoming the 2019 recipient of the California Green Medal Leader Award, presented by the California Sustainable Winegrowing Alliance and other California wine organizations committed to sustainability.

Taking on the Challenge

The Alexander Valley property was deeded in 1877 to Cyrus Alexander, for whom the valley was named. Beginning in 1956, it was owned by the Demostene family, who grew winegrapes and built the Sausal Winery in 1973. After acquiring the land and winery for an undisclosed sum in 2012, Silver Oak began a plan to revamp the property with new vines, new buildings and a new outlook. Winemaker Nate Weis joined Silver Oak in 2014 and transitioned to head winemaker in 2016 as director of winemaker Daniel Baron retired.

Not coincidentally, the opening of the new in 2011 gave Silver Oak a concrete example to follow, not necessarily in all details but in the scope of its ambition. Weis had studied winemaking at Davis, which offered a winery design course under professor Roger Boulton, who was the mastermind of the new campus winery. Duncan, Weis and others saw what Davis had done.

"Roger was treating this in a way that said, 'I think this can be done at a commercial level,'" said Weis. "David likes nothing more than a challenge. So that really sparked the idea for this whole project. We're building a winery that we want to make as sustainable as possible. And how do we know we succeeded? The LEED Platinum status recognizes that and our next step, the Living Building Challenge, goes even further."

The LEED certificate recognizes achievement in building design, materials and construction, while the Living Building Challenge, run by the International Living Future Institute, measures success in operating the buildings with ongoing sustainability; specifically, fossil-free, net-zero energy. Silver Oak has applied for this further certification based on its 2019 performance.

Going Solar

Major buildings on the property include a complex of connected production, barrel cellar and administrative buildings that total 90,000 square feet, and a separate 1,000-square-foot hospitality center with a commercial kitchen, as well as the water treatment building.

Architect Daniel Piechota intended the buildings to "frame the vineyards," so there is almost no spot from which a vine cannot be seen. They incorporate plenty of windows, skylights and clerestories to provide the views and cut down dramatically on the daytime lighting needs.

The buildings share a minimalist, barn-like silhouette, constructed from concrete, steel, glass and wood. KS Shadowline steel panels with insulation built-in form many of the wall sections. The winery and hospitality center are clad in redwood reclaimed from winery tanks at the long-defunct Cherokee Winery and recut as sheathing.

Collectively, the buildings hold 2,595 rooftop solar panels. These feed power not immediately needed immediately to a jet-black stack of Powin Energy 330-kilowatt capacity batteries designed as a backup for a portion of the winery systems and with plenty of room left to expand as needs and technology improve.

"Right now there is not a lot of payoff in backing up all the energy we would need for a certain amount of time," Weis said. "But in the future, maybe. The beauty of this is it's scalable."

Software monitors the property's micro-grid of electrical energy. "It's basically software that is looking at how much power the facility is projected to use," Haley Duncan said. "How much charge does the battery have? What is the cost of grid electricity? What is the weather? When is the right time to actually use the power stored in the battery as opposed to pulling from the grid?"

Weis added, "It's all predicated on peak pricing, basically. It's a way to—it sounds worse than it is—but to cheat Pacific Gas & Electric, basically." On a chilly but sunny day in January the energy monitor showed solar power accounting for more than half the energy used, while the grid of PG&E supplied the rest. During much of the year, that situation is reversed, and Silver Oak sends power out to the utility. The balance of activity shows Silver Oak generating more energy than it uses on a yearly basis, Haley said.

Water and Steam

Wineries traditionally need a lot of water, specifically hot water, to clean-equipment, hoses and barrels. Heating that water is energy-intensive. Silver Oak's approach to reduce that energy load was to use carbon dioxide heat pumps for most hot water production and to switch to steam for cleaning barrels, a notoriously water-intensive job.

"Of all the technologies that we've invested in, I think the heat pumps are one of the things that worked the best," Haley said. "We have a little bit of back-up capacity when we need to use a lot of hot water for harvest, and it was pretty exciting to see that we only used the backup system six weeks out of the year. So the rest of the time, the CO_2 heat pumps were working perfect."

The Mayekawa Eco Cute Unimo W/W heat pumps are highly efficient, electric-powered units that heat water, using the liquid-to-gas phase change of CO_2 as the refrigerant instead of an ozone layer-damaging hydrochlorofluorocarbon. Haley said they work slowly but well, heating water to 194° F. "If we aren't watching and the water runs out, it takes a full 24 hours to replenish."

As for the steam cleaning, an electric-powered generator provides the steam. This type of cleaning requires so much less water to start with than hot water cleaning that the switch made sense, both for water and energy conservation, Weis said. An automated barrel-washing and filling line by Tom Beard also conserved a lot of labor hours, he noted.

Ammonia is used as the refrigerant to cool the air for barrel storage, using GEA 40VMX and 60VMX ammonia reciprocating compressors. However, the standard refrigerant, glycol, handles the tank temperature control.

As for the people spaces, Haley said that figuring out the heating and cooling was among the first initiatives her team tackled. They chose an HVAC unit by Mitsubishi, a City Multi VRF (variable refrigerant flow) that could reuse waste heat that it generated in the heating and cooling. She said it was a technology they already used successfully in the Oakville winery.

Payback Period

Planning the new winery for maximum energy and water sustainability was an idealistic environmental goal, but was it smart financially?

"Every single decision we made has a payback, and the longest payback period is five years," David said. "The payback on the membrane bioreactor water treatment plant comes from the fact that it saves space. To install the usual treatment ponds, we would have had to take 2 more acres out of use for vines. At 8 tons per year, times the cases of wine, times our margin, it works out pretty well."

Earning the LEED Platinum credential and having so many sustainability features also make the winery a more attractive destination, especially for Millennials and Generation Z, Duncan said. It gives the hospitality and marketing staff plenty to talk about in addition to the wine. Visitor traffic has more than doubled on an annual basis in the new winery, he said. "People who come to Healdsburg for wine basically come here, and we've had many nice things written about us." WBM

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Winemaking & Wineries

1821 Fine Wines & Spirits announced that Michael Wolff joined the company as head of consumer and trade marketing, effective Jan. 13, 2020. In this role, Wolff oversees marketing, communications and public relations for 1821 Fine Wines & Spirits, a Zonin Family Company. He comes to the position with more than 20 years of experience in the wine and spirits industry, specifically in strategic wine and spirit brand planning and management, with a focus on execution and growth.

Peachy Canyon Winery hired Skylar Stuck as its new director of sales. Stuck is a 30-year wine industry veteran who has spent the last 23 years working to build brands and promote wines crafted in Paso Robles and the Central Coast. Most recently, Stuck worked as general manager at Bonny Doon Vineyard in Santa Cruz, Calif. Previously he was general manager at Halter Ranch Vineyard for seven years and senior vice president and export director at Hope Family Wines, both located in Paso Robles, Calif.

Scott Reed

Round Pond Estate owners Miles MacDonnell and Ryan MacDonnell Bracher announced that Scott Reed has taken over as director of national and international sales for Round Pond Estate. The position was previously held by Diane Cline. Reed first joined Round Pond Estate in Jan. 2015 as midwest regional sales manager before being promoted to Eastern division sales manager in May 2017, then national sales manager in March 2018.

Fess Parker Winery hired wine sales veteran Jeremy Moore to its sales team. Moore is based in Florida and overses Fess Parker Winery's distributor and retail account relationships across the Southeastern United States. Moore has spent the last nine years with direct management and sales responsibility for industry leader Walt Disney World Company, managing more than $6 million dollars in sales volume and working closely with more than 100 suppliers within the Breakthru Beverage Group.

Thomas Woodley

Avennia hired Thomas Woodley as its new national sales director. Woodley brings nearly 20 years of wine sales and distribution experience to the company. He spent 15 years with Woodward Canyon, where he led national and international distribution initiatives for the renowned Walla Walla winery. He was also vice president of sales when he left Woodward Canyon in 2018, and oversaw sales and distribution in 33 states and six countries. In his new position, Woodley leads all domestic and international sales distribution programs for Avennia.

Charles Smith announced that Philip Tardy joined his company as senior vice president of sales, representing K Vintners, SIXTO, ViNO CasaSmith, Substance, B. Leighton and POPUP. Tardy brings more than 20 years of experience in the wines and spirits business. In his new role, he oversees the entire sales organization across all U.S. and international markets.

Elizabeth Pressler and Spencer Graham, founders and proprietors of Elizabeth Spencer Winery in Rutherford, Napa Valley, announced that Brian Kelleher has joined their company as general manager. Kelleher is a veteran wine executive, who was previously employed by Pahlmeyer LLC in Napa, Calif., for the last seven years. During his tenure at Pahlmeyer, he held several positions, most recently as vice president, sales and marketing where he was responsible for sales, marketing, and strategic planning development.

Ali Paterson

V. Sattui Winery promoted Ali Paterson to vice president of marketing. Paterson is responsible for the winery's marketing and promotional efforts, communications and public relations. Paterson has held previous positions at V. Sattui Winery, including office manager, direct-to-consumer marketing manager and, most recently, director of marketing.

Bion Rice, CEO and director of winemaking at Sunstone Vineyards & Winery in Santa Ynez, California, announced his resignation from the business, handing over control to his family and new investors. Since he took the helm of the Santa Ynez winery in 2011, Rice successfully repositioned the Sunstone brand, which attracted investors. The change in management comes with his decision to focus on his Artiste wine brand as well as his new consulting firm, Cultivate Growth Advisors.

Far Niente Family of Wineries and Vineyards hired Vida DeLong as its new vice president, direct-to-consumer sales. A 26-year veteran of winery consumer-direct businesses, DeLong was most recently senior director, consumer experiences at Ste. Michelle Wine Estates, where she over saw direct-to-consumer (DTC) programs at wineries in Napa Valley, Oregon and Washington. In her new role, DeLong manages DTC sales at the luxury group's wineries, which include Far Niente, Dolce, Nickel & Nickel and Bella Union in Napa Valley, and EnRoute in Russian River Valley.

Eden Rift appointed Jennifer Leslie as its national sales manager. Leslie brings a multidisciplinary background to her new role. She's held previous positions at distributors Skurnik Wines and Chambers & Chambers, while simultaneously managing her own wine brand, Vitis Jenifera, focused on low-intervention winemaking and social justice. In her new position at Eden Rift, Leslie works closely with distributor, retail and restaurant buyers, as well as with consumers at in-store tastings and established consumer events around the country.

Hope Goldie has been promoted to director of winemaking at Darioush after working alongside founding winemaker, Steve Devitt, for nearly 15 years. Devitt assumed the role of director of viticulture and oversees all vineyard management and grower relations. Goldie earned her Masters in Enology from the University of California Davis in 1998. After cellar work at Opus One, Sierra Nevada Brewing Co. and Stag's Leap Winery she began her career at Darioush in 2005 as enologist and then winemaker in 2012.

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Frescobaldi Toscana announced Michael Miller as its new vice president of sales and operations in the U.S. Previously the U.S. area manager, Miller will continue to grow the U.S. business through import, distribution and sales. He will also act as the liaison for Manicaretti, the importer for Frescobaldi's olive oil brand Laudemio, the duty-paid importers Shaw-Ross International, and the duty-free agent Slainte Wines, Inc.

Frescobaldi Toscana also announced Andrea Orsini Scataglini as its new communications manager. As communications manager, Scataglini assists in building relationships with journalists and opinion leaders around the world. Scataglini has a WSET level 3 certification and is a membersh of La Confrère des Chevaliers di Tastevin Vins de Bourgogne. Prior to taking on this new role, Scataglini managed communications for Tenuta dell'Ornellaia and Masseto for 11 years.

Haynes Vineyard hired Nico Cueva as head winemaker. In his new role, Cueva will direct and oversee all winemaking operations. Cueva comes to Haynes Vineyard with several years of experience in the wine industry, including harvest, cellar and full-time winemaking positions in California's Santa Barbara and Sonoma counties as well as abroad in South Africa and Australia.

Sally Nightingale

Napa Valley's Cuvaison Estate Wines appointed new small lot and research winemaker, Sally Nightingale. In this position, Nightingale focuses on exploring the character and diversity of unique blocks within Cuvaison's 200-acre Los Carneros estate vineyard and contributes her expertise to the company's Brandlin Vineyard as well. Nightingale works alongside winemaker Steve Rogstad to produce Cuvaison's small-lot and micro-lot wines, as well as the winery's legacy wines.

Sonoma Collection announced Mike Cox as winemaker for all winemaking projects. Cox worked alongside vintner Walter Schug for the past 25 years, crafting wines from vineyards in Sonoma Valley, Sonoma Coast and Carneros. Cox graduated from UC Davis with a degree in enology in 1991 while working his way up through local wine cellars. He joined Schug Winery in 1995, taking over the winemaker role when Schug approached retirement.

Le Vigne Winery hired Terry Culton as its new winemaker. Culton has worked with several wineries throughout coastal California and Oregon including Peachy Canyon Winery, Adelaida Cellars, Calera Wine Company and Willamette Valley Vineyards.

Craig Miller also joined Le Vigne Winery as its national sales manager, leading the company's efforts to expand distribution within the U.S. market. Most recently, Miller was the national sales manager for Peachy Canyon Winery where he guided the winery's U.S. distribution network as well as its export business. He holds a degree in marketing from the University of Southern California in Los Angeles.

RaeLynn Zenzius

Alma Rosa Winery & Vineyards hired RaeLynn Zenzius as its director of business development. Zenzius joins Alma Rosa after most recently working as general manager of Santa Barbara County's Kalyra Winery, working in production, bottling, DTC sales and event management. In addition to her experience at Kalyra Winery, Zenzius has earned her WSET Level 1 certification and is currently enrolled in the Sonoma State University Wine Business program.

Mezcal De Amor S.A.P.I. De C.V. (owners of Mezcal Amores in Mexico, known in the United States as Mezcal Amaras) appointed Shelley Turner senior vice president of sales and operations, further expanding its sales and marketing efforts in the U.S. Prior to Mezcal Amaras, Turner was the vice president of sales for Q Artisanal Cocktail Mixers; before that she managed Stolichnaya Vodka and Moet Hennessy and was instrumental in launching Belvedere vodka in both the U.S. and Canada.

Distributors, Importers & Retailers

Burke Beverage announced that Chicago-based master sommelier Douglas Marello was named the company's new general manager of wine and spirits. In his new role, Marello leads the effort to implement a new vision for the company that strives to attract new supplier partners and develop new customer relationships for the organization while continuing the growth trajectory of its current supplier partners.

Industry Services & Suppliers

Vicard Group USA Inc. hired Jeff Vaughn as Tonnellerie Vicard business developer for Sonoma County, Oregon, Central Coast and other strategic West Coast territories. Vaughn has 13 years of wine industry experience, including management of fine dining restaurants, an associate wine director role at The Hotel Del Coronado in San Diego, wine and spirits distribution, U.S wholesale sales and, most recently, as a wine ambassador for Napa Valley's Peju Province Winery.

Wineshipping, LLC appointed Eric Lewis as its new chief executive officer. Lewis comes to the position with extensive logistics, supply chain, e-commerce and operations management experience, including roles at Amazon and Google Express. Reporting to the board of directors, Lewis officially stepped into the role as of Jan. 20, 2020.

WineBid welcomed Matt Torrie as its new CFO. Torrie came to the company from Zulily, where he helped it grow from $300 million to over $1.5 billion in revenue. While at Zulily, as part of management, he facilitated the initial public offering (IPO) process and later acquisition by QVC. He received his accounting degree from the University of Washington and began his career at Deloitte.

Zepponi & Company announced Kevin O'Brien as its newest principal. O'Brien, a licensed CPA, first joined Zepponi & Company in 2015 with extensive professional experience focused on the wine, beer and distilled spirits industries. He has since helped expand the renowned advisory firm's strong wine base in the Pacific Northwest, as well as into the larger beverage alcohol category. Prior to joining Zepponi & Company, O'Brien worked at Portland-based accounting firm Irvine & Company with numerous winery, brewery and distillery clients on corporate advisory matters, including financial modeling, strategic planning, and mergers and acquisitions.

Le Grand USA hired Devin Fowler as West Coast account manager. Fowler is currently studying for his Level 1 and 2 sommelier test. At just 24 years old, he already brings almost 10 years of food and wine experience to his new position. His new territory includes California and Oregon.

Devin Fowler

Coravin, Inc. appointed Christopher Ladd as its chief executive officer. Frédéric Levy, who occupied the role since 2015, stepped down January 31, 2020. In his new role, Ladd leverages his deep experience across consumer, retail, marketing, and e-commerce to strengthen the Coravin brand. Ladd brings more than 20 years of experience from previous companies, including Crocs, Lululemon and New Balance. The majority of his experience has focused on digital, retail, ecommerce and marketing in addition to successfully scaling businesses globally.

StaVin announced Alex Quirici has joined the company as business development specialist. In this new role, he manages the company's customer relationships in Napa, Sonoma, the Central Valley and the Sierra Foothills. Quirici previously worked for Southern Glazer Wine & Spirits and, most recently, Tonnellerie O cooperage. He has a degree in business economics from the University of Oregon.

Syntegon Technology appointed Dr. Michael Grosse as new chief executive officer. Most recently, Grosse was a member of the management board of Tetra Pak. He has management experience in the international mechanical engineering industry, particularly in the areas of process and packaging technology for the food industry. Grosse joined Tetra Pak in 2003 and was, among other things, responsible for expanding the global services business. He took on his new position on March 1, 2020.

Saxco named John Berry as the company's new chief executive officer. Berry, who most recently served as chief operations officer and senior vice president of strategy at Optimas OE Solutions, brings more than two decades of experience leading distribution businesses across multiple industries. Former CEO, Guy Marsala, will continue with the company as chairman of the board of directors.

Associations & Education

The board of directors of Wine Women, a 501(c)(3) nonprofit, voted in Nicole Cummings as its new president. Cummings is the director of human resources for Cakebread Cellars. She holds the Professional in Human Resources certification, was a recipient of the "40 under 40" award from the *Midlands Business Journal* in 2012, and is an active member of Society of Human Resource Management, *Forbes* HR Leadership Council, Wines Vines & HR and citizen's advisory committee for the Napa Valley Transportation Authority.

The board of directors of the National Association of Wine Retailers (NAWR) elected David Parker, owner and CEO of Benchmark Wine Group, as its president for the two-year term beginning January 2020. Devin Warner, president of Chicago Wine Company, was elected vice president. John Hinman, founding partner of Hinman & Carmichael serves as secretary and Jeff Zacharia, president of Zachy's Fine Wine serves as treasurer for the two-year term.

Cain Hickey has been hired by Penn State as the statewide viticulture extension educator. Cain is currently the viticulture extension specialist in the Horticulture Department at the University of Georgia and has presented at numerous academic and industry conferences across the nation. He's also authored peer-reviewed journal articles and extension publications. His most recent research focuses on cultivar evaluation, pruning, trellising and fruit-zone management in relation to crop yield and quality and spring frost mitigation. He begins his new role at Penn State in May. **WBM**

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Bob & **Maggie Tillman**, owners , Alta Colina, Paso Robles, California

BOB, director of winemaking | **MAGGIE**, director of sales/marketing

"Having spent many years in the electronics business, I am familiar with a lot of different trade publications in different markets. Hands down, *Wine Business Monthly* is by far the best I have read. It dominates our business with a great mix of theory vs. application, product vs. process, vine vs. wine, market analysis vs. sales strategy, and finance. Quite simply—it is the go-to source for all things wine."

Bob Tillman

"In the last five years we've gone beyond a traditional tasting room with the additions of our Cellar Door Tasting, Summit Vineyard Tasting and Trailer Pond vineyard campground. We've found success with all three experiences across different consumer audiences – and all three were created with *WBM* consumer data in mind. *WBM*'s coverage of tasting room trends as well as salary information has been invaluable as we grow our business and our team."

Maggie Tillman

JULIA P GARRETT

NAME AND TITLE: Bob and Maggie Tillman, Owners, Alta Colina
Bob, director of winemaking; **Maggie**, director of sales/marketing

WINERY NAME AND LOCATION): Alta Colina Vineyard & Winery. Our vineyard sits atop two 1,750-foot mountains in the Adelaida District of the Paso Robles AVA. We planted in 2005, focused completely on Rhône varieties. Since 2013, we have farmed organically. After 8 years in a neighbor winery, we built our own winery in 2014, nestled in the canyon 500 feet below our vineyard.

ANNUAL GRAPE/TONNAGE: The vineyard gives us 100 tons each year with roughly +/- 20 percent vintage variation. In 2019, we fermented 51 tons, selling the remainder to several world-class wineries in Paso.

PLANTED ACRES: 31 acres: 80 percent red, 20 percent white—all Rhônes.

CAREER BACKGROUND:

Bob: As my daughter, Maggie, is fond of saying—for 35 years I was an electrical engineer by day and a home winemaker by night. After retiring, I bought a 130-acre ranch in the Coast Range west of Paso Robles and set about creating our brand.

Maggie: Like my dad, Bob, I didn't see a career in wine coming. Armed with an undergraduate degree in linguistics, my plans to continue my studies in that field were derailed when a "break from school" led to my first tasting room job. After working with four other great Paso wineries, I transitioned to working with my dad to launch the first vintage of Alta Colina in 2009. Since then, we've built a small but mighty team and continue to focus on quality in everything we do.

WHAT HAS BEEN YOUR BIGGEST PROFESSIONAL CHALLENGE?

Bob: Given that we went from a little book learning and a barrel in the garage to 3,000 cases a year of estate bottled Rhônes, this could be an extensive listing! In reflecting, we find the challenges to be uncompelling—instead, our thoughts turn to the impressive core of Paso people who have helped us along the path, and the incredible luck Mother Nature has sent our way. Alta Colina is as much about the journey as it is about the destination.

VARIETALS THAT YOUR WINERY IS KNOWN FOR: We usually bottle six reds and four whites per vintage. It is a mix of varietal labels and blends. Our signature wines are the Toasted Slope Syrah, Claudia Cuvee Marsanne, and GSM.

Friends in the Cellar

ILLUSTRATION BY BOB JOHNSON

IN THIS DETECTIVE'S EXPERIENCE, people are overly wrought with owning things, especially prestigious, expensive things. I don't know why, but this has never been important to Jake Lorenzo. It really hit home when we were forced to evacuate during the Wine Country fires. We took some clothes, a few cases of wine and a bunch of food from our freezer. I grabbed our passports and some documents, and we were out the door to stay with friends out of the fire zone. Things, in and of themselves, hold little cachet for this detective. Friends, on the other hand, are a big deal. Over the course of our lives, Jakelyn's mother and I have been blessed with scores of wonderful friends, and each one of them contributes to the way we live our life here in Wine Country.

Don't get me wrong, Jake Lorenzo owns plenty of stuff, but most of it is utilitarian or reminiscent of memorable things in our lives and not necessary to our survival. Our walls are festooned with the brightly colored art we brought back during our many trips to Mexico, but almost every piece brings back a welcome memory. We own countless sets of dishes, but only so we can serve multi-course meals to our friends while we open bottle after bottle of wine. I have my Cajun microwave, our boil pots, the container for frying turkeys and my sausage stuffer, but those are practical items necessary if we are to take care of our friends and provide the food to which they have become accustomed.

I'm not much of a fisherman myself, although I like drinking on boats, and I'll drop a line in the water to keep you company. My friend Dr. Iggy Calamari has made a science out of fishing. When he fly-fishes in the Sierras, I can count on having a couple of fresh trout for dinner, even though he releases most of his catch back to the wild. Every summer he goes to Alaska, where he catches salmon, halibut and rockfish. In a good year, he comes home with more than 100 pounds of fish that has been flash frozen and vacuum packed. That is more than one man can eat, so he is always looking for friends with whom he can share his fish. Jake Lorenzo is a good friend, and Dr. Calamari makes sure I have plenty of fish.

Chuy Palacios is the finest attorney I know, but his legal skills are a sorry second to his cooking chops. Life doesn't get much better than spending time with Chuy at a table quaffing interesting wine while devouring scrumptious food, especially if Chuy has cooked it. He is a great travel companion despite his propensity for inviting young women along who prefer to shop and do "spa time." He loves to laugh, which this detective thinks is a primary requirement of any friend.

Jakelyn's mother and I have a diverse set of friends from wide-ranging walks of life. Friends visit us from Mexico, Argentina, England, France, Italy, Spain and almost every state in America. We remain close to friends who were once baseball players, actors, teachers, boat captains and airplane pilots. We still hang out with tequila makers, chefs, writers and scientists. We can pull a cork with vineyard managers, winemakers or even tourists who just stop by to check out the garden.

Whenever one of these friends shows up, we take advantage of the wine cellar. This detective stores close to 1,500 bottles of wine in the cellar. I don't have a lot of expensive, renowned bottles (although there are a few), but there is a great eclectic collection of fine wines made from countless grape varieties from a myriad of countries by talented winemakers. I have the perfect wine for almost any occasion—I simply need to peruse my cellar to discover that precise bottle and bring it to the table. As stated in the historic motto of the New Mexico Wine Patrol, my job is to select and serve. Think of it as Jake Lorenzo's version of fly fishing, except in this case nothing is catch and release.

Rummaging through my cellar, selecting a bottle of wine is a difficult, but rewarding task.

First off, you need to pay attention to who is drinking. If it is Jakelyn's mother, then we are probably going with Pinot Noir—and not too old or she'll scrunch up her nose and say, "Cedar chest." That translates as, "This doesn't taste as fruity as I like, and I don't have the patience to see if it will open up into something wonderful."

When I'm selecting for novices, I like something delightful like a Torrontes, or a Pinot Blanc or a lighter Côtes du Rhône. Choosing is easier if I'm pairing the wine with food, but I am still looking to charm my friends with unique varietals. An Italian dish might be perfect to show off the Elena Walch Schiava, while my Spanish tortilla tapa may be perfect accompaniment for the Cune Reserva.

There is no way we can empty the wine cellar before this detective turns in his investigator's shield. I'd rather drink a bottle too early than never, so pick what you want.

If the Fonsecas are visiting from Mexico, then I need to bring something delicious and challenging, like an aged Sauvignon Blanc from Spottswoode or a Syrah from La Madres Vineyard, but I better bring a bottle of tequila as well, because they will want to show me how it matches up with the food.

One thing we love doing with friends is letting them loose in the wine cellar. No matter how diverse my cellar, there are times when it seems to me like the same old same old. That's when I send a friend into the cellar to pick out anything that might interest them. Often, they fear they will select some special bottle. I assure them there are no special bottles. I explain that Jake Lorenzo has a huge wine cellar and a daughter who doesn't drink. There is no way we can empty the wine cellar before this detective turns in his investigator's shield. I'd rather drink a bottle too early than never, so pick what you want.

It's all about friendship and hospitality. If friends make the effort to visit, the least we can do is generously entertain them with food, music and stories. Wine makes all those things better, especially when all you have to do is make a choice and pull a cork. **WBM**

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