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A Mega Deal, Innovation + Quality and Adapting to Climate Change

JUST AS WE WERE wrapping up production of the May issue, big news dropped in the wine world: Constellation announced the sale of 30 wine brands and six wineries to E&J Gallo for $1.7 billion. The wineries are Mission Bell in Madera, California; Turner Road Vintners in Lodi; Clos du Bois in Healdsburg; Wild Horse in Templeton; Hogue Cellars in Prosser, Washington, and Canandaigua in New York. People are wondering how this is going to play out, i.e. what Gallo will do with the brands, wineries and former Constellation employees. CEO Joseph Gallo sees the acquisition as an opportunity to bring new consumers into the wine category.

The May issue also coincides with the 2019 Innovation + Quality (IQ) conference. IQ is a forum for ultra-premium wineries focused on innovations that advance wine quality, including trials. IQ includes a Winemaker Trials Tasting where winemakers showcase wines from lab trials as well as full-scale production experiments.

To say that we feel trials are important is an understatement. In this issue, two esteemed winemakers collaborated on an article that explains the benefits of conducting wine trials, how to select trials, go about them most effectively, and more. It's a comprehensive look at trials and one that, we hope, inspires you to try more of your own. Another article in this issue reviews results of trials *Wine Business Monthly* has featured during the past year.

The May issue reveals the fifth annual Innovation + Quality Innovative Product Award winners and includes a recap of last year's IQ session on oxygen management during fermentation and pre-fermentation in the early stages of wine production.

We've been hearing a lot more about climate change these days and have all experienced more extreme weather events lately. There's more recognition that the global climate is changing. An article *WBM* published in the January 2019 issue discussed forecasts which indicated Napa could experience temperature increases that aren't compatible with luxury-priced Cabernet by the mid-21st Century.

This issue also includes a recap of from a forum on climate change that was hosted at Larkmead Vineyards in Napa by winemaker Dan Petroski, who says there is no single topic that's more important than climate change and detailed how it will affect our day-to-day life and our livelihoods.

Researchers around the world are starting to recognize the need to assess climate and its impact on viticulture. One initiative, the LIFE-ADVICLIM project, aims to study climate change adaptation and mitigation scenarios for vineyards across Europe. Researchers continue working to develop winegrapes that are resistant to fungal diseases as well. Along these lines, an article in this issue looks at a collaboration in France that has produced grape varieties capable of fighting mildew and powdery mildew, two diseases with occurrence rates that are expected to increase to the extent that temperatures warm.

All of this, as well as articles about vine row orientation, innovations in packaging, the release of oxygen from closures after bottling, recruiting tasting room employees, the booming wine industry in Texas, and a list of the Top 100 vineyard owners in Napa await in the May issue.

Cyril Penn, editor

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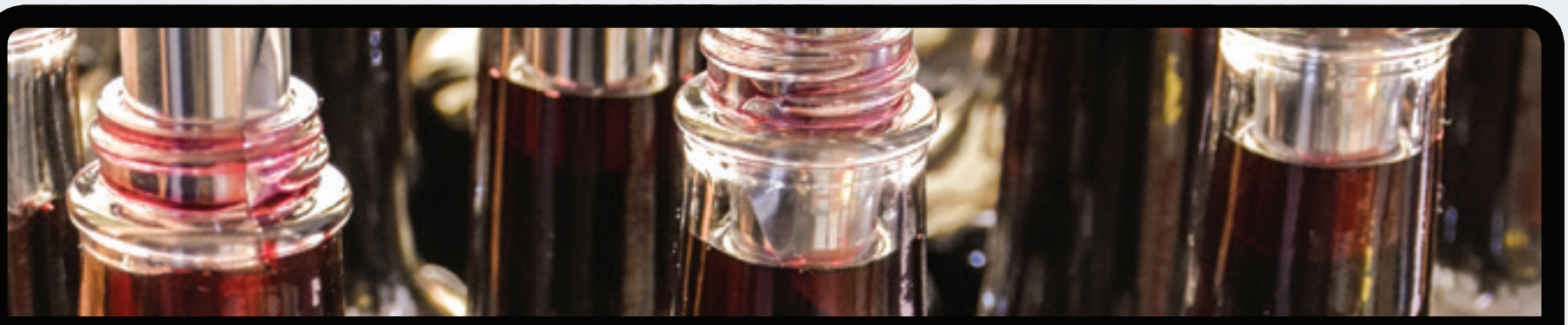

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who's talking in this issue

Julie Lumgair and **Cara Morrison**, consulting winemaker and winemaker, Sonoma-Cutrer Vineyards, "How to Set Your Vineyard and Winery Trial Up for Success," page 20

"Ideally, all experiments should be run multiple times and evaluated with the correct sensory statistical tests, but this is real life. Jump in anyway."

Kevin Sass, winemaker, Halter Ranch Vineyards and Winery, "Managing Oxygen in Fermentation for Wine Quality and Style," page 48

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Vincent Pugibet, Domaine de la Colombette, "In France, Researchers are Putting Resistant Grape Varieties to the Test of Sustainable Development," page 106

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Lance Winters, master distiller, St. George Spirits, "Master Distiller Lance Winters Addresses the Wine Industry at 2019 Unified Wine & Grape Symposium," page 126

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Jason Moore, winemaker, Modus Operandi, "Wineries Create Custom Glass Bottles to Build Brand Recognition," page 112

"There's a huge ocean of competition out there. What are you going to do as a brand to have a customer pick up a bottle and explore more?"

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

E&J Gallo Agrees to Buy 30 Brands from Constellation for $1.7 Billion

Constellation Brands has decided to sell more than 30 of its wine and spirits brands to **E&J Gallo** for $1.7 billion, the companies announced early April. Gallo will acquire wine production facilities in California, Washington and New York states. The deal requires regulators' stamp of approval. Constellation, of Victor, NY, said most of the 30 brands from its wine and spirits portfolio are priced $11 retail and below, including **Black Box**; **Clos du Bois**; **Capri**, **Richards Wild Irish Rose**, **Ravenswood**, **Hogue Cellars** and **Mark West**. Gallo also is acquiring the following wineries: **Mission Bell**, **Turner Road Vintners** and **Wild Horse** in California; **Hogue Cellars** in Washington, and **Canandaigua** in New York.

New Lawsuit Filed Over To Kalon

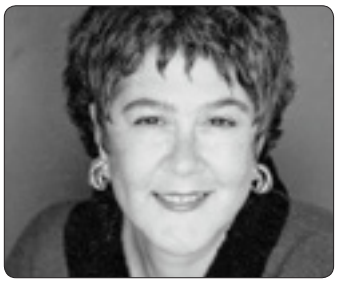
A Napa Valley wine company has filed a lawsuit against **Constellation Brands** over its **To Kalon** trademark, the name of the vineyard **H.W. Crabb** established in 1868 in the heart of the Napa Valley. **The Vineyard House**, which owns 17 acres of To Kalon vineyard, wants the trademark cancelled, according to the complaint. **Beckstoffer Vineyards** and **Robert Mondavi Winery** have fought in court over the use of the vineyard name. Wines produced with fruit from the vineyard have labels that read "Beckstoffer To Kalon Vineyards."

Vintage Wine Estates Buys Central Coast Winery

Vintage Wine Estates has purchased **Laetitia Vineyard and Winery** from businessman **Selim Zilkha**. The winery is slated to become the hub of Vintage Wine Estates' Central Coast wine production. The price for the property was not disclosed. Laetitia is in the Arroyo Grande American Viticultural Area. The sale includes the 35,000-case winery and 680-plus acres of vineyard land. About 287 acres are planted in vineyards. Laetitia winemaker **Eric Hickey** has become a member of the Vintage Wine Estates winemaking team.

Renovated Tasting Room Opens at Louis M. Martini

The tasting room at **Louis M. Martini** near St. Helena opened to visitors on March 29. **Howard Backen** of **Backen, Gillam & Kroeger Architects** led the renovations of the 1933 winery building. The design features an open floorplan; 30-foot-high glass walls with views into the barrel cellar; a demonstration dining room; and an underground cellar. The winery welcomed visitors during the renovations in the adjacent Monte Rosso tasting room. **E&J Gallo** purchased Louis M. Martini Winery in 2002.



Wine and Restaurant Writer Lisa Shara Hall Dies in Oregon

Longtime wine and restaurant writer **Lisa Shara Hall** died peacefully in March in Oregon after a four-year battle with Lou Gehrig's disease and related dementia. She was 66. She contributed to the ***Oxford Companion to Wine***, ***Decanter***, ***Wine***, ***Wine Business Monthly*** and other publications. Born in Newark, N.J., Lisa moved to Oregon to attend **Reed College** in Portland. She remained in Portland for the rest of her life. Lisa was the main restaurant news critic for ***The Oregonian*** during the 1990s. She then started writing about Oregon and Washington wines. She co-authored "The Food Lover's Companion to Portland" and later wrote "Wines of the Pacific Northwest." Survivors include her husband of 30 years, **Kirk Hall**.

Eastern Winery Exposition Draws More Than 900 Visitors

More than 900 people attended the **Eastern Winery Exposition** on March 19-21 in Syracuse, N.Y. The program included workshops on sparkling wine; microbial management; cold climate grapes and wine updates; and other topics. The event also featured an auction. Dr. **Chris Gerling**, extension associate for enology at **Cornell University** and president of the **Eastern Winery**, and **Art Carmichael** of **National Winery Insurance**, led the auction to raise scholarship funds for the **American Society for Enology and Viticulture-Eastern Section** – or ASEV-ES. The Eastern Winery Exposition alternates between Lancaster, Pa., and Syracuse. **WBM**

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INNOVATION+QUALITY *Awards*

Fifth Annual Innovation + Quality Innovative Product Award Winners Announced

WINE BUSINESS MONTHLY's editorial mission is to help wineries and growers evaluate and successfully deploy innovative new products. Throughout the year, we write about new products and new product categories that are advancing quality in the wine industry. From these, as well as submissions from winemakers around the world, and with help from the 2019 **Innovation + Quality Advisory Board**, the winners of the fifth annual Innovation + Quality Innovative Product Awards were chosen based on innovation relevant to ultra-premium wineries.

Smoke Taint Removal ConeTech

The **ConeTech** team has developed a new and proprietary method of smoke taint removal that uses a combination of low-pressure spinning cone distillation which removes smoke taint while leaving as much as possible of the original, untainted aroma compounds in the wine. ConeTech also developed other targeted molecular adsorption chemistry, to remove smoke taint compounds. During testing, ConeTech tracked more than 10 compounds, including 4 methyl guaiacol, syringol, methol p-cresyl ether, o-cresol, and o-guaiacol. *Wine Business Monthly* senior technical editor **Curtis Phillips** tasted two-year-old samples at the **Unified Wine & Grape Symposium** and believed the process to work, important given the number, and size of, wildfires in the past few years.

NDtech Amorim

Following a 5 year, 10 million research and development investment, **Amorim** released NDTech, an individualized quality control screening technology for natural cork stoppers that promises to be a natural cork with a non-detectable TCA guarantee (releasable TCA content at or below the 0.5 ng/L quantification limit; analysis performed in accordance to ISO 20752). The new chromatography machine can analyze each cork in seconds, thus reducing the testing time. Existing chromatography machines typically require up to 14 minutes for each batch of corks. Its screening technology can pinpoint a cork that has more than 0.5 ng/L of TCA and remove the cork from the supply chain.

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*releasable TCA content below the 0.5 ng/L quantification limit; analysis performed in accordance to ISO 20752.

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RoboBottle **G3 Enterprises**

The RoboBottle is the first project from **G3 Enterprises**' Open Innovation Lab, and focuses on enabling a more efficient, higher quality bottling experience. At its core, the RoboBottle is a tool to aid the bottling-line mechanics in setting the line for a particular bottle shape. RoboBottle uses set of sensors and small computer in a bottle-shaped package to gather data that determines whether the capper is operating at peak performance. With its associated app, called BottGuide, the G3 RoboBottle gives bottling line mechanics near-realtime feedback and advice for setting-up and maintaining screw cappers.

Autonomic Bird Laser **Bird Control Group**

The Autonomic Bird Laser is a bird repellent system that uses a fully automated robotic laser that runs 24 hours a day to scare birds away from a vineyard. It acts by providing a preventative shield of light that moves sporadically around the vineyard, frightening birds without noise. **Bird Control Group** says that customers have seen a 70 percent reduction in bird nuisances.

Zenith **Enartis**

The Zenith® range, developed by **Enartis**, is a new solution to the many challenges of wine tartrate stabilization. Potassium polyaspartate (KPA) based Zenith inhibits formation and growth of potassium bitartrate crystals, thus preventing their precipitation in bottle. Zenith is effective for tartrate stability with a long lasting stabilizing effect, no negative impact on color, respectful of wine sensory characteristics and environmentally sustainable. Zenith is the result of six years of research in collaboration with public and private European institutions, universities and other major players in the winemaking industry. **WBM**

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How to Set Your Vineyard or Winery Trial Up for Success

Trials are an essential part of your winemaking regimen

Julie Lumgair and Cara Morrison

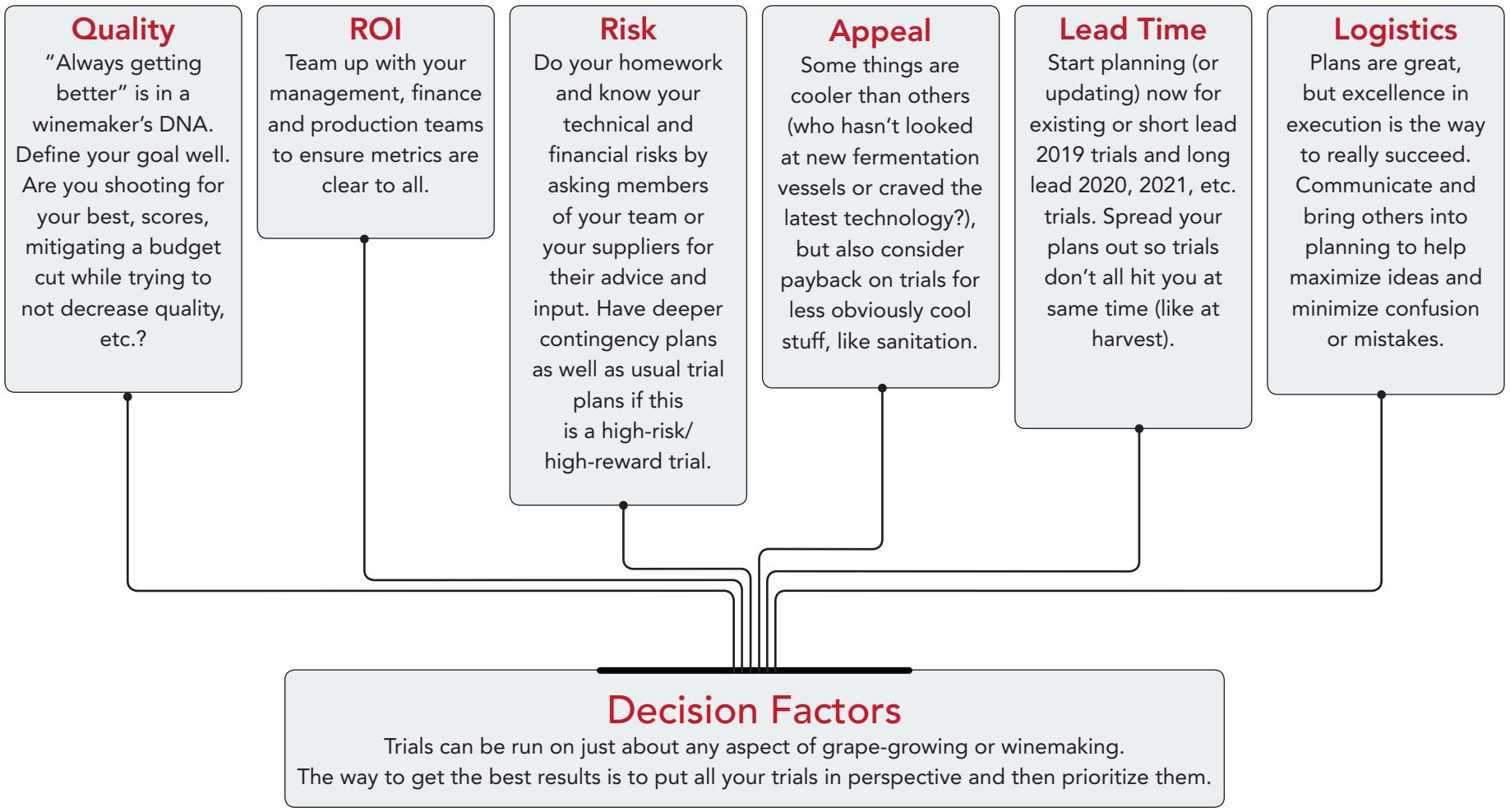
Julie Lumgair is a noted consulting and hands-on luxury tier winemaker for J. Moss and other wineries. Her wines span fourteen vintages and 23 varietals from nine of Napa Valley's world-class AVA's, Italy, and Sonoma's Russian River Valley, Chalk Hill, Alexander Valley and Knights Valley AVA's. Her calling cards are consistently producing wines that garner acclaim, distinctly farming and expressing vineyards, excellence in operations and a passionate attention to customer delight and lasting relationships. Prior to wine, Lumgair spent years in the Fortune 500 as a GM and new products specialist in leading food and oral care consumer packaged goods.

Cara Morrison is the winemaker at Sonoma-Cutrer Vineyards. When it comes to making wine, she brings an uncommon wealth of knowledge and passion. A native of San Jose, she earned her Bachelor of Science degree in fermentation science from the University of California at Davis. After college, Morrison spent a year traveling the other winemaking regions of the world, working at wineries in Australia, Chile and New York while also studying the craft in New Zealand, Eastern Europe, Italy, Germany and France. Morrison also held positions at Jekel Vineyard and Fetzer Vineyards.

THE MOST RISKY PHRASES in life are "Because that's how so-and-so did it" rivaled closely by "That's how we've always done it." Yet, you hear it a lot in the winemaking and grape-growing business because it may feel like a rock to stand on.

But play that out long-haul and it's not a win. Copying the past without question or sitting still is not a strategy for quality, growth or staying competitive in a fast-changing world. Perhaps easier, but riskier. Reflecting on the old and new **Fortune 500** (even in the last 20 years) it is clear that even scale is not insurance.

Just because one method or technique works for one winemaker does not mean it works for another. And, even if you invest in continuously improving your wines and vines, every vineyard, vintage and cellar are a bit different. Adapting to curve balls and embracing new ideas is how our industry has been able to reach new heights of quality, creative expression and efficiency. The beauty of making wine is that there are so many variables; a winemaker can explore any number of options in pursuit of the best possible wine. So how to sort it all out?



Why Trials Are Important

If you aren't running trials, you could be wasting money on unnecessary products or treatments. You could be missing out on the next opportunity to move your wine to the next level. The change could be something as simple as fermenting at a different temperature or adjusting your vineyard micronutrients.

Ask yourself if there is anything you do because you just *feel* it's right. Is it something that takes a lot of effort? Is the money spent on creating value? Does the extra work result in a positive difference? How do you know, truly know, if it's worth the time and effort? This is why you do trials—to find out, to prove to yourself that you should be doing that or that you could save a lot of money.

Another barrier to trials can be the perfectionist in you. If you can't run the trial in triplicate with ideal controls, then why bother? Ideally, all experiments should be run multiple times and evaluated with the correct sensory statistical tests, but this is real life. Jump in anyway. Perhaps run the same trial on big decisions three years in a row, with improvements each year, as your triplicate. Your results may not be publish-worthy, but all they need to do is drive a fact-based conversation that leads to good decision-making about whether this product or process is worth the cost and effort.

Trials are also about patience. Try things in multiple vintages. It's agriculture. Be ready to adapt to the vintage as it unfolds. Just because you like a yeast one year doesn't mean it's going to be great every year. Same with "that" block in the vineyard, your coopers, and everything else. Just because it worked for one vintage doesn't mean it works every vintage. There are no recipes in winemaking, just the ability to read a vintage, be informed by experience, keep exploring and adapting the plan to hit goals.

Determining the Trial

Let's say you may be warming up to the idea of trials. The next step is deciding where to put your attention. How do you prioritize? Trials that should have priority are those that are going to make a big difference in your quality (wine or grape) and your bottom line—ideally both. The second part of the quest is determining what is realistically possible. Understanding what you can execute is all about evaluating your circumstances. Look at how much bandwidth you've got, as well as what you need to do, not just want to do.

Most winemakers regularly perform bench trials on blends and winemaking enhancement products. But there are many other opportunities in operations. Trials on materials and methods can often hit higher ROI payoffs. Look at your wines' final quality, plus less glamorous topics like water usage, handling practices and more. Walk around your own operation with fresh eyes and an open mind and talk to front line cellar and vineyard workers—this can be a trials goldmine.

CONSIDER CUSTOM CRUSH VERSUS IN-HOUSE WINERY TRIALS

Priorities differ based on what you have available, such as working in your own winery, where you have control over cellar priorities and practices, or when making wine at a custom crush house, where you may have limited influence.

Let's use a malolactic fermentation (MLF) trial as an example of a trial that doesn't get much buzz but has definitely been beneficial for cost and quality, as seen from two perspectives.

A. **CUSTOM CRUSH**: If you're a consulting winemaker or producing wine in a custom crush house, you get into environments where you are not the controlling winemaker. Now, your number one priority is protecting high-value red wine in a cellar you do not control. A great trial may be around different strains of malolactic bacteria, wine temperatures, and the amount of agitation that can finish ML faster. This helps protect your wine, therefore mitigating any split lot expense of the trial.

B. **COST AND QUALITY**: If you make wine in-house and you're on your own cellar floor, you know if there are threats of other bugs or not, and so quality assurance trials may not necessarily be a top-of-mind concern. You can run a similar trial as above, but you may have more time and confidence in a clean cellar. You can get more creative and start looking at the timing of additions (co-fermentation in early primary fermentation or adding at mid-primary fermentation) or play with addition rates to stretch your malolactic dollar. Since you have more control over the site, you can analyze and taste the wine more often to be sure the trial doesn't go sideways. The objective can be both quality/sensory difference and lowering costs.

Trials Ideas

Grape Growing	Harvest	Juice/ Fermentation	Aging/Wine	Cellar Practices	Bottling/ Packaging
Clones, rootstocks	Calling picks	Co-fermentation	Malolactic bacteria and nutrients	Sanitation products	DO control
Canopy management	Hand versus machine or different mechanical harvesters	Yeast, nutrients	Microxygenation (MOX)	Months of barrel aging	Filtration
Pruning methods	Sorting: in-field, clusters, berries, optical, manual, other technical tools	Cold soak or extended maceration	Stirring lees in barrels or tanks	Racking (tools, techniques) versus quality assurance goals and efficiency	Line sanitation methods and products
Leafing: timing, method, etc.	Crush pad efficiency and throughput versus quality goals	Vessels: ampora, concrete, open- or closed-top tanks, barrel, T-bins	Coopers, toast levels, stave age, oak alternatives	Compare pumps, hose and rig set ups versus technical and labor goals	Closures: corks, screwcap, technical corks
Micronutrients	White pressing decisions (techniques, cuts)	Cap management (pump-overs, punch-downs, delestage, automated/manual techniques and devices)	Cellar humidity and temperatures (evaporation, quality assurance, cost implications)	Steam (for sanitation, oak renewal, specific microbial control, water reduction, etc.)	Aging trials
Sprays	DO control	Fermentation temperature and days in alcoholic fermentation	Racking times and techniques	Quality assurance and efficiency in wine transfers (in facility)	Large format
Irrigation	Saignée percentage and techniques	Automatic tank management software	SO_2 timing and amount	Sustainability projects	Kegs
Cover crops	Whole berry versus crushed	Tannins, acid, water, other additions	Topping lots and topping frequency	Water savings/ water reuse	Cans
Vine spacing	Direct loading vessels versus pumping must in line	Early malolactic co-innoculation	Blending varietals, blocks, etc., timing for blend decisions	Quality assurance and efficiency in bulk trucking	Box
Crop load	Enzymes and other pre-alcoholic fermentation additions	Red pressing decisions (techniques, cuts)	Fining agents, alcohol, mouthfeel enhancements	DO control	Refillable growlers

These are just some of the many thousands of trials you could run in a winery.
Take a look at your wine and your operation and find ways to experiment and improve.

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EXAMPLE OF EASY LOGISTICS, LOW-COST TRIAL

Some trials are so easy to set up, that they're no brainers. Every year new barrels come in to the winery. Put aside two barrels of each cooper/forest/toast/stave age combination into a designated area. At harvest, all the trial barrels are together and easily filled with the same exact juice and kept as one lot, resulting in an instant barrel trial with minimal effort. Now you can evaluate the barrel quality without the variance of different wine lots.

EXAMPLE OF COMPLICATED LOGISTICS, POTENTIALLY LONG-TERM ROI PAYOFF TRIAL

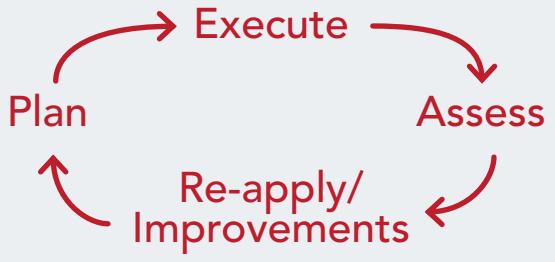
If you are looking to lower your barrel-purchasing costs, but are not sure how to make the best wine in tank, you can trial the various micro-oxygenation machines, tank stir devices and oak alternatives. The options are endless, though you have to do your homework by talking to vendors and colleagues for advice on what may work best. Once you decide how to set up your trial in various tanks, make sure you use the same lot in tank and barrel for a complete comparison. It will take a lot of work and multiple vintages to fine tune what you like, but the payoff may be huge in the end.

EXAMPLE OF QUALITY-MINDED, MODERATE- TO HIGH-ROI TRIAL

Moving to screw cap or another closure to eliminate or reduce TCA has an added side benefit of costing less. Don't jump all at one time. Trial a small bottling that is wine club only to see how your loyal customers react to it. Taste the wine six, 12, 18, 24 and 36 months after bottling to see if there are quality differences. You may get rid of the TCA but create other issues. Your wine may go reductive under screw cap. Your customers may not accept this new closure in certain channels but like it in others, such as on-premise by-the-glass. Learn from these experiences and trial again.

EXAMPLE OF HIGH-APPEAL, POTENTIALLY HIGH-RISK TRIAL

You keep hearing about adding less SO_2 to juice, no commercial yeast and other, more natural, winemaking methods. This may sound like an appealing idea, but you need to be sure you havea clear plan and a lot of experience to make your wines naturally. If all your wines don't reach RS dryness, you can spend a lot of time and effort correcting that in the end. Start out small by trialing very reliable lots of wine you are familiar with, then look at the chemistry and microbial load. Learn from that first lot and then slowly expand to more lots next year, as you become more comfortable.



Every trial is an outcome in itself, but it's also a constant improvement process. You're re-creating yourself, streamlining costs and making better decisions. You need to be a life-long learner. When the trial is finished, there is still more to do: write up your results and make your conclusions, then test them again and again.

EXAMPLE OF QUALITY-MINDED, UNKNOWN ROI TRIAL

A cellar protocol for loading barrel aged wines to bottling tank blends, for example, could mean regular pump outs were done on everything except whites and Pinot Noirs which were historically bulldog pumped, leaving dissolved oxygen (DO) measurements in question. To start a trial, teach the cellar team how to benchmark in-barrel DO (consistently <0.3 mg/L) before transfers and establish a front line team that owns bottling blend quality on work orders further upstream from the loaded bottling tanks. The team measured DO pick-ups when performing the usual, faster pump-outs to nitrogen sparged tanks and found out of spec DO pick ups (+1.5 to 2.0 mg/L) as compared to the balance of those lots which used bulldog pump and sparging lines (<0.5 DO pick ups). The balance of time and aromatic quality sacrificed to sparge DO back down to pre-bottling targets easily justified the purchase of a second bulldog pump (a three-figure purchase) to double capacity, improve quality and change tank loading protocols. On volume and labor, it paid out in two weeks.

When Mother Nature Says No to a Trial

It's a well-known fact that Mother Nature is unpredictable, but it's up to the winemakers to adapt: that's our job description. There's always an opportunity to execute another trial very quickly. If you're trying to conduct a trial on leaf-thinning but you're dealt a bad Botrytis year, maybe this is the year you decide to do a Botrytis trial. There's the ability to execute—you just have to be persistent and try to put out the exact same winemaking goal in a couple of places.

Logistics, Best Practices and Top Tips

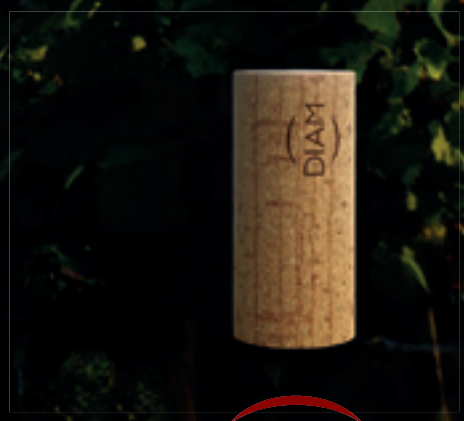
A retired physicist gave this advice, and it works for any science field:

1. Vary on one perimeter at a time
2. Always plan on repeating your work. The first time is for practice.
3. If in doubt, record data. You will never remember it and if it's not needed, you can discard it later.

The best way to plan for vineyard or winemaking trials is to do it post-harvest, because that's when it's fresh in your head. Create two to three main goals and decide on some trials then and there. That's the time to write down all your vineyard trials. Then you can make sure you have them executed for the year because you can plan for any special pruning, leaf pulling, etc., before the growing season gets away from you. The second time to evaluate trials in is spring/summer after you tasted the results of the trials and have attended different idea-generating events, such as **Innovation + Quality** (IQ) or the **Unified Wine & Grape Symposium**.

Preparation is key to a successful winemaking trial as well. If, six months ahead of harvest, you've put in the time to thoroughly think through all you'll need and how things will run, you'll have a successful trial. This is especially important if you want to test out equipment, such as field and crush pad upgrades, micro-oxygenation, stir methods or special filtration machines. The equipment may be available at the last minute, but most need to be reserved ahead of time.

“You say Diam, I say Yes!”



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Tips on Outlining Trials

Writing out your trials ahead of time can make running multiple trials through a growing season or a hectic harvest more manageable. This chart shows the items to think about when creating a trial and has vineyard and winemaking trial examples. Remember, it may not be a full-blown experiment done in triplicate that can be published, but it is something that helps you understand how different viticulture and winemaking practices can affect your wine quality and bottom line.

The vineyard example is mechanical leafing versus hand leafing. Due to labor shortages, the wine industry needs to look at mechanical methods more and more. Doing a trial of hand versus machine leafing can help you understand what difference each method makes, whether those are positive or negative differences and how to better manage machine leafing now that you know if and how it is different. It seems basic, but it is easier to learn in a trial than after you decided to machine leaf everything and realize you could have done it better.

An easy example of winemaking trials can be a simple Chardonnay barrel yeast comparison. Many vendors talk about the positive quality attributes contributed by non-*Saccharomyces* yeast, but it costs more money and time at harvest since you need to add the non-*Saccharomyces* and then add the standard *Saccharomyces* yeast a few days later. Is it really worth the extra cost and effort? The only way to find out is to run a simple trial comparing the different yeasts on the same exact juice.

Vineyard Trial Example Mechanical vs Hand Leafing	**Winemaking Example** Chardonnay Yeast
Objective Write out why you are doing this experiment. It may convince you or your manager it should be done and it helps you realize its priority.	
To compare wine quality and financial impact of mechanical versus hand leafing Cabernet Sauvignon. Compare two methods of mechanical leafing to our standard hand leafing.	To explore alternative non-Saccharomyces yeasts as a way to improve aromatics and mouthfeel in Chardonnay.
Standardize How are you going to reduce your trial down so that you are testing the one or two things you are interested in?	
Pick fairly uniform block based on history, sun exposure, soil, growing conditions, ability to mark clearly.	Use the same juice for all three tanks to compare the yeast. If the juice needs any additions, such as tartaric, add it to the mother tank before it is separated out.
Logistics Think about how you are going to handle the vineyard block or lot of wine. How are you going to keep it separate? Do you have enough material for full fermenters? Will you make enough to have full containers and topping material for aging?	
Mechanically leaf one-third of block on a.m. side only, mechanically leaf one-third of block a.m. and p.m. side, and standard hand leafing and tunneling on other one-third. Alternate treatments every three rows. Pick same time. Ferment lots separately. By lot, freerun to two neutral barrels with balance to similar new oak. If possible, press lots separately. Keep in separate barrel lots for free-run (minimum) and all (best).	Press at least X gallons of juice into one tank, make acid addition, settle 24 hours, rack into three tanks for yeast adds, go to barrel when *Saccharomyces* yeast is fermenting. Stir in barrels and top all three lots with control.
Evaluation Method and Metrics Plan how to evaluate success before doing the trial. The metrics should be aligned with why you are conducting this trial in the first place. Can your "why" be measured objectively? Will you need special equipment or an outside laboratory? If you will be tasting to determine the outcome, how will you set up tastings to remove bias and create significance to your results? For example, choose a triangle with paired, or blind duo-trio format with many tasters or many repetitions.	
Finished wine metrics drive final decision: Sensory at AF, post ML, 6 and 12 months. Use Year 1 secondary metrics for improved plans Year 2: Post green-drop test berry chemistry, phenolic panel, including IBMP (bell pepper). Ditto for juice panel and post ML wine. Record comparative grape observations, tasting and analysis during ripening. Visually compare leaf regrowth, cluster damage, rot. Take weekly field pictures at same locations. Measure TPA yields, berry and cluster weights. Record sorting observations, metrics. and differences between treatments. Keep separate in press/barrel. Triangle and preference tasting after 6 and 12 months.	Monitor Brix and temperature daily. Visual signs of fermentation or yeast counts until 15° Brix. Sensory of control versus two trial non-*Saccharomyces* yeast in a mix of ranking, triangle and preference tests.
Control/Reduce Variables What are you measuring against? You need to do the various treatments against your standard procedure to know if the new treatments are worth the time, effort and money. Make sure to minimize your variables.	
For hand leafing, use standard leafing and tunneling methods. Leaf by machine and hand same day. Irrigate, sucker, etc. in block all exactly the same. Ferment with same yeast, nutrients and other treatments.	Make sure to include a control so you can see how that juice would react with your regular yeast as compared to the non-*Saccharomyces*. Compare two non-*Saccharomyces* yeast to a standard *Saccharomyces* yeast, and use that standard *Saccharomyces* yeast as your secondary yeast.

Materials

How much product do you need to order? Do you need to rent a machine ahead of time?

If you do not have a machine leafer, line one up through your vineyard management company or neighbor. Be sure to give them a few months notice and keep remind them of your trial often so it does not get missed.	List the desired gallons per trial, various yeast you need, calculate how much yeast you need to buy, and include other details such as nutrient requirements. Again, do this now so you don't have to look it up at harvest time.

Instructions

If you are doing something out of the ordinary, such as rehydrating non-*Saccharomyces* yeast or new leafing methods, write the procedure here so you don't have to look back on any websites or other information during the busy harvest season. Review this with everyone involved with the trial to be sure that your trial is not compromised by a misunderstanding. Go over the procedure with a trusted co-worker to foresee any issues with the plan. discuss the contingencies and improve the trial overall.

Use Sunny Vineyard, block A since it is flat and even. 1. Leaf all rows same day. Machine treatment A: a.m. side only Machine treatment B: a.m. and p.m. side Hand control (C): Standard procedure including tunneling, a.m. side only 2. Mark each row treatment with color coded tape. 3. Watch leaf regrowth, vineyard manager and winemaker to decide if hand leaf again is necessary. 4. Harvest all lots same day and with the same team. Weigh separately. Collect berries or clusters for weight if possible. 5. Destem into macrobins to top load separate fermentations. Use trusted yeast A and trusted ML bacteria B on all three lots. Cap manage all lots similarly and all at same time. Keep records of yields at crush and daily AF. 6. Press separately same day/week and keep in separate barrels for sensory analysis. 7. If trial lot fails for field or AF conditions, shift to other useful data gathering but do not use this as leafing decision plan for XYZ tier of brand programs.	Procedure: 1. 15 to 20 ppm SO_2 to juice in press pan. 2. Set juice tank temp to 60°F. 3. Add any tartaric acid or other treatments as necessary. Settle overnight. 4. Rack to three tanks. 5. Saccharomyces yeast - use standard procedure. 6. Non-Saccharomyces yeast. Pour yeast into 20°C to 25°C (25 MAX) (68°F to 77°F) H_2O (1.5 gallons per 500g yeast); Do not stir. Wait 10 minutes Stir to get cells in suspension Add juice (unsulfured); 0.5 gallons per 500 g yeast Wait approximately 20 minutes Add yeast suspension to tank 7. Add Saccharomyces yeast after 3+ days 8. When juice is starting to ferment and has all the necessary heat, move to barrels for fermentation

Label Well

Labeling of trial lots is essential. Label vineyard rows clearly and in tape you can see during night picking. Have a kit in your car with masking tape, head lamp, extra batteries, and a Sharpie with you in-field to mark all bins. Pre-name block or lot codes before harvest so your team knows all names well. Invest in colored bungs or prominently mark barrels and trial topping kegs with colored tape. If you go too fast, you can, with a series of additions through toppings, mistakenly get into your control barrels and the trial is lost.

Observations

Write down how the trial actually happens. Include anything that may cause variation or how you had to adjust the trial for real harvest conditions. It's easier to collect data during the experiment than to have to repeat it. If you don't write down what happens, you likely won't remember and will repeat mistakes.

Leafing a.m. only side (treatment A) had too much regrowth and we had to go back in and hand leaf and tunnel at 75% to 85% veraison in conjunction with green drop. Cluster damage visually. Harvested 4 tons of each treatment separate and fermented. No significant difference in IBMP in treatments A versus B, significant difference versus C with hand leafing and tunneling. Fermentation rates similar. Pressed same day. Slower press day so able to press all lots separate and retain full barrels of each and separate barrels/kegs for topping.	Non-*Saccharomyces* A didn't drop much in Brix after three days so we left it in tank for 5 days. Non-*Saccharomyces* B was very active and we added *Saccharomyces* yeast after 2 days. None of the yeast foamed over in barrel fermentation. Non-*Saccharomyces* A took 8 days longer to finish. Non-*Saccharomyces* B gave an off aroma. (If you keep digital records of the Brix/temp, you can even cut and paste the data so you don't have to look for it later.)

Sensory

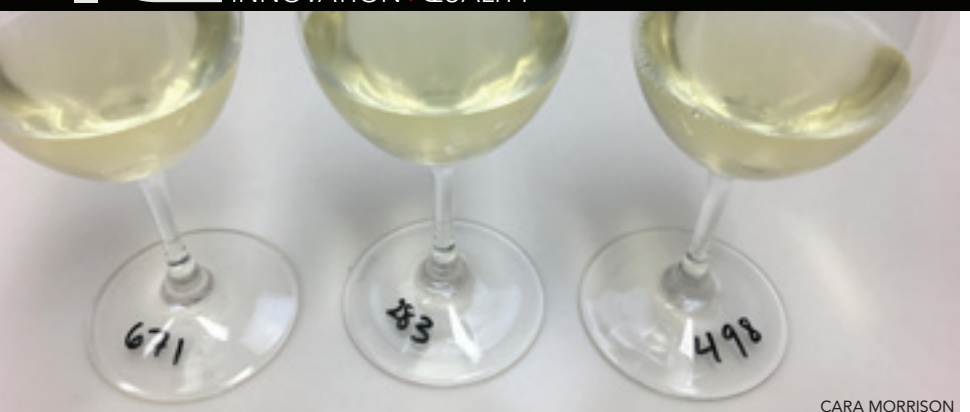
Taste wines blind and force rank No. 1 to No. 3. If you and the group feel there are big differences, run triangle tests and preference tests.

Did not do significant sensory tests on machine treatment A since we had to re-hand leaf. Group tastings show a significant difference between machine treatment B and hand leafing C, correct 7/10 triangles.	Preferred non-*Saccharomyces* A in ranking test and didn't like non-*Saccharomyces* B, the control is a solid second. Ran 12 triangles and picked out different wine 8/12 times. Proved it is different, so ran preference and group preferred non-*Saccharomyces* over *Saccharomyces* 7/12 times.

Conclusions

What did you learn from the trial? Are the results conclusive or not? Do you repeat the trial on a larger scale next year? What things would you change? Talk to vendors and colleagues about your experience and seek advice on how to improve next year.

Hand and machine leafing both sides were not similar in analyses or wine quality. Continue trialing machine leafers with adjusted protocols. Reconsider canopy configuration versus leafer available. Revisit ROI by block. Eliminate a.m.-only leafing option since we had to go back in with a hand crew. Next year, adjust machine for more leafing a.m. side, less p.m. side. Trial different mechanical timing versus hand leafing and tunneling based on dollars per ton. Do not include reserve program in mechanical trial. Hand leaf Reserve with standard tunneling shading practices.	In sensory tasting, the group eliminated non-*Saccharomyces* B and could see a difference between non-*Saccharomyces* yeast A and the control, but not a clear preference. Based on observation, non-*Saccharomyces* A took longer to start in tank and even longer to finish in barrel. Vendor recommended a different temperature and SO_2 for next year. Trial a small lot again next year since it may add complexity to the wine blend.



CARA MORRISON

An example of a triangle test setup; each wine has a three-digit code to prevent bias.

Analyzing Trial Wines Through Sensory Evaluations

The order to perform various evaluations when tasting trials is:

1. Forced Ranking: Performed to determine if any samples can easily be eliminated due to poor quality (Example: Rank by top choice, second choice
2. Triangle Test: Performed to determine if a group can correctly pick out a difference between treatments.
3. Paired Comparison: Once you prove two treatments are statistically different in a triangle test, then you can do this evaluation to see which treatment is preferred.

Other sensory test methods for trials are well-documented, but using a method of forced ranking, then triangle, then paired comparison is a solid foundation that can easily be adapted to most wineries' practices, regardless of scale.

HOW A TRIANGLE TEST WORKS:

This is a multi-purpose difference testing, also called a Duo/Trio, which helps you determine if there are noticeable differences in the final wine that are easily picked out. Three samples are presented simultaneously: two are the same (both are the control) and one is different (the trial wine). Prior to tasting a three-digit code is assigned to each sample bottle and glass—using three, three-digit codes per tasting. You can pour all the samples at the same time by marking them with random, non-biased numbers (such as 671, 283 and 498). Make sure glasses are marked and keep the key to the codes blind.

Importantly, after pouring, mix the order of samples, so each taster tastes the three wines in different orders.

If the tasters can pick the odd wine out, there is a clear difference between the trial and the control wine.

There are some statistical advantage versus other standard sensory methods.[1] Thirty-three percent is the statistical chance of picking the right samples, so picking out the right sample 50 percent or more of the time (for example) is a small difference; Study up on test a bit to determine what you think will be a statistical difference.

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HOW THE PAIRED COMPARISON TEST WORKS

- Two different wines
- Random order (AB or BA)
- Choose preferred sample for a specific attribute
- Streamlined test for notable differences versus more accurate, complex tests (Triangle Test, etc.)
- Test is only effective if the two samples are proven different. Otherwise, it's a random chance which one you pick
- Do not use this comparison as the sole decision basis for important ROI, key QA or final blend tests.

Sensory Trial Evaluation Tips

- Build your sensory memory by tasting consistently.
- Take notes across key attributes for your wine goals.
- Taste samples blind.
- Pour representative samples (clear sample ports, clear wine thief, clear sample bottles, taste out of neutral barrels).
- Conduct a quiet tasting without cross talk. Organize a discussion with an agreed upon decision-maker and statistics available.
- Check glassware for off aromas.
- Use watch glasses.
- Correct sample temperatures.
- Create a neutral aroma environment.

JULIE LUMGAIR

The afternoon before a night pick, head out to the vineyard and place all the color-coded trial bins in the correct locations to ensure that harvest runs smoothly and your trials aren't compromised.

References

[1] Cowey, Geoff and Travis, Brooke (WBM, Feb. 2009), reprinted with permission of *The Australian & New Zealand Grapegrower & Winemaker* (Aug 2008): Practical Sensory Evaluation in the Winery

Coming to Conclusions: Actionable Results

Reviewing your trial is the essential final step to determine whether your winemaking practices should change.

Ask yourself and your team some of the following questions: What are the final tasting results? Do we actually like any of this stuff? Is this cool enough to bottle as a premium product and put it out through the wine club? Are we going to do this trial again? How can we get closer to our goal? Even though the wine is gorgeous, is it worth it if we did not come out ahead financially? Perhaps most importantly, ask whether the results will change your buying regime.

From there, think about scalability. Experiments can be scaled slowly. If it worked for one year, try it again. If it still worked, try it even more. Work your way up.

Scalability implies discussions about the want as well as the possible, because sometimes you have to change your setup to scale certain types of ideas. It's a lot harder to scale up doing more whole berry on red, for example. But pumping crushed must in long must lines, especially in a year with unresolved tannins and green seeds will make lesser-quality wine, than if you work it more gently in the whole berry and get it off whole seeds faster. The test of whole berry versus faster crushing and pumping options may show immediate sensory differences and also show added time and mitigation expenses post-harvest.

Same goes in the vineyard. Are you really going to pay for this crew to go in here and put cross arms on everything? Are you going to go put something in this vineyard or keep on having to do the work-around and pick mixed block sections, select rows or fruit from different vine sides? These are important questions to ask because very rarely do you get the opportunity to pull a full replant and change row orientation, for example.

Sometimes the perfect plan is not doable, so jump in on experiments to find a workable solution.

Final Thoughts

The pursuit of innovation and quality is the life-blood in a dynamic industry with complex consumer segments and difficult distribution routes that are crowded with thousands of wines. Mastering the tools of change and confidently leading ongoing annual plans aimed at getting better and/or making an operation more profitable will serve your brand and team very well.

Having discussed the *why* and the *how* of viticulture and enology trials, now it's up to you to determine *what* you will be trialing this harvest season. **WBM**

Winemaker Trials: The Year in Review

Michael S. Lasky

Michael S. Lasky is the former editor of *AppellationAmerica.com* and is the author of hundreds of articles for national magazines and newspapers.

WINE BUSINESS MONTHLY'S EDITORS believe that trials are the embodiment of a winemaker's pursuit of quality and selected more than 20 trials to feature at last year's **Innovation + Quality** conference, a forum for ultra-premium wineries focused on cutting-edge innovations that advance wine quality.

Innovation + Quality 2019 will be held at the **Silverado Resort & Spa** in Napa, California on May 22-23, 2019. At the conference, winemakers who have conducted new trials will pour their wines so attendees/fellow winemakers can taste the wines and compare the resulting wines from each trial. The 2018 Innovation + Quality conference attracted nearly 400 winery attendees and 100 wine industry exhibitors, a similar number of each are expected for the 2019 event.

As we have done for the past year, *WBM* will feature in the magazine and online a more in-depth examination of selected winemaker's trials, probing through a winemaker's postmortem what led to the creation of the experiment and the knowledge the winemakers took away from the end results.

The editors at *Wine Business Monthly* would like to encourage more winemakers to submit their active or proposed wine trials for possible presentation at upcoming Innovation + Quality events or for publication in the magazine. Accordingly, to give some guidance and inspiration, we look back at previous trials and look forward to the topics for upcoming trials. To submit a trial for consideration and help continue to advance winemaking, please visit *https://www.surveymonkey.com/r/J7TKQZT*

A review of the wine trials presented in each issue of *Wine Business Monthly* in 2018 and early 2019 reveals a wide range of topics and technologies, all in the pursuit of increased wine quality and winemaking knowledge. Highlighted here are just some of the engaging wine trials and their results. (You will find complete versions of the summarized trials below in our monthly magazine archives posted at *winebusiness.com*.)

Comparing Oxygen Ingress Rates' Effects on Aroma and Flavor Profiles in Chardonnay

January 2018

Winemakers **Steven Rogstad** and **Matt Sunseri** at Napa-based **Cuvaison Estate Wines** had the opportunity to test a trio of alternative closures engineered with various oxygen ingress rates and accordingly wanted to see exactly just how different the aromas and flavors would be with each.

The 2015 Carneros Chardonnay was bottled with three different "zero carbon footprint" closures with different oxygen ingress rates to demonstrate the differences in mouthfeel and aroma profiles.

Lot 1: Closed with Nomacorc Select Green 500, exposed to 2.54 mg per liter O_2 YTD

Lot 2: Closed with Nomacorc Select Green 300, exposed to 2.23 mg per liter O_2 YTD

Lot 3: Closed with Nomacorc Select Green 100, exposed to 0.91 mg per liter O_2 YTD

Conclusion: At different oxygen ingress rates, the wine exhibits different aroma profiles, color and character. The Select Green 100 proved best with white wine.

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The Phenolic Challenge: Whole-Cluster Pinot Noir vs. Adding Stems Back

February 2018

Vintage to vintage, winemakers need to assess how the quality of whole clusters determine the need for a boost in tannins derived from adding stems. The differences are often subtle, as winemakers **Gina Hennen** and **David Paige** at Oregon's **Adelsheim Vineyard** learned.

They fermented one tank with 25 percent whole-cluster (75 percent destemmed) and an identical tank with 25 percent stems added back (100 percent destemmed). In each case, the stems or whole clusters were at the bottom of the fermenter. Each had a four-day cold soak. Following that, the tanks were warmed, and the fermentations started (uninoculated). Cap management was the same for each fermenter, with one to two punch-downs per day. The fermentation curves were very similar throughout, with mixed temperatures ranging from 75° F to 80° F during the height of ferment. The tanks each had four days' post-fermentation maceration, and they were pressed on the same day, for a total of 14 days on the skins.

The goal for this experiment was to explore the difference in perceived tannin between the two treatments. In more challenging, wetter weather, the option to carefully sort fruit instead of dumping whole clusters into the tank proved best. In such years, it would be helpful to use recovered stems, potentially from a different lot, post-sorting.

Lot 1: 16PN QM 16 A (Whole clusters)
Lot 2: 16PN QM 16 B (Stems)

Conclusion: The winemakers perceived differences between the two treatments, finding the stem addition to at least mimic the tannin impact of a whole-cluster fermentation. Going forward, they will consider adding stems back to a fermenter when looking to add a whole-cluster effect to a given lot.

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Napa Sparkling Winemaker Employs Vivelys' Cilyo Tool to Successfully Tame Unstable Polyphenols in Chardonnay

April 2018

By using **Vivelys**' Cilyo, a measurement tool designed to analyze the oxygen needs of white and Rosé musts, **Domaine Carneros** winemaker **Zak Miller** has found a way to take the brute out of the winery's vintage Brut.

The objective of the trial is to add a precise dose of O_2 to lower the amount of unstable polyphenols present in the taille press fraction of Chardonnay. The goal is to reach a compromise between the decrease of phenol acids and the protection of the aromas by using Vivelys Cilyo processing.

A hard press fraction of Chardonnay from the Carneros area was used for the trial. No additions of SO_2 were made during harvest or at the press to avoid the inactivation of the polyphenol oxydase (PPO) and favor the action of this enzyme to oxidize phenols. We utilized a new technology named Cilyo from Vivelys, which consists of measuring the oxygen consumption of the juice at the settling tank, right after pressing the grapes. This machine gives an exact dose of O_2 to add; in the case of this sample, 12.2 ml/L was dosed through a micro-oxygenation device. After the oxygen treatment, the tank was settled and racked to avoid re-oxidation of this compound, and we continued with our normal process of alcoholic fermentation.

Lot 1: Chardonnay Press Fraction - Control
Lot 2: Chardonnay Press Fraction - Treated 12.2 ml/L O_2

Conclusion: There are considerable sensorial differences between the control sample and the treatment sample. The treated press fraction is paler, less aggressive and less bitter, while the control remains more astringent and probably will need some fining to reach our quality standards.

Edna Valley Winemaker Compares Different Yeasts to Achieve Variability and Complexity in Chardonnay

May 2018

Niner Wine Estates winemaker **Molly Bohlman** performs trials with different yeasts on a regular basis to seek out new variability and complexities with her fermentations. In this first of a two-part trial, she compared CY3079, a yeast she uses regularly, with BRG to see how this newer yeast would affect a newer block in a 77-acre vineyard.

A block consisting of 3.17 acres of Chardonnay clone 4 on 1103P rootstock was used for the trial. The grapes were picked on the same day and pressed into tank for cold-settling. Prior to settling, the juice was divided into two tanks, each receiving a different yeast strain, one inoculated with CY3079 and the other with BRG. The juice was then transferred to barrels for fermentation. Fermentation dynamics, laboratory and sensory analysis were compared post-fermentation. Approximately 7.5 tons of fruit were ultimately used in this trial.

Lot 1: Chardonnay with CY3079 yeast
Lot 2: Chardonnay with BRG yeast

Conclusion: Fermentation dynamics (temperature and length of ferment) and laboratory analysis were similar between the two yeast strains. The BRG-ending Brix was lower than the CY3079-ending Brix, but glucose/fructose levels were the same. Both lots were inoculated with the same strain of ML bacteria and completed MLF at the same time, so no noticeable effect on ML performance was seen. Preliminary sensory notes for BRG: pretty apple/pear fruit, delicate floral, clean and focused mouthfeel, bright acidity, minerality/salinity. For CY3079: baked apple, pineapple rind, lemon meringue, less aromatic, richer/rounder mouthfeel, softer acid impression.

Part 2: Comparing Native and Commercial Yeasts to Bring Out Ideal Characteristics in Chardonnay

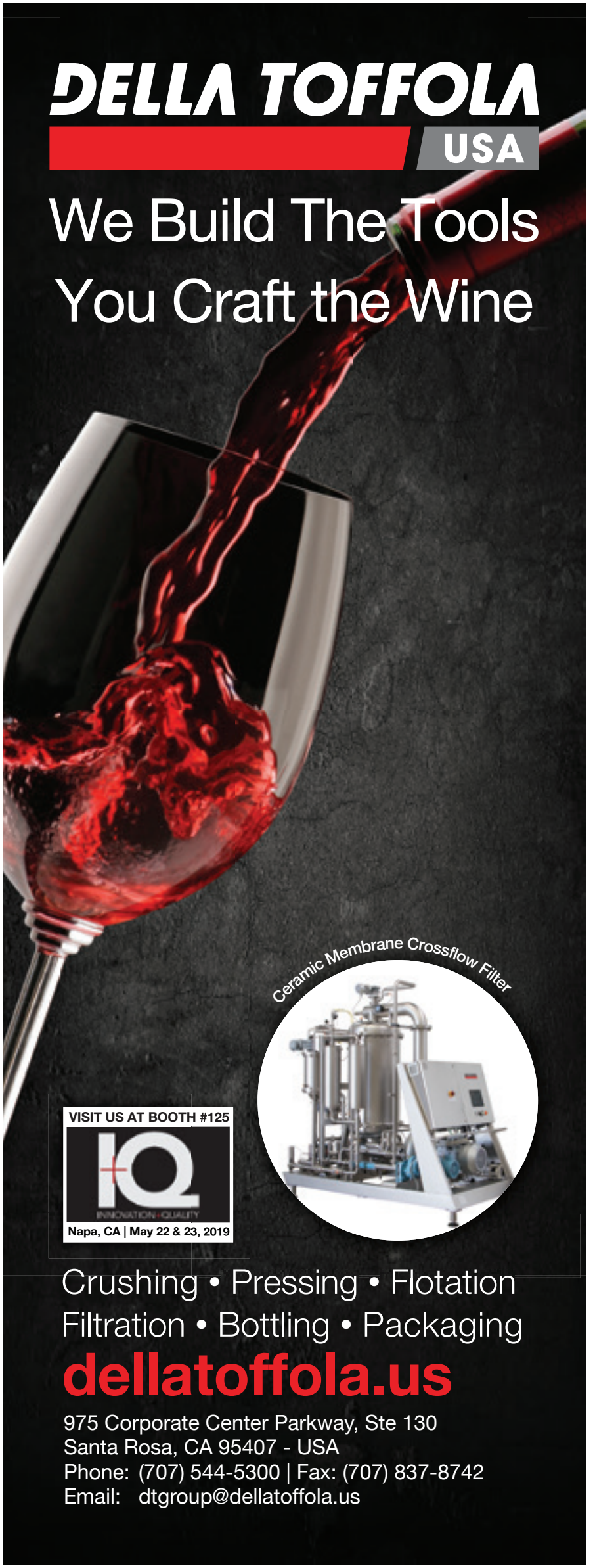
June 2018

In this second of a two-part trial, Molly Bohlman compared a native yeast to a commercially available yeast strain called Cross Evolution to see how it would affect an older block in her 77-acre vineyard.

A block consisting of 3.19 acres of Chardonnay clone 95 on 101-14 rootstock was picked on the same day. The grapes were whole- cluster pressed and the juice transferred to tank for settling. Post-settling, half of the juice was transferred to barrels without any yeast added and half of the juice was inoculated with Cross-Evolution yeast. Fermentation dynamics, laboratory and sensory analysis data were gathered in order to objectively and subjectively compare the two yeasts.

Lot 1: Chardonnay - no yeast added
Lot 2: Chardonnay - Cross-Evolution yeast added

Conclusion: The uninoculated juice took three days longer to start fermentation and seven days longer to complete its primary fermentation. Analysis between the two lots was similar except for 0.3 grams/L more RS remaining in the uninoculated lot. Malolactic bacteria was not added to either lot but MLF was completed by both lots over a two month period. Sensory preference at this point is for the uninoculated lot.



Assessing Smoke Taint Risk By Comparing the Mixture of Plants Found in Forest and on Plains

August 2018

The problem with studying grapes infected with smoke taint is that there is usually no control—grapes from the same vineyard that were not exposed to smoke—to compare like a before-and-after trial. **Washington State University** professor **Tom Collins** set up a control group of unaffected grapes and ones virtually exposed to judge the differences.

Merlot and Cabernet Sauvignon grapevines at the WSU **Prosser Irrigated Agriculture Research and Extension Center** (IAREC) were exposed to simulated wildfire smoke during the 2017 growing season. For each variety, four rows of 30 vines were covered by temporary hoop-house structures, two rows each for the control and for the smoked treatment, for a total of 60 vines for each treatment. The vines in the smoke treatment were exposed to simulated wildfire smoke generated by burning either a mixture of plants typically found in rangelands in eastern Washington for the Merlot vines or a mixture of conifer bark mulch for the Cabernet Sauvignon vines. Smoke intensity was monitored using **TSI** Dusttrak aerosol particle monitors while smoking duration was 38 hours for the Cabernet Sauvignon vines and 48 hours for the Merlot vines. Smoke was delivered from the smoke generator to the fruiting zone in the vineyard canopy using 4-inch flexible drain lines.

Wines were made from the control and smoke-affected fruit at the **Chateau Ste. Michelle/WSU Wine Science Center** in Richland, WA, using standard WSU red wine protocols. Samples were collected daily throughout the fermentation and stored at -80°C for subsequent analysis of smoke taint related volatiles using GC/MS and non-volatiles (glycosides) using UHPLC/QTOF-MS. Additional samples have been collected at weekly intervals since the end of fermentation to assess changes in composition over time.

Lot 1: Merlot, control vines
Lot 2: Merlot, smoked vines
Lot 3: Cabernet Sauvignon, control vines
Lot 4: Cabernet Sauvignon, smoked vines

Conclusion: The Merlot and Cabernet Sauvignon vineyard blocks used for this trial were exposed to real wildfire smoke during the 2017 growing season, in addition to the simulated smoke applied as treatment during this trial. The intensity and duration of these "wild" wildfire episodes were monitored using the TSI Dusttrak monitors, which recorded time and weight averages for the two smoke episodes that were much lower than the treatments applied during the trial. Despite this exposure, there are differences in the sensory perception of the control and smoked treatments for both varieties. Analysis of the volatile and non-volatile composition is ongoing.

Flash Detente as a Mitigation Technique for Smoke-exposed Grapes

September 2018

Carneros Vintners is a custom crush facility in Sonoma, California whose operations include a 20-ton **Della Toffola** flash détente unit which was used for this trial. After the huge wine country fires in September 2017, Carneros Vintners received several loads of tainted grapes which provided the natural opportunity to see how well flash could salvage the crop.

Nate Rippey, general manager and vice president of production and **Rick Jones**, consulting winemaker, Della Toffola USA, attempted to assess the effects of flash on the chemistry and sensory character of smoke-exposed grapes from Napa and Sonoma. Grapes harvested after Oct. 8 with known exposure to smoke were received by Carneros Vintners, with the client's intention of using flash to reduce the smoke's impact. A portion of the grapes were set aside for 'traditional fermentation' in small lots and the balance was flashed. The resulting wines were analyzed, and several pairs were reserved for tasting at the Innovation + Quality 2018 event.

Lot 1: 2018 Mt. Veeder Cabernet Sauvignon (Napa)- Control
Lot 2: 2018 Mt. Veeder Cabernet Sauvignon (Napa)- Flash
Lot 3: 2018 Atlas Peak Cabernet Sauvignon (Napa)- Control
Lot 4: 2018 Atlas Peak Cabernet Sauvignon (Napa) - Flash

Conclusion: In these wines, flash decreased the amount of free guiacols by an average of 53 percent. Total guiacols showed more moderate reductions (12 percent). However, total guiacols were not increased in the flash wines, as might have been feared. Benchtop sensory shows the flash samples have an improved nose, with the most offensive aromas being reduced or even eliminated. Smoke flavors, particularly the retro-nasal "ashtray" finish, are slightly reduced by flash treatment but still present. In that regard, the analysis and tasting tell a consistent story. While flash might be a step in the right direction, the problem of completely removing smoke taint is likely to require addressing the bound forms. Given the intermittent nature of smoke taint, a chance to taste these trials seemed worthwhile.

Oregon Winemaker Checks the Effect of Maceration Timing of Pinot Noir on Smoke Taint Extraction

October 2018

A to Z Wineworks winemaker **Dan Berglund** wanted to tackle the wildfire smoke taint problem yet a different way than has been done already. His approach was to see if different soak times and days on skins made a difference in the perception of smoke. The results surprised him.

Three 1.5 ton fermenters were filled with machine-harvested Pinot Noir from the same vineyard block. A blend sample of the three tanks was sent in for smoke taint analysis 12 hours after filling, or approximately 20 hours of total soaking time. This result showed a guaiacol concentration of 8.8 µg/L. The first tank had no cold soak, and was fermented to dryness, for a total of 8 days on skins. This tank had a final guaiacol concentration of 14.3 µg/L. The second tank had a 3-day cold soak and was then fermented to dryness, for a total of 12 days on skins. This tank had a final guaiacol concentration of 13.0 µg/L. The third tank had a 3-day cold soak and was then pressed at 5° Brix, for a total of 8 days on skins. This tank had a final guaiacol concentration of 13.3 µg/L. All three tanks had a final 4-methylguaiacol concentration of 2.0 µg/L.

Lot 1: Pinot Noir with no cold soak, fermented to dryness - 8 days on skins
Lot 2: Pinot Noir with a 3-day cold soak, fermented to dryness - 12 days on skins
Lot 3: Pinot Noir a 3-day cold soak, pressed at 5° Brix - 8 days on skins

Conclusion: Despite having four days more on skins than the other two tanks, the second tank did not show any additional extraction of guaiacol or 4-methylguaiacol, but contained slightly less guaiacol. It also did not seem to make much difference. This suggests that all the smoke taint compounds were extracted in the first 8 days on skins, so macerating for an additional 4 days did not increase levels of smoke taint. In addition, he found that by extracting more tannin from the skins in those additional days of maceration, the smoke taint compounds might be less perceptible in tastings compared to the lots with less time on skins.

Implications of Barrel, Stainless Steel and Alternative Oak RRV PN Ferments

January 2019

Virginia Dare Winery's winemaker **Humberto Berlanga** wanted to compare and narrow down the improved color and texture quality of barrel fermented-, oak alternative- and stainless-steel tank-fermented Pinot Noir from the Russian River Valley.

This was Phase II of a two-part trial (the first was presented at IQ 2016) comparing barrel-fermented Pinot Noir against a stainless steel-fermented control. The objective of this second phase was to determine if the same quality improvement can be achieved with the use of oak alternative products during fermentation in a non-oak vessel. The barrel-fermented lot was preferred by IQ attendees and the Virginia Dare winemaking team. The color and texture were improved in about 20 percent based on measured color and tannin numbers. As in the previous year, the same vineyard lot of Russian River Pinot Noir will be equalized and separated to ferment in five different environments: new oak (Perle barrels), one-year-old oak (Perle barrels), 1-ton ferment in alternative oak at equal new barrel equivalent; 1-ton ferment no oak (serving as the control negative), and standard stainless steel ferment protocol. Conditions and yeast as well as nutrient regime will be maintained equal for all the groups.

Conclusion: The original aim of the trial was to attain darker color. The vineyard got a very nice fruity texture and fruit expression on very nice texture, but it was a little bit on the lighter side for color. The darker color derived from the new oak Perle barrel ferment. Eight out of 10 participants during the IQ presentation preferred the new oak lot. It follows that the darker color had more eye appeal to consumers. The winemaking team liked what the Perle barrels produced and will consider expanding their use behind trial quantities to a limited general production. **WBM**

New Study Measures the Dramatic Release of O_2 from Stoppers Post-bottling

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 2008-2015. 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.

FOR A GENERATION NOW, manufacturers have offered alternative wine bottle closures to dodge the threat of TCA that once seemed inescapable in natural corks punched from the bark of cork oak trees. They have developed technical or agglomerated closures made from cork material, synthetic stoppers and refined the performance of aluminum screw caps.

The latter two alternatives immediately zeroed out TCA induced by closures while the technical corks eventually evolved to the point where the exclusion of TCA below a certain threshold can be guaranteed in some.

Even in natural corks, the formerly free-roaming phantom of TCA has been fenced in. Manufacturers are slowly but steadily driving it in the direction of extinction, so they and their winemaker customers have been able to turn their attention to another, more subtle, challenge related to closures: oxygen.

O_2, so called because it takes two atoms to make a molecule of oxygen, is the third most prevalent element in the universe after hydrogen and helium. Yet O_2 is arguably first among the gases that winemakers have always needed to manage during the fermentation and maturation of their wines. Oxygen is both an enemy and an ally, a spoiler and a nutrient. Yet it remains one of the least considered tools that winemakers have at their disposal.

New research underscores that winemakers' oversight of O_2 no longer stops at the beginning of the bottling line. Thanks to university studies and research and development breakthroughs by closure manufacturers, winemakers have learned they have the ability, and possibly the responsibility, to take their management of O_2 even further than through maturation—all the way into bottling and through the subsequent period of bottle aging.

Focus on Initial O_2 Release

Research and development efforts continue to refine closures' abilities to tailor oxygenation capabilities to the needs of individual winemakers. A new study published in a French technical journal paints a more detailed picture of what happens to the oxygen levels inside a bottle during and immediately after bottling and adds a new acronym, oxygen initial release, or OIR (not to be confused with oxygen ingress rate) to the jargon of wine oxygenation.

The January 2019 issue of *Revue des Œnologues* carries an article by researchers from **Diam Bouchage** in Céret, France. Titled "Impact of stoppers on the aging of wine in bottles," the piece focuses on how, when and how much oxygen enters a bottle of wine during and after bottling, and how various closure types affect this process. The authors were **Véronique Chevalier**, **Alexandre Pons** and **Christophe Loisel**, who is the research and development director of Diam Bouchage, manufacturer of Diam closures, an agglomerated and guaranteed TCA-free stopper.

It has long been shown that the act of squeezing a plug-type closure, whether made of punched cork, agglomerated cork or another substance, releases a large contribution of O_2 into the wine bottle because of the increased pressure inside the closure, where air that includes oxygen is trapped by cell walls or other structural elements of the closure. All closures are inherently porous, which allows them to be compressed enough to fit into the bottle neck and then contain the internal tension to push back out against the neck of the bottle to make a tight seal.

Even when a properly equipped and managed bottling line effectively sparges all the air out of a bottle with nitrogen or another inert gas before it is filled with wine, a bottle will get a big shot of oxygen beginning at the moment the closure is compressed and inserted. The researchers compared the performance

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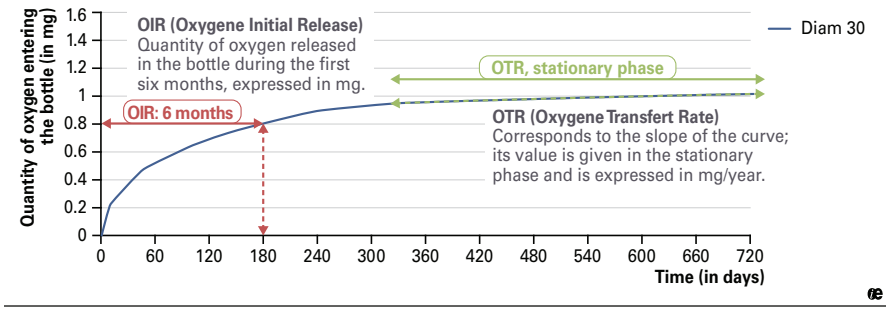
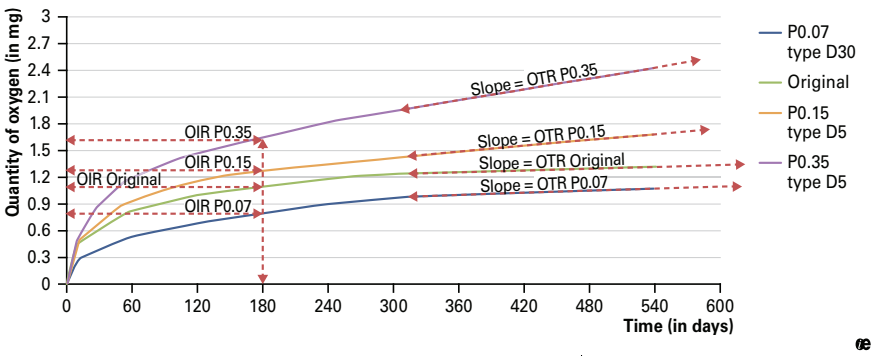
■ **Figure 2: OIR and OTR – Example of a batch of Diam 30 stoppers.**



■ **Figure 3: Four levels of permeability of Diam stoppers.**



SOURCE: REVUE DES ŒNOLOGUES

of Diam in terms of oxygen release into the wine with three grades of natural cork stoppers defined by appearance, which is the industry norm.

Their work generally confirmed the steep slope of oxygen release during the first weeks and months that others also have described. "During corking, the diameter of the stopper goes from 24.2 to 18.55 mm or a decrease in stopper volume of 40 percent," the article stated. "Automatically, oxygen pressure in the cork pores or cells increases significantly…. The overpressure in the stopper is at its maximum when it is compressed during bottling, and the kinetics of oxygen release are thus very fast during the first few days in bottle."

As oxygen leaves the closure, the pressure inside the closure lessens, and the rate of release slows. The study found that at 180 days this initial phase of oxygenation ended, and another phase began, characterized by a steadier and slower rate.

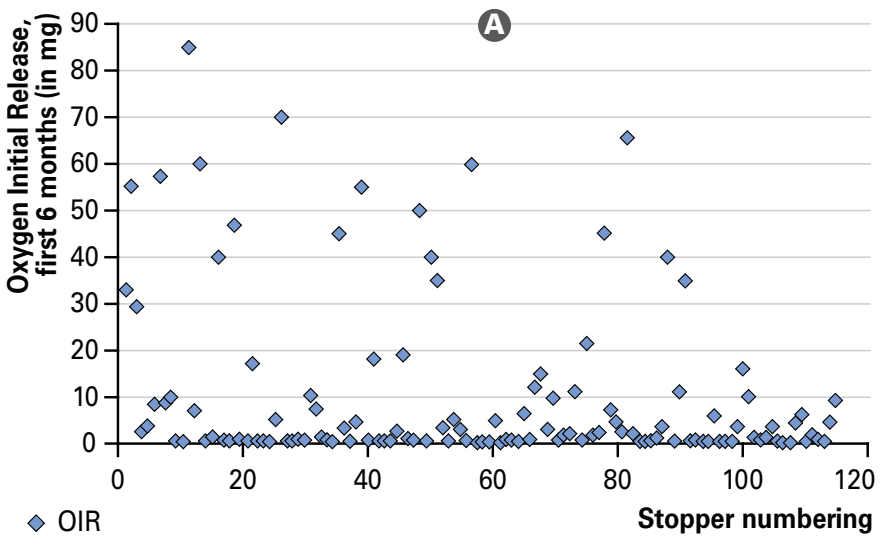
OIR Lasts Six Months

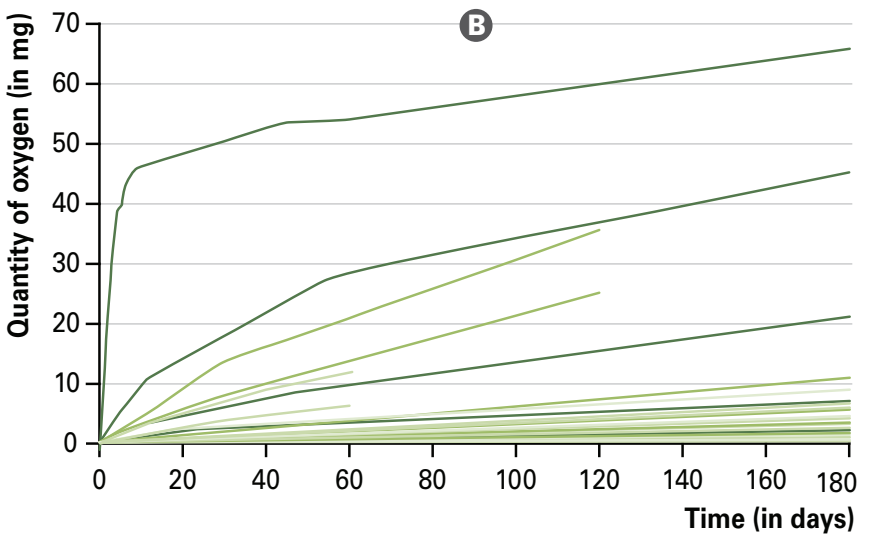
The researchers coined the term oxygen initial release (OIR) to distinguish the first rapid phase from the later period of long-term oxygen transfer rate (OTR). A Diam 30 stopper, for example, gained 0.8 mg of O_2 during the first six months of OIR and less than 0.2 mg more during the next six. The corresponding numbers for the more permeable Diam 5 were about 1.7 mg OIR and 2.1 mg OTR.

The OIR expresses in milligrams the total amount of oxygen that accumulates during the first 180 days. After that the OTR represents the rate at which more oxygen is added, in mg per year.

A more startling finding of the study was the extreme variability in both OIR and OTR among the approximately 100 natural, punched corks they tested. A majority gained between 0 and 5 mg of O_2 in 180 days, and a significant minority gained 20 to 40 to 60 mg or even more. **Amorim**, the biggest producer of natural corks, states on its website that its Icon and long bottle aging corks have an OTR of 2.5 mg O_2 for 12 months, and the rate goes up by about 0.1 mg per year after that.

■ Figures 4: Ⓐ OIR for about 100 natural stoppers, Flower, Extra and Superior categories. Oxygen input curves for each of the natural stopper categories: Ⓑ Flower, Ⓒ Extra, Ⓓ Superior.





SOURCE: REVUE DES ŒNOLOGUES

The authors chose corks from three categories of visual appearance: the smoothest and least visually flawed, flor, and extra/superior. No widely accepted method of grading natural corks for their oxygen-transmitting characteristics has been developed, so the authors relied on the same visual grading that most winemakers use (along with manufacturer's reputation) to make their buying decisions.

The lack of consistency in both OIR and OTR that they found in punched corks is another bit of evidence in the long-running case against natural cork as the ideal wine bottle closure. Consistency, however, is not an issue for any of the popular alternative closures today. Screw caps, agglomerated corks and extruded or molded corks all eliminate most variability through their industrial production techniques.

Methods and Technology

What was different about this study, according to Diam's R&D director Loisel, was the use of empty bottles to eliminate the impact of the wine on the O_2 since wine has a notorious appetite for it. The research team blanketed the bottles with nitrogen prior to vacuum-corking with a **GAI** corker that enabled them to reduce any O_2 to less than 1 mg per bottle, which was later subtracted from the results.

They measured oxygen content by chemiluminescence, using essentially the same method and equipment that **Vinventions**' Nomacorc division pioneered for this purpose in its seminal research on total package oxygen (TPO) and its components of dissolved oxygen (DO) and head space oxygen (HSO) during the past dozen years.

Using sensor dots pre-attached to the bottles, the researchers "read" the amounts of O_2 that entered with a Fibox 3 LCD Trace V6 from **PreSens Precision Sensing**. The sensor spots are made of fluorescent compounds that absorb light energy sent by a transceiver and then reconstitute it as red light. The measurement comes from the reconstitution time, which is inversely proportional to the amount of oxygen in the bottle.

One key advantage of this technology is that the bottles don't have to be opened or penetrated to take the readings. Another is that it is easy to perform and can be done under various temperature and humidity conditions, including those in a wine cellar.

The article in *Revue des Œnologues* is the first of three planned by the research team. Part two will look at bottled white wines after 10 years of aging from a trial underway with Sauvignon Blanc in Bordeaux. Part three will look at red wines over time. This work is intended to better define the oxygen needs of wines in-bottle as a function of varietal, grape ripeness, winemaking and aging techniques, the authors stated.

Matching O_2 Rates to Wine Styles

The potential usefulness of the new definitions of oxygen release into bottles was addressed in the first article's conclusions. "It is known in enology that the kinetics of oxygen contribution affect final wine quality (for example, micro-oxygenation). We can therefore imagine that with a high OIR, some wines could be protected for a certain amount of time from the development of reduced odors (cabbage, rotten eggs).

"In contrast, for other wine types that are made with an eye to longer bottle aging, this rapid contribution will have less of an impact, and only the OTR will affect the quality of the wine aged in bottle. Thus, a slow, controlled addition of oxygen over several years can lead to a wine with aroma complexity, which is also called 'bottle bouquet.'"

Diam has joined numerous other closure manufacturers in offering a range of products with varying oxygen specifications. Screw cap producer **Stelvin** has long offered two levels of tightness or permeability in its cap linings, identified as Saran Tin, the least permeable, and Saranex, which allows more oxygen exchange. Stelvin more recently introduced Stelvin Inside, a range of four liners with varied OTRs. Several other screw cap makers have developed OTR ranges also.

Vinventions' Nomacorc closures have long offered a range of OTRs as well. Recently Vinventions launched its Subr closure made from micro-agglomerated natural cork material, with a TCA-free guarantee and a published oxygen ingress rate that acknowledges the OIR effect: 1.45 mg of O_2 in the first year, 0.40 mg in the second year and 0.25 mg per year after that. Subr is glue-free, according to the company, and instead uses a plant-based binder.

Ambivalence About Natural Cork

Winemakers around the world have become increasingly educated about the relationship between closures, oxygen and their own wines. They have been busy conducting trials to find the products that manage oxygen in a predictable way, rather than trying to simply exclude it via tight screw caps or at the other extreme surrender to the variability of natural corks.

U.S. winemakers rated screw caps highest in consistency of oxygen transmission in ***Wine Business Monthly***'s 2018 Closure Survey, followed in order by technical corks, synthetic closures and in last place, natural corks. The survey confirmed, though, that more wineries continue to use natural corks than any of the alternatives, yet "winemakers from large and mid-sized wineries are much more likely to use technical cork closures than those from small wineries," wrote *WBM* senior technical editor **Curtis Phillips**.

It remains to be seen how natural cork producers will address the challenge of oxygen consistency and predictability that their competitors have now fully embraced as an attribute important to their customers. There is no sign that corks are becoming extinct, however, especially for the great wines of the world that, not coincidentally, are the ones that people like to age the longest. Since they are the wines most affected by oxygen over time and since they are still overwhelmingly stoppered with natural cork, it's too soon to say that natural cork doesn't have a natural affinity for wine. **WBM**

Wine Closures

Natural cork is the most frequently used closure by winemakers due to its ability to compress and expand to form a tight seal, as well as allow the wine to breathe over long periods. Natural cork is regarded as environmentally friendly since corks are easy to recycle and are sustainably produced (the same trees are stripped about every nine years). Historically, the main drawback of natural cork is the possibility of wine developing cork taint ("corked") brought on by TCA (2,4,6-trichloroanisole) in the wine, which in most cases is said to be imparted by the cork itself due to natural occurrences in the cork or how it is processed. Over the past couple decades, the cork industry has changed or improved their production processes to the point where there is much less of a chance of TCA contamination. Several vendors now are also guaranteeing their closures have a below detection threshold.

Technical cork includes any closure made from cork granules. Often they are made to resemble natural cork and are manufactured using a combination of agglomerated natural cork granules and a binding agent, with other optional parts. For our purposes, this category includes highly-engineered closures, like the DIAM, that include non-cork "microspheres," as well as cork granules and binding agents.

Alternatively, tecnhical cork may have natural cork disks glued to the ends (in contact with the wine). These types of cork are also known as "1+1" corks (there are also 2+0: two disks on one end, and 2+2: two disks on each end) and have a low incidences of cork taint compared to natural cork. Technical corks are efficient at preserving sulfur dioxide concentrations within the bottle, and are most commonly used with wine that is meant to be consumed within the short-term (two to three years). The "Twin Top" is the most well-known technical cork developed.

Synthetic closures mimic natural cork closures in how they look and function, for the most part, but are made of plastic (injection-molded or extruded); thus they do not present the risk of TCA contamination. The most commonly cited drawbacks of synthetic closures include: difficult to remove from the wine bottle (as well as re-seal) and higher risks of oxygen permeation than natural cork although this latter aspect has seen improvement. Historically, synthetic closures had pushback due to their synthetic makeup and their environmental impact, as they are oil-based and are not biodegradable, like a natural cork. However, some synthetic closures on the market are made from plant-derived ethanol rather than petroleum.

Screw caps, also known as "Stelvin caps," ROTE caps (Roll On Tamper Evident) or ROPP caps (Roll On Pilfer Proof), are made from aluminum and seal onto a wine bottle's neck in a threaded fashion, as opposed to being pushed into the bottle's opening like a natural cork closure. Screw caps are said to offer a tighter seal, thereby protecting against cork taint and keeping unwanted oxygen at bay, serving to preserve aromas and improve a wine's overall quality. Conversely, some have accused screw caps of suppressing wine aroma and quality too much (reduction). Screw caps, the predominant closure choice in New Zealand, continue to rise in usage by U.S. wineries as U.S. consumers become more comfortable with them.

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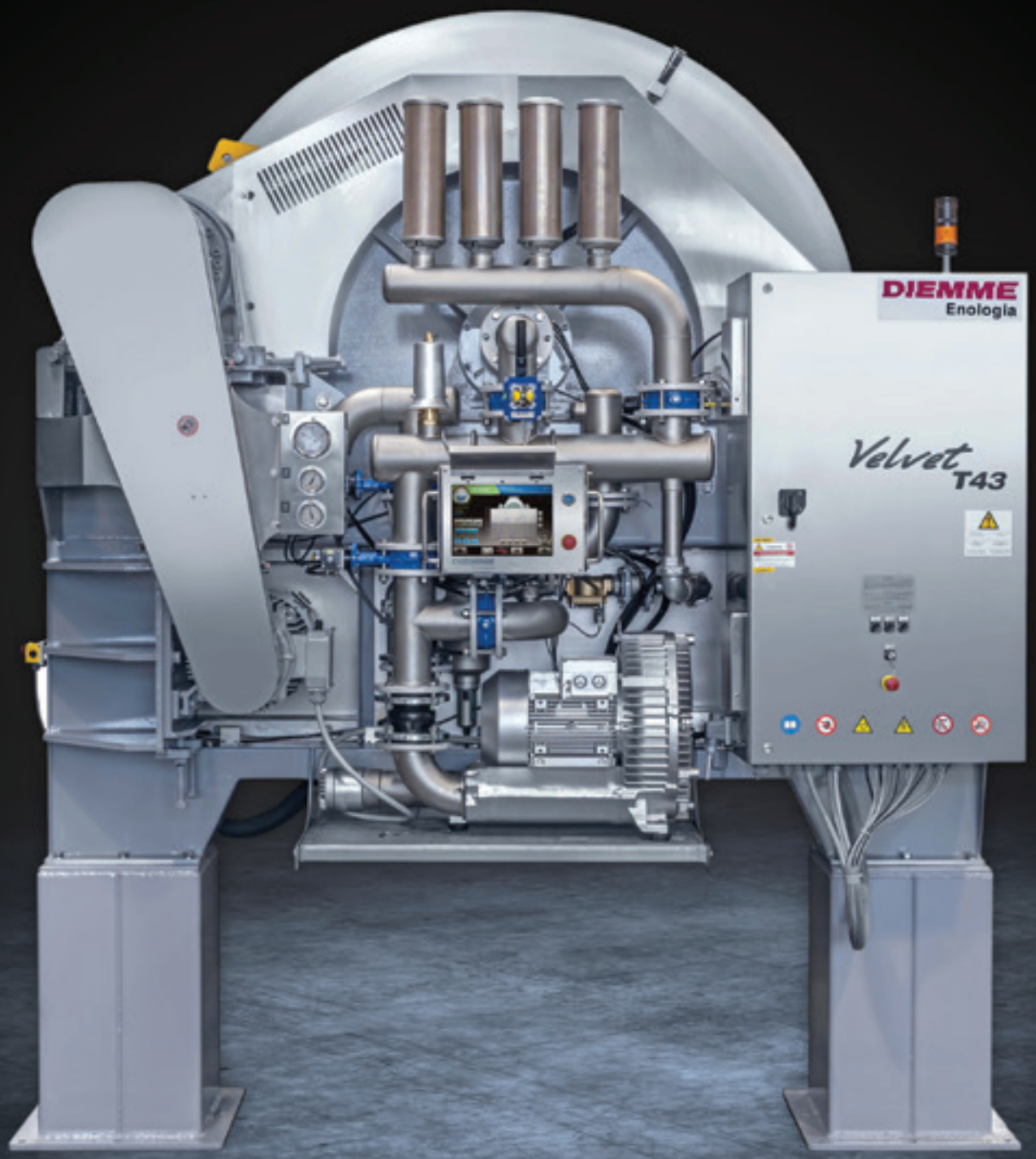

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Managing Oxygen in Fermentation for Wine Quality and Style

Ted Rieger

THE PHOTO GROUP

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

MANAGING OXYGEN EXPOSURE FOR wine quality is important in all stages of winemaking. Winemakers continue to gain knowledge to understand and employ the benefits of careful oxygen management during fermentation and pre-fermentation in the early stages of wine production. At *Wine Business Monthly*'s 2018 **Innovation + Quality** (IQ) conference in Napa, winemakers presented insights, trial data and successful management strategies during the session, "The Evolving Role of Oxygen in Fermentation Processes and Why We Should Care."

Sam Tannahill, director of viticulture and winemaking with **A to Z Wineworks** in Dundee, Oregon, specializes in Pinot Noir and Chardonnay, and served as session moderator. In his introduction he alluded to basic oxygen management goals to prevent spoilage, enhance phenolic structure, and improve wine stability and aging, but he also noted, "We want to see how using either smaller or larger amounts of oxygen during fermentation can take a wine from great to extraordinary." Referencing the challenges of climate change, Tannahill also observed, "As vintages get warmer and there is more UV radiation and grape skins get thicker, oxygen management in white wines, as well as red wines, will be a factor in how we influence wine style and quality."

Oxygen and Red Winemaking

Molly Hill, winemaker with **Sequoia Grove Winery** in Rutherford, Napa Valley, called oxygen management one of the most complex subjects in winemaking. She said Napa Valley winemakers are extremely lucky to have vintage-expressive grapes and wines with high amounts of anthocyanins and tannins to work with. She said there is more experimentation with oxygen dosing during fermentation and just after primary fermentation, but using only oxygen or micro-oxygenation (MOx) as a tool can lead to trouble, especially in some vintages when wines have lower capacities to absorb oxygen.

Molly Hill, winemaker, Sequoia Grove Winery

Hill talked about the "teeter-totter" of managing wine style between reductive character and oxidative character. Reductive character wines are dark red/blue in color; lean toward hydrogen sulfide, dimethyl sulfide, mercaptans; and have less fresh fruit character. If they go too far, they can have rotten egg and cooked corn characteristics. Oxidative character wines can be brown/brick red in color, as

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well as show acetaldehydes, volatile acidity (VA), sherry, nutty and less fresh fruit character. It is also more challenging to correct an oxidized wine.

"Our wines are made slightly reductive; so when the cork is pulled and exposed to oxygen, they reach a level teeter-totter and the wine becomes fully expressed in front of the consumer," Hill summarized. She then listed production opportunities in the winery to create environments for each side of the teeter-totter.

Options to create reductive environments include: must and primary fermentations in closed top tanks, use of lees in tank and barrel that are a big oxygen sink to protect wine, use of dissolved carbon dioxide (CO_2) and use of sulfur dioxide (SO_2) that binds with oxidative components.

Options to create oxidized environments include: cold soaking (lower temperature can increase oxygen solubility); pump-overs, punch-downs and delestage; open top fermenters; pressing; moving to barrels; racking, aging in barrel and topping operations; bottling, aging in bottle (closure selection); and pouring the wine in the glass or decanting by the consumer.

At Sequoia Grove, the goals are to show a wine's varietal character and express the characteristics of the vineyard site and the vintage. Hill said oxygen dosing during primary fermentation is a current trend that can lead to fresher, fruitier red wines with less herbaceousness and a rounder mouth-feel, but she believes there is room to broaden the exploration of aroma and flavor. "I wonder if we could elaborate on our aromatics rather than focus so much on fruit characteristics and recognize that great wines are made with a variety of flavor components," she said.

White Wines and Early Juice Oxidation

Cameron Frey, vice president of winemaking with **Ramey Wine Cellars** in Sonoma County, has worked with early juice oxygen exposure for 20 years. He described it as enzymatic browning, a process similar to what is observed with a cut apple. Frey explained: "Enzymatic browning serves as a defense mechanism in plants triggered when tissue is damaged. The rapid formation of brown phenolic complexes, catalyzed by polyphenol oxidase [PPO], known as melanin, seals off the site of infection or wound, forming a physical barrier to further infection and degradation."

Cameron Frey, vice president of winemaking, Ramey Wine Cellars

He further explained that PPO enzymes become active as soon as pressed or crushed grapes are exposed to oxygen. This enzymatic activity lasts only about six hours. Utilizing oxygen, PPOs catalyze the hydroxylation of monophenols to diphenols and subsequently the oxidation of diphenols to quinones. "Quinones are powerful oxidants and, in particular, oxidize flavanols readily to brown polymers," Frey said. PPO activity is an extremely rapid enzymatic reaction that require oxygen.

Frey discussed experiments and practices with passive oxidation in comparison with SO_2 additions and inert gas in relation to PPO browning reactions. Practices that involve adding sulfur at the press or in the juice pan, or using CO_2 in place of oxygen, create a "green juice" reaction. But as Frey explained: "You get a higher level of phenolics that don't do what they naturally want to do, which is go through the enzymatic browning process. The PPO enzyme is

denatured, but the oxygen is still there because sulfur does not react directly with oxygen, and there is no oxidative protection." Evaluation of these wines with higher phenolic content found a correlation with the tendency toward more wine browning later, and increased levels of bitterness and astringency.

Since the 1980s, trends in using passive oxidation have become widespread for improving white wine quality and color stability. Frey summarized three primary results/benefits of early juice oxidation in white winemaking:

- It decreases the content of oxidizable phenolics, resulting in a decreased level of potential browning as wine ages.
- It results in significant decreases in astringent and bitter phenolic content and possibly minimizes the amount of fining needed on finished wines. This may be of particular importance with thicker-skinned varieties that have higher phenolic content, such as Viognier, Riesling and Gewürztraminer.
- It can provide lower SO_2 requirements as a result of having less oxidizable phenolic substrates in finished wines.

"We practice this and have had success. I attribute the ageability of our Chardonnay to early juice oxidation," Frey said. Ramey Cellars also uses this process to make Sauvignon Blanc, Kerner and Rosé wines. Frey encouraged other winemakers to try this and said, "I think you'll find some nice changes, and, hopefully, improvements in your white wine quality and stability."

Managing Oxygen and Sulfur in Red Wines Pre- and Post-ML

Kevin Sass, winemaker with **Halter Ranch** in Paso Robles, presented data from trials on SO_2 treatments on red wines that had completed malolactic fermentation (ML) and the effects on phenolics. The winery began working with the phenolic analytical company **WineXRay** in 2012 to get a better handle on phenolic composition and began running trials on Cabernet-based wines that had completed ML and went into barrels. Sulfur was added to individual barrels for comparison at three different levels: 0 PPM, 10 PPM and 30 PPM. The trial barrels were topped weekly to prevent head space with wine with no sulfur added. Analysis was run weekly for a 90-day period, and a final analysis was run after 90 days. Sass said the level of phenolic binding generally decreased significantly after 90 days.


Kevin Sass, winemaker, Halter Ranch

A concern of the winery, and the main reason to add SO_2, is to prevent an increase in volatile acidity (VA) levels. Based on data from the final analysis, the wine with 0 PPM of SO_2 addition showed the highest levels of color, bound color and tannins, without a significant increase in VA. Sass said, "With no addition, we had an 11 percent increase in binding with a minimal increase in VA."

Sass provided a quote from the book by winemaker and scientist **Clark Smith** in *Postmodern Winemaking: Rethinking The Modern Science Of An Ancient Craft*, that he believes helps explain what is happening: "Because acetic acid bacteria are not inhibited by the pigment-bound SO_2, phenolic vigor is all that protects young red wine." Sass also explained that when

> "I wonder if we could elaborate on our aromatics rather than focus so much on fruit characteristics and recognize that great wines are made with a variety of flavor components."
>
> **Molly Hill,** winemaker, Sequoia Grove Winery

red grapes are picked at adequate phenolic ripeness, they will have more tannic and phenolic structure to help protect them during winemaking, even though they have higher pH. Having quality vineyard sites, and the trend toward picking grapes at higher ripeness levels in recent decades have contributed to these changes and called into question the need for traditional sulfur addition practices in winemaking.

"The days of having a 3.30 or 3.40 pH in Cabernet Sauvignon are basically gone," Sass said, who noted that 3.7 pH is now fairly common in red wines, and Syrah is sometimes above 4.0 pH. He observed, "In our trial, we didn't have a big increase in VA because we had good 'phenolic vigor' in the grapes and wine. This begs the question, why are we adding SO_2 if it doesn't change the pH and if it's not really helping us? Is it really helping you or is it just making you feel better?"

Sass said he's also seen cases where sulfur was aggressively added to wine after ML, and there were still problems with VA. Thus, having and understanding "phenolic vigor" is important for good winemaking practices. Noting that the wine industry faces possible ingredient labeling requirements in the future that could include sulfur content, he suggested winemakers start decreasing sulfur use and find alternatives. He suggested the following needs for data and research from professional and academic peers:

- At what dissolved oxygen (DO) levels do spoilage yeasts and bacteria thrive and metabolize?
- Is there a tool (in barrel) we can use to test this?
- Is there a tool we can use to sparge out DO while in barrel?
- How much DO are we picking up through barrel aging?

He summarized, "There is a lot of movement toward getting away from sulfur and SO_2, and I think the technology is out there to help us do this."

Oxygen Management in Pinot Noir for Phenolic Composition and Style

Robert Mondavi Winery director of winemaking Genevieve Janssens discussed winery trials begun in 2001 regarding the manipulation of cap management and temperature with Pinot Noir to influence style and sensory character. Janssens described four trial treatments for comparison:

- Control: The winery's traditional winemaking protocol with standard daily pump-over regimes during cold soak through fermentation in tank.
- Must Warming: Must warmed to 40° C the fifth day after crushing then allowed to cool to 32° C before yeast inoculation.
- Rack and Return: Two rack and returns performed during fermentation between 19° and 10° Brix in place of pump-overs. After the second rack and return, the cap was mixed for five minutes with a "firehose" technique to break up the cap.
- Wine Warming: On the 11th day after crushing, wine was warmed to 40° C by running it through a heat exchanger and with warm water over the top of the tank. Wine is dry by enzymatic residual sugar before heating.

Based on sensory panel evaluations of the wine from the four treatments, wine warming was preferred, followed closely by rack and return, then must warming and finally the control. Based on phenolic analyses of the different treatments, wine warming resulted in higher levels of polyphenolic compounds, such as catechin, epicatechin and polymeric phenols. Rack and return resulted in higher levels of caftaric acid, malvidin, polymeric anthocyanins, total anthocyanins, and monomeric anthocyanins.

The actual protocol practiced in recent years combines several methods of manipulation and continues to evolve, but includes the following steps: cold maceration three to five days at 10° Brix with one full tank punch-down per 24 hours; rack and return prior to inoculation; one rack and return around 15° Brix; from inoculation to 10° Brix—three to five aerative punch-downs per day; from 10° Brix to dryness—one to two non-aerative punch-downs per day; and cap wetting at dryness.

Janssens summarized, "Pinot Noir style is always evolving, and it is a sensitive variety to oxygen. It is possible to dramatically change the style of Pinot Noir by manipulating the fermentation." **WBM**

A Tool from the Past Illuminates the Future

Winemakers discuss the future of Cabernet Sauvignon and winemaking in a warming climate

Mary Chakeris Jorgensen

ERIC JORGENSEN

(Panel, l to r): Glenn McGourty, viticulture and plant sciences, UC Cooperative Extension; Chris Howell, general manager and winemaker, Cain Vineyards; Leo McCloskey, president, Enologix; David Graves, co-founder, Saintsbury; and Greg Jones, Linfield College, moderator, and (standing) Dan Petroski, winemaker, Larkmead

"WHAT IS NEAR AND DEAR TO MY HEART," said **Larkmead** winemaker **Dan Petroski**, "is the conversation about the future of Cabernet. Cabernet Sauvignon is what we built Napa Valley on in the last two to three decades. There is really not a singular more important topic than climate change and how it will impact our day-to-day life."

After brainstorming ways to encourage conversations about important issues facing Napa Valley, Petroski had a light-bulb moment: He remembered that Larkmead founder **Lilli Hitchcock Coit** held salons in the 1800s, and began a new series of quarterly salons last year. For this edition, he invited a panel of experts and peers interested in talking about climate change and the future of the valley.

The central question posed by Petroski to a panel of experts: "Is the future of Cabernet Sauvignon in Napa much more limited than the valley is willing to acknowledge, considering climate change?"

The panel was moderated by **Greg Jones**, a research climatologist specializing in the climatology of viticulture. He was a contributing author on the IPCC Assessment Report,[1] that shared a 2007 Nobel Peace Prize with **Al Gore**. This report is thought to be instrumental in bringing about the

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Porto Protocol: Making a Commitment to Do More

Adrian Bridge, CEO of **Taylor`s Port**, and the man behind the **Porto Protocol**, welcomed delegates to the **Climate Change Leadership – Solutions for the Wine Industry 2019** conference in Porto, Portugal, an event that was attended by more than 600 delegates from 30 countries featuring 60 speakers including a keynote speech by former U.S. vice president **Al Gore**.

The purpose of the Porto Protocol (*www.portoprotocol.com*) is to raise awareness that climate change is here and that there are things we can do now to make a difference. By joining The Porto Protocol, companies make a commitment to do more than they are doing at the moment. The industry initiative is not just a call to action, but a binding commitment by its signatories, from whatever area, to make a greater contribution to mitigating climate change.

Adrian Bridge

"The (wine) industry can learn from each other to help solve a problem that impacts everyone and, as a branded agricultural industry, it can help shape consumer awareness that things are being done by this responsible industry to improve the future," Bridge said as the 2019 Climate Change Leadership conference began.

"Mitigating climate change is a very tough challenge and it's made harder by the fact that not everyone is in agreement," Bridge said. "The reality is that many individuals and companies are already doing a great deal and have been working to tackle this problem for years. However, they have often kept such information to themselves, conditioned as we all are to keep new technologies and our research private. It is now time that we learn to share our information and to learn from each other."

"The wine industry is the only branded agricultural industry in the world. Uniquely, it can tell you where its parts actually come from. What we in the industry often refer to as terroir is simply all about that sense of place. For most of us, it is about looking after remote regions where grape growing may be the only activity. It is about family businesses that think about future generations. It is about the opportunity that we have to transmit all of this to the consumer and to share with them the very responsible approach that we have for nurturing the land. This is why the wine industry, in my view, can take a leadership position."

"Climate change is real and is happening around us every day all over the world. As our speakers today will confirm, evidence of climate change is clear and incontrovertible. Its effect on the environment and on human lives and livelihoods can no longer be ignored," Bridge said.

Porto Protocol,[2] which calls on the wine industry to take a lead on climate change. Jones serves as the drector of the **Center for Wine Education** and is a professor of environmental studies at **Linfield College**. Jones' modeling for the next 20 years sees the warming trend continuing globally and in wine regions.

Cain Vineyard's winegrower and general manager **Chris Howell** emphasized that it's our duty to do something about climate change and global warming. "It's not just scientific," he said. "It's moral, it's ethical, it's about our choices as humans on Earth and what we are leaving future generations, who may be in a worse position to deal with this. As a community, we absolutely need to address this and adapt—not only in terms of our own impacts but also in terms of how our vineyards will be impacted." In 2006, Howell read a tiny article on the front page of ***USA Today*** which quoted Jones about climate change, "…basically saying Napa was going to fry," said Howell. An ad-hoc group formed by the **Napa Valley Vintners**, including **Saintsbury**'s co-founder **David Graves** and Howell, invited Jones to dinner. That began Howell's engagement with the effect of global warming on vineyards and wine.

According to Jones, more than 95 percent of all geoscientists in the world agree that our human influence—because of sheer population, urbanization, deforestation and green-house gas release—is all part of the issue. No wine region across the globe has seen any cooling trends—the changes are happening, Howell said.

Meeting of the Minds

Beginning with Graves, Jones introduced the panel; then, each gave a short background of their careers and their work related to climate change. Graves, known for his leadership in climate activism in Saintsbury's early years along with his co-founder **Richard Ward**, was one of the first to sign on to the Porto Protocol. **Leo McCloskey**, owner of **Enologix**, a trained ecologist and an expert in fine wine analytical chemistry, manufacturing and quality, offered a way to scale quality wines, factoring in climate change. Since 2018, Enologix has predicted a vineyard's future temperature based on its climate history. Chris Howell spoke about the importance of a wine's sense of place, its terroir and the climate's important role to this sense of place. **Glenn McGourty**, Mendocino County director of viticulture and agriculture/viticulture and plant science advisor for **UC Cooperative Extension**, touched on several topics, including the importance of soil health in conservation.

The evening's 90-minute discussion included practical steps wineries can take today to move to more sustainable models.

McGourty shared ways wineries can better cope with climate change through soil health, technology, cultivation and cultivars. He stated that he discovered the world of soil health that builds resilience into the vineyard and promotes microbial activity, which results in less chemical fertilizer usage.

He stressed the need for Napa Valley to think about all the cultivation happening there because cultivation is damaging to the soil in the long run. "You can't build as much water storage or get nearly the infiltration rates of rainfall," noted McGourty. He went on to talk about the importance of developing a landscape that can absorb some of these bigger rainfall events of 4 to 8 inches, which seem to be occurring more often. Adding some detail, McGourty explained that tilled bare soil isn't nearly as efficient as a

non-tilled system with natural regenerating sod, which absorbs a lot of the moisture—up to a 200 percent higher infiltration rate.

Bringing technology into the picture, he also suggested the use of remote sensing devices, such as fixed-wing drones, which fly over the vineyard and show the moisture stress in the vineyard. The results can be downloaded to a phone and relayed to the irrigation system to activate water valves in places that are stressed and keep valves closed in places that are fine.

As for cultivars, McGourty reiterated what McCloskey is advising his clients to do, to look at cultivars that are more heat-tolerant. "As Leo said," said McGourty, "if we are going to continue with Cab, we have to have something to blend into it so we can mitigate some of the things that might be missing in higher-heat situations."

Earlier in the discussion, McCloskey said that his recommendation to companies new to him is to make and sell 80 percent Cabernet blends—making up to the 20 percent of the blend with varietals that thrive in heat to build up color lost by Cabernet. "To maintain the density of the wine, the size and interest of the wine that the market has gotten used to, other varietals such as Petit Verdot or Malbec, must be planted in Napa Valley to accommodate the higher heat…" said McCloskey. "You can't control the optimum temperature of Cabernet because it is under tight genetic control."

After fielding questions from more than 20 attendants, including wine-makers from **Opus One** and **Silver Oak**, the panelists concluded that the general feeling from the discussion was that Napa Valley's leadership was vital to changing winery practices in the world.

"We are borrowing our environment from the future without inheriting it from the past," said Graves in a closing statement. "We need to be aware and act on the profound changes in our vineyards and the entire eco-region to secure a healthy future." **WBM**

For more information on Larkmead's salon series, contact Dan Petroski at *dan@larkmead.com*.

References

[1] The IPCC Report, the Intergovernmental Panel on Climate Change Field, C.B., L.D. Mortsch, M. Brklacich, D.L. Forbes, P. Kovacs, J.A. Patz, S.W. Running and M.J. Scott, 2007: North America. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 617-652. *https://www.linfield.edu/wine/greg-jones.html*

[2] Porto, Portugal is home to an important new initiative to mitigate the effects of climate change--the Porto Protocol. Launched in July 2018 with Barack Obama as keynote speaker, Porto established an innovative platform for the wine industry to share environmental best practices. Former vice president Al Gore, Miguel Torres of Bodegas Torres Family Winery and *WBM* editor, Cyril Penn, were among the speakers at this year's summit.

The Porto Protocol has two major objectives.

The first is to ask everyone to do more to help than they are doing at the moment. Too often we think that the problem is for others to solve or that our individual contribution will not matter. And why bother? Surely some scientists will develop the solution and we can all continue as we are. This will not happen and we must all start to do more – every contribution, no matter how small, helps.

A second objective is to create a platform where participants can share their ideas, achievements and experiences. Many companies have worked hard to develop solutions that they are applying to their businesses, often through hard work and careful research. The objective is to share solutions that are making a difference, stimulate new ideas and inspire others to take action.

Letter of Principles of The Porto Protocol

(*www.portoprotocol.com*)

Principles

By joining The Porto Protocol, companies are committed to:

- Do more than they are doing at the moment
- Guide their activity by good environmental practices principles
- Promote, in the respective value chain, these principles that characterize good environmental practices
- Seek to identify opportunities for cooperation with other Porto Protocol members and with external entities, regarding Climate Change
- Execute projects oriented towards the sustainability of the organization
- Disseminate good practices and case studies to The Porto Protocol platform
- Participate in the initiatives promoted by Climate Change Leadership Porto, to support The Porto Protocol
- Publicly report on their development performance
- Appoint a delegate to manage the relationship with The Porto Protocol

The Porto Protocol assumes the commitment to its members to:

- Promote, through The Porto Protocol platform the communication and dissemination of good practices of its members, as well as of the projects and other initiatives that companies are the main road to the Climate Change fight.
- Develop, together with members, tools to help fight climate change, share/dissemination of innovative ideas and provide access to learning tools, reports and know-how produced by Official entities
- Encourage debate and companies to explore new concepts
- Maintain a close relationship with its members through a regular communication and promotion of events
- Support the leadership of companies in matters of climate change

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Wednesday, May 22 Schedule

2:00 p.m. – 3:30 p.m.

WINEMAKING KEYNOTE TASTING

A Global Tasting Event: Winemaking Practices Around the World

Join four of the world's most celebrated winemakers in an unprecedented exploration of the trials, challenges and rewards of growing grapes and vinifying wine across the globe. With experience that ranges from Napa to France, Argentina to Israel, New Zealand and South Africa, Zelma Long, Laura Catena, Jenny Dobson and Celia Welch will bring their tried and true winemaking innovations and problem-solving approaches to this rare tasting.

SPEAKERS:

MODERATOR:
Elaine Chukan Brown
Hawk Wakawaka

Zelma Long
Vilafonté

Laura Catena
Bodega Catena Zapata

Jenny Dobson
Winetrust

Celia Welch
Corra Wines

At the start of the session, Zelma Long – winemaking partner at Vilafonté in South Africa – will be presented the IQ 2019 Lifetime Innovator Award, in honor of a lifetime spent dedicated to the pursuit of quality in the California wine industry.

3:30 p.m. – 4:00 p.m.

Green Medal Award Ceremony

The California Sustainable Winegrowing Alliance will recognize the recipients of the Green Medal Awards, vineyards and wineries who are leaders in implementing the 3 E's of sustainability (environment, economic and social equity), at Innovation + Quality.

LEADER AWARD:
Silver Oak Cellars

ENVIRONMENT AWARD:
Scheid Family Wines

COMMUNITY AWARD:
Smith Family Wines

BUSINESS AWARD:
Domaine Carneros

5:00 p.m. – 7:00 p.m.

IQ CONNECT *Soirée*

The exclusive opening night reception to kick off the IQ Event

IQ CONNECT is an evening wine and food reception featuring wineries and winemakers known for their devotion and dedication to innovation. Join hundreds as they taste through some of the wine world's most cutting-edge creations in a relaxed environment.

For more information please call us at 707-940-4749 or visit www.winebusinessIQ.com.

Thursday, May 23 Schedule

9:00 a.m. – 10:00 a.m.

Recent Research: Research That Will Change the Way You Make Wine

New research comes along all the time, but what is really applicable to day-to-day winemaking? This session will feature research that has immediate relevance and can be acted upon in the next vintage. Anita Oberholster will moderate, providing an out of UC Davis, as well as a sneak peek at ongoing projects diving into the impact of different membrane filters on wine composition, optimizing and determining efficacy of cleaning and sanitation protocols in the winery, tannin ripeness versus sugar ripeness in Pinot Noir and more.

11:00 a.m. – 12:15 p.m.

Advances in White Winemaking: The Latest Innovations in Technologies and Processes for White Varieties (session + tasting)

Looking to improve your white wines? What are white winemakers experimenting with and implementing? Hear about the practical applications of some of the newest technologies and some interesting ideas to explore in your own winemaking process. The session will focus on tank stirring, oxygen management, and role of fermentation temperature to improve or adjust mouthfeel and aromas.

1:15 p.m. – 2:30 p.m.

Climate Change and the Future of Winemaking (session + tasting)

What threat does climate change pose to ultra-premium winemaking? How will rising temperatures affect ripening, maturity, alcohol levels and more? This session will explore the ways to counteract a warmer growing season in both the vineyard and the winery.

Winemaker Trials Tastings

Experience one of IQ's greatest features – Winemaker Trials

These trials have been hand-selected to be presented at IQ.
Winemakers will be on hand to pour wines and interact with attendees. Times are as follows:

9:45 a.m. – 10:45 a.m.

Using Leaf Pull to Increase Thiols in Sauvignon Blanc
Chemeketa Cellars

Using a Foliar Yeast-Derived Spray to Accelerate Phenolic Maturity of Oregon Pinot Noir
Adelsheim Vineyard

Understanding Regional Differences in Petite Sirah
New Clairvaux Vineyard using the Aimee Brand

Comparing Seven Bentonite Products for Efficacy, Compaction, Cost and Sensory Effects
King Family Vineyards

How Skin Contact Time and Additions Change Merlot from the Same Vineyard
Meeker Estate Winery

11:30 a.m. – 12:30 p.m.

Stabulation Sauvignon Blanc with Lafazyme Thiols
Whitehall Lane Winery

Examining the Effects of Duration and Timing of Oxygen Dosage During Primary Fermentation
Erath Winery

Use of Brett Versus Saccharomyces for Pinot Gris Primary Fermentation
Merisi Wines

Effect of Short Skin Contact on Chardonnay Sensory Characteristics
Rappahannock Cellars

12:30 p.m. – 1:30 p.m.

Comparison of Phenolic Extraction in a GOfermentor versus a Tank
Sky Acres Winery

Winemaking Alternatives to Sulfur Dioxide
Scheid Family Wines

Clone and Oak Treatment in Pinot Noir Single Barrel Bottling and Bottle Aging
Terragena Vineyar

Chardonnay Three Ways: Measuring Effects of Concrete Tank, Puncheon Barrel and Stainless Steel Drum
Artesa Vineyards & Winery

Using Eclat Barrels to Achieve Varied Phenolic Levels and Sensory Characteristics in Willow Creek Chardonnay
Torch Cellars

2:00 p.m. – 3:00 p.m.

Aging Capacity of Common Filtration Protocols In Pinot Noir
Chemeketa Cellars

Impact of Different De-stemmers on Organoleptic Profile in Oregon Pinot Noir
Adelsheim Vineyard

Results of Various Smoke Taint Treatments on Cabernet Sauvignon and Meritage
WineSmith Wines & Consulting

Smoke Taint Removal Utilizing Differential Filtration: A Step Beyond Traditional Treatment
Winesecrets

Impact of Varying Intervals of Extended Maceration on Texas Mourvèdre
William Chris Vineyards

Tart vs Soft: Effects of Malolactic Fermentation on Napa Tocai Friulano
New Clairvaux Vineyard using the Aimee Brand

Trials are subject to change. Please see winebusinessiq.com for the most up-to-date listing.

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Recent Research Isolates Eight New Triterpenoids and Their Effects

Differences are wide enough that they can be used as criteria in barrel-making and purchasing decisions

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.

BY THE TIME THAT it has been made into a barrel, can one really say what sort of wood has been used in its construction? It's likely that familiarity makes it relatively easy to tell the difference between acacia* (AKA black locust), beech, chestnut and oak barrels on sight although I wouldn't be confident of my own assessment since, like a lot of winemakers, I've only worked with oak barrels myself. Most winemakers can probably tell the difference between an American oak barrel and one made from French or Eastern European oak (*Quercus robur* and *Quercus petraea,* respectively). The difference in weight between an American oak barrel and one made from French or Eastern European oak is a pretty good way for one to guess if the barrel was made from AO (*Quercus alba*). That being the case, I'm not so sure if Oregon oak (*Quercus garryana*) could be separated from AO or FO on sight or feel, but I've used more barrels than most winemakers not working for **Kendall-Jackson**, and I can't recall ever seeing a *Q. garryana* barrel.

American oak may be relatively easy to discriminate from French and other European oaks but, historically, it has been difficult to tell the difference between the two species that make up French and European oak once the trees have been harvested. Over time, coopers have relied upon things like the wood grain (ring width) and the reported forest of origin to predict the eventual organoleptic qualities of the resulting barrels.

Better Identification Through Chemistry

More than a decade ago, **Andréi Prida** and **Jean-Louis Puech** published a paper entitled, "Influence of Geographical Origin and Botanical Species on the Content of Extractives in American, French, and East European Oak Woods[1]". This study was able to determine that it is possible to tell the difference between American and French oak via the analysis of the oak extractives. The chemicals of interest for this study included the ellagitannin as well as the principal oak-derived odorant compounds (aromatic aldehydes, lactones and phenols).

The paper also looked at whether it is possible to tell the difference between the oak from France and Eastern Europe to separate oak wood from the same species based upon the geographical origin. The authors reported some success in discriminating between French and Eastern European oak but noted that, as of 2006 and with the criteria described in this paper, some samples of Eastern European oak could be misclassified.

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Quantitative Analysis: Enter the Triterpenoids

A decade later Prida, along with **Axel Marchal** and **Denis Dubourdieu**, published "New Approach for Differentiating Sessile and Pedunculate Oak: Development of an LC-HRMS Method To Quantitate Triterpenoids in Wood[2]". This paper notes that while the two primary oak species from the French forests that are used in cooperage, *Q. robur* (AKA pedunculate oak) and *Q. petraea* usually are lumped together under the rubric "French oak," there are differences between the two species. For example, *Q. petraea* tends to have higher levels of ellagitannins and lower levels of oak lactones than *Q. robur*. Unfortunately, there is so much individual variation that these can't be used to accurately determine from which species a given oak sample may be.

Citing an article in *Analytical Chemistry* from 2011([4]), which embarrassingly I still had in my "To-Read" stack eight years later, Marchal *et alia* noted that the four new triterpenoids (AKA quercotriterpenoids or QTTs) could be used to discriminate between oak wood from *Q. petraea* and *Q. robur*. Furthermore, three of the triterpenoids were found to increase the perception of sweetness in a wine.

Triterpenoids, The Sweet and the Bitter

This leads us to the most recently published article on the subject of oak triterpenoids published by Marchal, Dubourdieu and several other researchers, "Triterpenoids from *Quercus petraea*: Identification in Wines and Spirits and Sensory Assessment[3]". In this article, the authors note that they isolated eight new triterpenoids.

Aside from the analytical chemistry angle by which these chemicals were isolated, which is interesting in its own right, the authors make a few observations that are worth noting. Firstly, they did identify eight new oak compounds. Secondly, they were able to identify and characterize the organoleptic impact that these triterpenoids have on wine and spirits. Thirdly, the authors noted that some of the triterpenoids are perceived as being intensely sweet. Fourthly, the amount of triterpenoids in either of the two main French/European oak species used in coopering is different enough that it can be used as a criteria in oak selection for the development of particular cooperage styles by building barrels out of staves with higher or lower concentrations of sweet triterpenoids. Additionally, since *Q. petraea* tends to have higher concentrations of sweet triterpenoids, specifically tetrahydroxoleane-type triterpenoids, than *Q. robur,* this sort of quantification could be used in select oak based on the particular French/European oak species.

Just as soon as we make one of these, we'll let you know. The analogy fits. Aging and finishing a wine is actually not at all unlike raising a teenager. It's a particularly critical time, a turning point in the developmental life of your baby. And just when you were sure you'd thought of everything, crossed your "t"s, dotted your "i"s—and then along came nature. Unpredictables happen, it's a fact of life and it's where we come in and shine. Our exceedingly refined array of alternative aging systems offer winemakers a wide range of nuanced control over flavors, textures and mouthfeel. Numerous useful tweaks, trims and controls heretofore unavailable via traditional barrel-aging. For over 30 years, scores of blind tastings have dialed in and proven a rigorous scientific process we call Barrel Profiling. A unique process created by us, which now enables winemakers to not just mimic barrel flavors, but to methodically reproduce the exact barrel of their choice. Flawlessly.

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What Next?

Industry suppliers are taking note. Andréi Prida, research and development specialist at **Seguin-Moreau** said, "We don't use this analysis as routine for Icôn process. But we are soon starting the production of limited edition barrels and big containers based on qtt concept. All trials were successfully completed. We have already processed the wood for it. So wood is seasoning now and will be used for making barrels."

For a mere winemaker like myself, while I do find the analytical chemistry aspects of the isolation, identification and quantification of oak triterpenoids interesting, the winemaking implications are the most significant. I want to make the "best wine" I can. Of course, that is a totally subjective and idiosyncratic term, and I revel in that idiosyncrasy. I am enough of an iconoclast that I don't really care that much about the oak origin or species for their own sake. It is what is in the glass that matters. If triterpenoids can be used to produce barrels that will give me a predictable élevage, then that is one less "vintage variation" with which I must contend. **WBM**

Citations

1 Andréi Prida and Jean-Louis Puech, "Influence of Geographical Origin and Botanical Species on the Content of Extractives in American, French, and East European Oak Woods," J. Agric. Food Chem. 2006, 54, 8115-8126.

2 Axel Marchal, Andréi Prida, and Denis Dubourdieu, "New Approach for Differentiating Sessile and Pedunculate Oak: Development of a LC-HRMS Method To Quantitate Triterpenoids in Wood", J. Agric. Food Chem. 2016, 64, 618-626.

3 Marine Gammacurta, Pierre Waffo-Teguo, Delphine Winstel, Blandine N. Cretin, Lauriane Sindt, Denis Dubourdieu, and Axel Marchal, "Triterpenoids from Quercus petraea: Identification in Wines and Spirits and Sensory Assessment", J. Nat. Prod. 2019, 82, 265-275.

4 Marchal, Axel, Pierre Waffo-Téguo, Eric Génin, Jean-Michel Mérillon, and Denis Dubourdieu. "Identification of New Natural Sweet Compounds in Wine Using Centrifugal Partition Chromatography–Gustatometry and Fourier Transform Mass Spectrometry." Analytical Chemistry 83, no. 24 (December 15, 2011): 9629–9637. doi:10.1021/ac202499a.

Endnotes

* When I first heard of barrels being made from acacia wood, I had images of loggers denuding the African savanna of its magnificent, nitrogen-fixing thorn-trees. In fact, it appears that the "acacia" used in making barrels isn't what I consider acacia tree in the first place. I believe that most/all of the "acacia" use for barrels is actually *false acacia* (*Robinia pseudoacacia*) otherwise known as black locust or Robinia. Black locust is native to the central-eastern United States and widely planted and naturalized to most of the temperate climes in the world. Black locust wood has a reputation for being durable and is used for such things as boat building, fence posts and railroad ties.

True acacias themselves have undergone a number of taxonomic changes in recent years with several species being moved from genus *Acacia* to new genera like *Vachellia*, *Senegalia*, *Acaciella*, or *Mariasousa*.

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Adour Cooperage
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Agrovin USA, Inc.
Petaluma, CA ☎ 707-782-6371 • *www.agrovin.com*

Alain Fouquet French Cooperage, Inc.
Napa, CA ☎ 707-265-0996 • *www.alainfouquet.com*

Allary Tonnellerie
Amity, OR ☎ 503-307-1593 • *www.nicholaskeelerinternational.com*

Artisan Barrels and Tanks
Oakland, CA ☎ 510-339-0170 • *www.artisanbarrels.com*

Barrel Builders, Inc.
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PRODUCTS: Barrels, oak alternatives, cooperage supplies/tools
OAK TYPES: French Oak, American Oak, Eastern European Oak, Acacia
BARREL SIZES: Burgundy, Bordeaux, Large Format

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OAK TYPES: American Oak
BARREL SIZES: 5, 10, 15, 20, 30 Gallon

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Tonnellerie Bernard has been crafting barrels using traditional French techniques since it was founded in Southwestern France in 1936. Tonnellerie Bernard benefits from a privileged supply of premium French oak staves from some of the most prestigious forests in central France. Tonnellerie Bernard proposes a range of barrels made from a selection of fine grain oak staves naturally air seasoned for at least 24 months. The Bernard "Délicatesse" barrels are made from specially chosen oak staves chimney stacked in order to provide maximum airflow and thus a more consistent seasoning.

PRODUCTS: Barrels
OAK TYPES: French
BARREL SIZES: Bordeaux, Burgundy, Large Format, Delicatesse Barrel

Berthomieu Tonnellerie
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For more than a decade Tonnellerie Berthomieu has been part of Groupe Charlois, the only cooperage group that is completely integrated from forestry operations to the finished product. Benefiting from the reputation of the Groupe Charlois, its knowledge of oak and savoir-faire offer a unique advantage.Located in one of the most renowned oak forests in France, the cooperage distinguishes itself by its unique steam bending process and by its exceptional selection of oak from France's most prestigious forests.

PRODUCTS: Barrels
OAK TYPES: French Oak
BARREL SIZES: Burgundy, Bordeaux, Large Format

Bouchard Cooperages
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Tonnellerie MAURY from Bordeaux offers French oak barrels based on grain tightness with a Bordeaux style toast.

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BARREL SIZES: Burgundy, Bordeaux, Large Format

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CFP Winemakers
Pittsburgh, PA ☎ 412-232-4507 • *www.cfpwinemakers.com*

Charlois Cooperage USA
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Cloverdale, CA ☎ 707-944-1371 • *www.charloiscooperageusa.com*

Integrated by the Charlois Group in 2011, and located in California's Sonoma Valley, this cooperage combines American production and French quality to create the best oak barrels stateside. All the exceptional know-how built up by the Charlois Group's experience of working with oak is now brought to the USA. Expertise, quality and sustainable development are combined to create local products intended to complement the quality of the winemakers' efforts. Charlois Cooperage USA's raw material is sourced from the best oak forests of the Appalachian Mountains. The fruit of this intercontinental alliance is the creation of a high-end collection of American oak barrels.

PRODUCTS: Barrels
OAK TYPES: American Oak, American-French Hybrid
BARREL SIZES: Bordeaux Export

Country Connection
Oroville, CA ☎ 530-589-5176 • *www.countryconnection.biz*

Creative Oak
Benicia, CA ☎ 707-746-5704 • *www.creativeoak.com*

Demptos Napa Cooperage
Napa, CA ☎ 707-257-2628 • *www.demptosusa.com*

East Coast Wood Barrels
Medford, NY ☎ 516-582-1065 • *www.ecwbny.com*

Éclat
San Rafael, CA ☎ 415-457-3955 • *www.boswellcompany.com/barrels/eclat-2*

Epocure Stave Co.
Lafayette, CA ☎ 707-455-1095 • *amaleoak.com*

Erbslöh Geisenheim, Inc.
New York, NY ☎ 212-315-2196 • *www.erbsloeh.com*

Ermitage Tonnellerie

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Cloverdale, CA ☎ 707-224-2377 • *www.tonnellerie-ermitage.com*

Tonnellerie Ermitage specializes in a select, made-to-order offering of barrels produced from the very best lots of oak from trees a minimum of 150 years old. Tonnellerie Ermitage works exclusively with State forests that are sustainably farmed and managed by the ONF and certified PEFC. Each order is handled with rigorous and personalized attention from the barrel or tank selection process through delivery and beyond.

PRODUCTS: Barrels
BARREL SIZES: Bordeaux, Burgundy, Large Format, tanks and casks

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In addition, G3 is introducing Phenesse Oak, a new oak alternative that comes with two types of tank staves (11MM format) and two types of chips sourced from high quality French and American Oak forests. The Phenesse products are designed to bring harmonious results to assist in quality winemaking for the North American region.

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PRODUCTS: Oak Alternatives
OAK TYPES: French Oak, American Oak

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Heinrich Cooperage

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PRODUCTS: Oak alternatives
OAK TYPES: French Oak, American Oak
BARREL SIZES: Barrel Alternatives that replenish barrels and for adding to tanks

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OAK TYPES: French Oak, American Oak, Eastern Eurnpean Oak
BARREL SIZES: Burgundy, Bordeaux, Large Format

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Oenosylva

Cloverdale, CA ☎ 707-224-2377 • *www.oenosylva.com*

Oregon Barrel Works

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Premier Wine Cask

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Dargaud & Jaegle's sophisticated barrels are water-bent, in the tradition of southern Burgundy where the cooperage is located. The combination of heat and moisture during toasting creates a generous but gentle oak profile characterized by sweet spice and round texture. Barrel Associates International
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PRODUCTS: Barrels
OAK TYPES: French Oak, American Oak, Eastern European Oak
BARREL SIZES: Burgundy, Bordeaux, Large Format

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PRODUCTS: Oak adjuncts, barrel alternatives
OAK TYPES: French Oak, American Oak, Eastern European Oak
BARREL SIZES: Oak adjuncts, beans, segments, barrel replica, barrel insert, stave fan

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PRODUCTS: New Barrels, Oak Alternatives
OAK TYPES: French Oak
BARREL SIZES: Burgundy, Bordeaux, Puncheons

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Tonelería Magreñán
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Tonelería Magreñán represents 5 generations of great coopering tradition. Its savoir-faire and perpetual quest for quality has given rise to its current prestige. Born into a family of coopers with a history dating back to 1820, it was Rafael Magreñán's affinity for the wines of Rioja that led him to create his own cooperage in Alfaro in 1950. Today the cooperage is managed by his grandchildren, Antonio and Teresa. Tonelería Magreñán is recognized for the quality of its products both in Spain and all over the world. Its barrels are made from American, French and European oak.

PRODUCTS: Barrels
OAK TYPES: French, American, Eastern European, Spanish Oak
BARREL SIZES: Bordeaux, Burgundy, Large Format

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Sancoins, France ☎ • *www.atelier-centre-france-tonnellerie.com*

Tonnellerie Baron
St. Helena, CA ☎ 707-328-8207 • *www.tonnelleriebaron.com/en*

Tonnellerie Bel Air
Calistoga, CA ☎ 707-987-8905 • *www.tonnellerie-bel-air.fr*

Tonnellerie Berger & Fils
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Tonnellerie de Mercurey
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Respect and stewardship of the forests blended with the traditions of our cooperage to serve your wines.

Tonnellerie de Mercurey is renowned for its precision oak blending and the consistency of our own integrated stave mill, NT BOIS. We use three criteria to objectively evaluate the quality of each stave based on grain size, terroir and forest management. The result is 7 specific oak selections and 9 highly developed toasting regimes designed to amplify the best qualities of each oak selection.

PRODUCTS: Barrels
OAK TYPES: French Oak, American Oak
BARREL SIZES: Burgundy, Bordeaux, Large Format, Half Barrels

Tonnellerie du Sud-Ouest
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Tonnellerie Leroi
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Originally founded by the oldest of the great Cognac houses, Tonnellerie Leroi boasts a rare expertise in the production of oak barrels. The noble quality of the material is matched by the mastery and skill of its expert coopers. By perfectly taming the heat during the toast, the master cooper reveals the subtle aromas of the oak, which brings to the wine or spirit its aromas and vitality.

PRODUCTS: Barrels
OAK TYPES: French Oak
BARREL SIZES: Bordeaux, Burgundy, Large Format, tanks and casks

Tonnellerie Mercier
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Tonnellerie Ô

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At "Ô" we are dedicated to providing our winemaking partners tools to craft the wine they intend. Because every bottle is a memory.

Tonnellerie Ô is a state-of-the-art cooperage near the heart of Northern California wine country, where artisan coopers hand-craft, hand-toast and hand-finish French and American oak barrels. Production methods feature innovative design and equipment from R. Monnot, SA, including a multi-stage jointer that is one of a handful of its kind in the world. In addition to pioneering technology, our coopers employ time-honored practices, such as barrel toasting in our traditional 2,500 square foot brick lined toasting room. Collectively, our Master Cooper and his team have nearly a century of experience crafting artisan barrels.

PRODUCTS: Barrels, Oak Alternatives
OAK TYPES: French Oak, American Oak
BARREL SIZES: Burgundy, Bordeaux, Large Format

Tonnellerie Quintessence

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Sonoma, CA ☎ 707-935-3452 • *www.tonnelleriequintessence.fr*

L'essence de l'art

Tonnellerie Quintessence is a creative cooperage blending savoir-faire and contemporary expertise. Located just outside of Bordeaux on the road to St. Émilion, Tonnellerie Quintessence crafts barrels from the finest oak milled at our PEFC-certified stave mill. Our team is committed to only the very best, the essence of Quintessence.

PRODUCTS: Barrels
OAK TYPES: French Oak, American Oak
BARREL SIZES: Burgundy, Bordeaux, Large Format

Tonnellerie Orion

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The Rapid Expansion of the Grape and Wine Industry in Texas

Justin Scheiner and Andreea Botezatu

Dr. **Justin Scheiner** is assistant professor and extension viticulture specialist at Texas A&M University in College Station.

Dr. **Andreea Botezatu** is assistant professor and extension enology specialist, also at Texas A&M University.

MIGUEL LECUONA

2017 Malbec harvest at William Chris Vineyards

WHEN PEOPLE THINK OF Texas, wine may not be the first thing that comes to mind. But, as the fifth leading wine producing state in the nation, Texans are becoming increasingly aware of this Lone Star treasure. Like many other states, the Texas wine industry has seen continuous growth over the last decade. However, just 19 years ago, Texas had only 40 licensed wineries, which is not very many, considering the size of the state and a population of over 20 million. Fast forward to 2019 and Texas now boasts more than 350 wineries, according to **Wines Vines Analytics**, and 8 million more Texans. [Editor's note: The **Texas Alcoholic Beverage Commision** reports more than 500 winery permits—wineries may have multiple permits, a permit may have been issued to a winery that never opened, or may have closed.]

While it may be surprising to many, Texas also has one of the most visited wine regions in the United States—the Texas Hill Country. Each year, this area of Central Texas named for its rolling hills hosts more than 30 million tourist visits, and savvy wineries embrace tourist-friendly business models. This contributes to wine's $13.1 billion total economic impact on the state.

Texas is one of the fastest growing states in the country, and Texans thirst for wine reflects that fact. According to the Texas Alcoholic Beverage Commission, Texans purchased around 57 million gallons of wine in 2017. On a per capita basis, that is still below the U.S. average of 2.94 gallons per person (**Wine Institute** 2019), but to an optimist this means the Texas wine industry has a potential for large market share gains as it supplies less than 10 percent of what is consumed.

So why did the number of Texas wineries increase ten-fold in less than two decades? The answer is not crystal clear, and it's not reasonable to attribute the massive growth to a single factor. However, the increasing interest in locally produced products and agritourism has likely helped those wineries that depend on tourism and direct-to-consumer sales. Likewise, the experiences and successes of pioneering grape growers and winemakers continue to boost the confidence of prospective producers to jump into the business.

Perhaps the most important factor was legislation passed in 2005 that enabled wineries to ship wines directly to consumers. This increased the viability of many wineries and, most certainly, those located off the beaten path. Wine clubs can be a real boon when weather and seasons have a strong influence on customer traffic.

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FIGURE 1

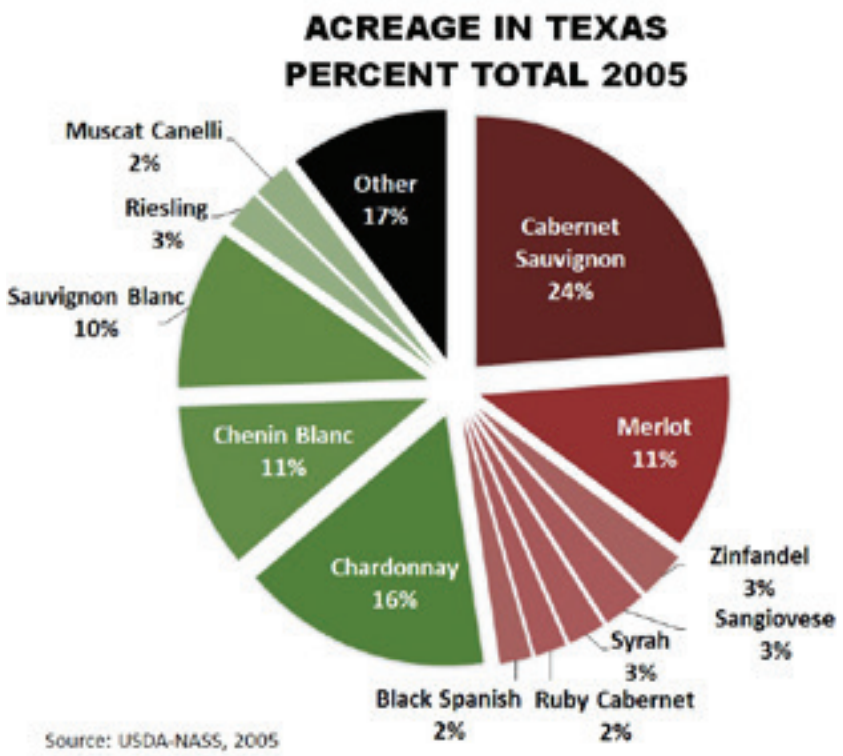
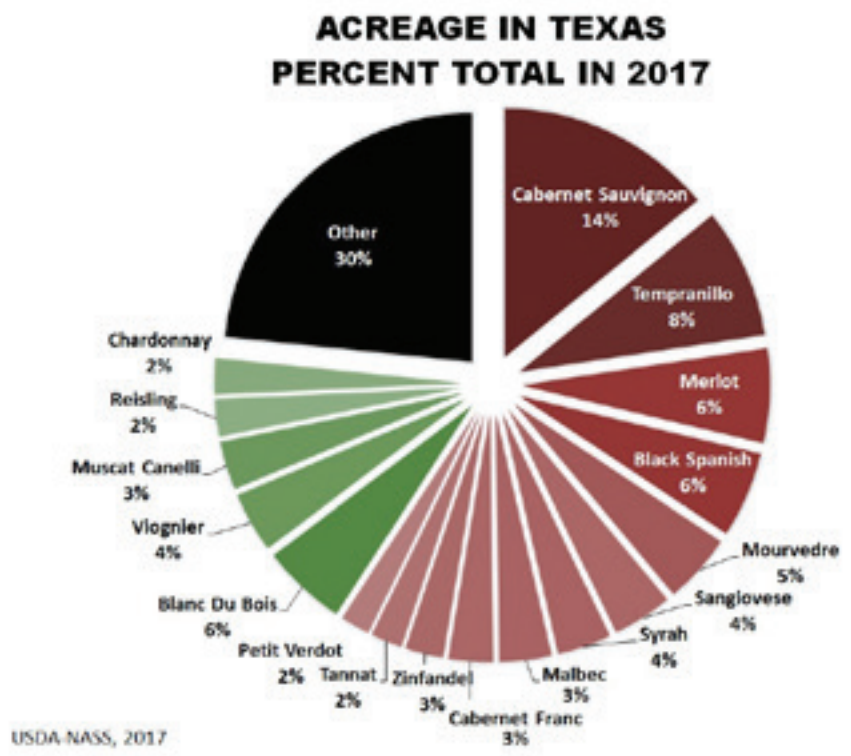


FIGURE 2



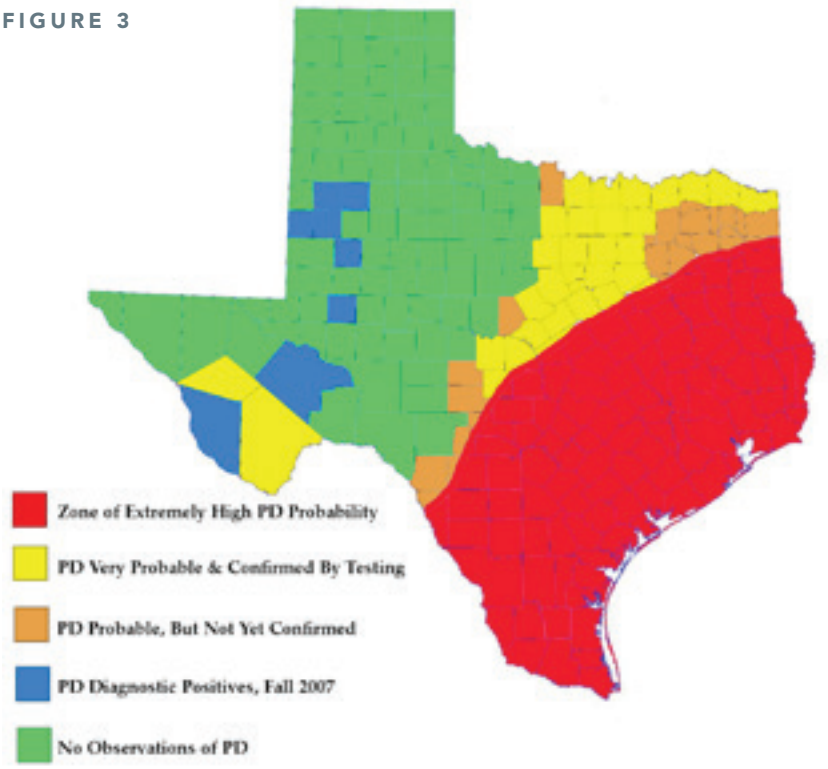
Grape Things are Happening

However, the most interesting aspect of the Texas wine industry is not its growth, but rather the diversity of the grapes and wines that are being produced. In 2005, the **United States Department of Agriculture National Agricultural Statistical Service** (USDA-NASS) carried out a grape variety and acreage survey. In this survey, noble grapes Cabernet Sauvignon, Merlot, Sauvignon Blanc, Chardonnay and Riesling accounted for 61 percent of total acreage. This was not a surprise, considering the name recognition and quality potential of those varieties (see FIGURE 1).

By 2017, grape acreage in the state had doubled, and those noble varieties only accounted for 24 percent of total acreage. Now more obscure, but certainly very interesting, varieties of grapes are being planted, including Rousanne, Marsanne, Aglianico, Dolcetto, Mourvèdre, Picpoul, Montepulciano, Albariño and Tannat (see **FIGURE 2**). It turns out that some of these lesser-known varieties are more consistent performers in the unique climates of Texas and produce some exceptional and truly memorable Texan wines.

Most of the acreage in Texas—more than 5,600 acres—is planted to *V. vinifera* varieties. However, Pierce's Disease limits growers along the Gulf Coast to resistant or tolerant varieties (primarily Black Spanish and Blanc Du Bois). The bacterium that causes Pierce's Disease, *Xylella fastidiosa* subsp. *fastidiosa*, is endemic to the U.S. Gulf Coast and it is vectored or moved from plant to plant by xylem-feeding insects. Research in Texas has identified approximately 30 species of known and potential insect vectors (see **FIGURE 3**).

FIGURE 3



Geographically, the state of Texas straddles the divide between the humid southeast and desert southwest. Eastern regions of the state can average over 50 inches of annual precipitation, while in the far west, annual precipitation is less than 14 inches. Likewise, the soils are diverse, with over 1,300 soil series across the state. These range from coarse, acidic sands to fine, alkaline clays. This is not too surprising, considering that the state of Texas has more land area than France. Eight American Viticultural Areas are recognized in Texas, ranging in size from just over 3,200 acres (Bell Mountain AVA) to over 9 million acres (Texas Hill Country AVA).

While most grapes are grown in the Texas High Plains, which is drier and higher in elevation than areas to the east, commercial vineyards can be found literally statewide, from Brownsville to El Paso to the Texas Pan Handle. In the Rio Grande Valley in deep South Texas, vineyards can be seen side by side with citrus orchards, and for short season varieties, like Blanc du Bois, the post-harvest period is as long as, or longer than, the period of time from budbreak to harvest. Preliminary research at **Texas A&M University** suggests that there is a potential to double-crop Blanc du Bois in this region.

The Texas Hill Country, located in central Texas, is dominated by limestone-based, alkaline soils. The climate in this region is generally more favorable than the Gulf Coast with respect to humidity and temperature, but untimely tropical moisture is always a threat. This region and the area from

around Dallas to the Red River along the Oklahoma border, referred to as North Texas, have the highest concentration of wineries.

Perhaps the most conducive region for grape production, based on soil, water and climate, is the Texas High Plains. This region, at an elevation of 3,000 to 4,000 feet, has larger diurnal temperature fluctuations than elsewhere in the state. This, coupled with the deep sandy soils and the relative dryness, creates conditions often compared to those found in Argentina or some of the Mediterranean regions. It is easy to see why Italian varieties (Sangiovese, Montepulciano, Aglianico), Spanish (Tempranillo, Mourvèdre), Portuguese (Albariño, Touriga Nacional) and others do so well here.

It is often said that the only consistency about the weather in Texas is that it's inconsistent. A telling example was in 2011, which was one of the driest years for the state of Texas. It was preceded by several years of drought, and the state experienced many wildfires, something that is foreign to many Texans. For a grape grower applying irrigation, the drought itself was not devastating, but the extreme heat the vines experienced that season added to the challenge, as areas in North Texas logged more than 100 days with temperatures of 100° F or higher. However, just four years later, Texas had its wettest year on record, and many areas received 20 to 30 inches above their annual average. On top of the extreme weather events that appear to have become the norm during the last decade, Texas growers must also be prepared to defend against untimely rains, late spring frosts, and occasional hail events. It is the authors' opinion that the grape growers in Texas who are consistently successful are as good as any in the country.

Texans often say it gets hot in Napa just like it does in Texas, but in Napa it gets cool at nighttime, thanks to the Pacific influence. In Texas, it just gets dark. There's certainly some truth to that, but the higher elevation areas of the state, such as the Texas High Plains and areas in West Texas, do have an advantage of cooler nighttime temperatures. Nevertheless, winemakers in Texas are not always able to depend on perfect fruit. Alcohol potential and pH quickly spike under high day and nighttime temperatures common in some areas of Texas although growers and wineries continue to work on identifying more and more grapes that excel under these conditions.

Despite the challenges of growing grapes, fantastic wines are made year after year. Most readers will not have an opportunity to taste Texas wines without a visit to the Lone Star State and, therefore, many national wine writers don't place much focus on them. However, Texas wines receive golds, double golds, and best of class awards every year at the **San Francisco International Wine Competition** (such as Best in Class Viognier, Double Gold that went to the 2017 Viognier from **Blue Ostrich Winery and Vineyard** in the High Plains; the Double Gold for the 2016 Tempranillo from **Brennan Vineyards** in Comanche; or the Double Gold for the 2017 Trebbiano from **Duchman Family Winery** in Driftwood, just to name a few).

Research and Educational Programs

Texas A&M University, the land grant university in Texas, has ramped up its teaching and research efforts in response to industry growth and support. Texas A&M's first research vineyard dates all the way back to 1893, but in the past five years, the university has really stepped up its efforts, thanks to both state and university funding. The Texas A&M **AgriLife Extension Service** maintains eight viticulture and enology positions across the state, and the **Viticulture and Enology Program** offers a range of educational events, from informal tailgate meetings to advanced short courses, workshops and webinars.

The clientele served range from prospective growers with zero grape-growing experience or potential new wineries to well-seasoned growers and winemakers. The program also includes an Enology Certificate Program established in Fall 2017 for students at Texas A&M University. This certificate was created in response to a demand from students and industry members alike for a training program and certification. By the end of the first year, the certificate program had an enrollment of 30.

Research opportunities are bountiful in a state with so many things going on. Texas A&M scientists focus on the challenges related to climate, such as high pH musts, color potential and stability, Pierce's Disease, crop load management, harvest timing and late spring frosts. Cultivar testing of advanced selections from breeding programs around the U.S. is an ongoing process with evaluations being performed from both a viticultural, as well as enological, perspective.

One unwritten duty of the Viticulture and Enology Extension Specialists at Texas A&M is to observe and learn in tandem with industry members as they adopt untried varieties and new methods. In the Texas High Plains alone, approximately 50 grape varieties are grown on a commercial scale. This includes everything from mainstream to extremely obscure varieties. Challenging conditions, such as extreme cold or untimely rains, present an opportunity to document both failures and successes and to pass this information on to growers and winemakers.

The Future of Texan Wines

What does the future look like for Texas? By all indicators, growth of the grape and wine industry doesn't show signs of slowing down anytime in the immediate future. In 2018 alone, approximately 50 new winery licenses were added and with each vintage, winemakers have collectively gained one more year of experience with Texas fruit. For growers, new, high-quality potential PD-tolerant grapes, such those from the **UC Davis** breeding program, offer yet another avenue for diversifying the industry, particularly in eastern areas of the state. Interestingly enough, the genes responsible for PD tolerance come from a species of grape native to Texas. There's no doubt, grape things are happening here. **WBM**

References:

Texas Alcoholic Beverage Commission. 2017. Per Capita Consumption. *https://www.tabc.state.tx.us/excise_tax/per_capita_consumption.asp*

Wine Institute. 2018. Wine Consumption in the United States. *https://www.wineinstitute.org/resources/statistics/article86*

United States Department of Agriculture National Agricultural Statistical Service. 2018. 2017 Texas Winegrape Varieties. *https://www.nass.usda.gov/Statistics_by_State/Texas/Publications/More_Features/tx-wine-grape-varieties-2018.pdf*

Insight & Opinion:

Fighting Flatline: Two Keys to Wine Production Profitability

Kyle Sawyer

Kyle Sawyer is president of ICC NW, an ICC Group company. ICC NW has been a manufacturer of custom stainless steel tanks for the food processing, beverage, pharmaceutical, pure water and chemical industries for 37 years.

THE LAST 20 YEARS of growth in the wine industry may be starting to flatline (see "State of the Wine Industry 2018" by the **Silicon Valley Bank** Wine Division), but that's no reason for winery profits to follow suit. With total volume growth leveling out and grape prices escalating, now is the time to be looking at ways to tune up winery technology and production methods.

There are a lot of ways wineries can increase productivity and quality while cutting costs to protect profit margins. Most of those tactics fall into two major categories: automation and conservation.

Key 1: Automation

One of the biggest factors in winery profitability comes down to labor, which is one of the highest expenses in a winery. Cellar workers are skilled labor, requiring six to 12 months of training. Automation is a wise investment that allows you to optimize efficiencies and allows your workers to apply their skills more effectively rather than devoting time to chores that can be automated.

Temperature control: Through the use of automation, temperature sensors and cooling jackets, winemakers can tightly manage every stage of fermentation for optimal results. Add internet connectivity to your automated processes and you get real-time visibility via any smart device, allowing you to manage equipment, temperature, fermentation and other critical functions from anywhere—again, reducing the need for on-site labor while increasing your ability to control every stage of the winemaking process.

Self-emptying tanks: One simple way to reduce labor and improve safety is to let tanks empty themselves. For example, a self-emptying tank that disgorges the must in a 100-ton fermenter can save you about four hours and cut the required manpower in half. It also has the added benefit of being much safer, as there is no need for someone to enter the tank to sweep it out.

Cap management: Since cap management is all about keeping the grapes wet and maintaining the right oxygen levels, tank size can go a long way toward efficient cap management. Whether by pump-over or punch-down, the speed with which a tank reaches healthy fermentation also translates to how quickly that tank can be emptied and refilled.

Important aspects include where the yeast sits in the tank, how much it interacts with the sugar and how much sugar is touching the yeast. All of these need to be kept in balance through the fermentation. The perfect ratio is dependent on the type of grape, as well as the height and width of the tank. Tall, narrow tanks are best for wineries processing thick-skinned grapes that can handle more manipulation and shorter, broader tanks serve wineries processing thin-skinned grapes that require gentler methods well.

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Key 2: Conservation

By cutting down on the amount of water, chemicals, energy, and skilled labor used throughout fermentation and processing, wineries can create a nice revenue-savings cushion.

Clean-in-place: With clean-in-place technology, the tank can be cleaned safely and efficiently without the need for employees to handle strong chemicals and enter the vessels. Chemicals and water can be filtered and reused, further increasing operational savings. Internal cleaning devices or CIP skids can be incorporated to clean vessels efficiently.

Temperature control can also help cut operational costs by reducing energy to maintain tank temperature. Keeping the tank room cool is not an efficient way to keep tanks cool and results in high energy costs. Through the use of sensors, thermal insulation, and properly sized and distributed cooling jackets, the time and energy required to adjust and maintain temperatures can be reduced.

Gravity and automated pomace-out: Tanks designed to disgorge must through simple gravitational force are another option for reducing energy usage and labor. With a conical or sloped floor and automated pomace-out door, winemakers can allocate skilled labor to a more efficient use of their time.

Using automated, connected systems, wineries can reduce staff time while keeping tight control of fermentation parameters, oxygen levels, temperatures, and reduce water and energy use. **WBM**

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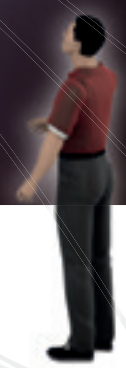

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GRAPEVINES HAVE DEEP ROOTS and we want to encourage our vines to grow deeply. That's what many people seem to think and talk about. Actually, that's not true. Grapevines do not have deep roots, though I guess that depends on what you consider "deep." Deeper than a carrot or cabbage root system? Definitely. Deeper than an oak tree's root system? Unlikely. While I've heard people talking about grapevine roots protruding from the ceilings of deep subterranean caverns, as well as 20+ deep grapevine root systems in the ultra-deep soils around Davis, California, those are not typical or common. In fact, those are truly exceptional cases.

The grapevine is a riparian plant used to surviving on water supplied by rivers and creeks. American *Vitis* species, selected for breeding today's modern rootstocks, are also mostly riparian in their native habitats, with some exceptions, including *V. berlandieri*, which is native to limestone hills of Texas, New Mexico and Mexico. That said, grapevines collectively do not have tap roots, which are root systems that feature a single main root with branches off that central structure. Grapevine root systems are more randomly distributed, though there are morphological differences among rootstocks, with the more riparian types (e.g., *V. riparia*) having a more shallowly-angled root structure and the more drought-tolerant types (e.g., *V. rupestris* and *V. berlandieri*) having a more steeply-angled structure. But none have a tap root. So please stop using that language when speaking about grape roots.

Indeed, grape roots are not very deep. The majority of grape roots are found at or above 3 feet in depth, with some roots reaching down to about 4 feet. With some exceptions for unusual soils, it is rare to find roots any deeper than that. Where I've seen roots deeper than that, at least in the North Coast, those vineyards tend to be quite vigorous and are difficult to control. In more arid regions, deeper roots may alleviate some of the irrigation need, but again, it is unlikely that roots will grow that deeply in those regions.

In an extensive review of grapevine rooting depth, it was reported that about 50 to 95 percent of roots were present in the upper 100 cm (3.3 feet) of soil, with the distributions varying widely over regions and rootstocks[1]. Roots can be found more deeply than that (down to over 5 feet), but the majority of roots are simply not very deep.

In my January 2019 article, I wrote about how I employ a delayed irrigation approach to encourage deeper, more extensive rooting, though even then I do not expect to see roots extending much past 4 feet in depth. Why? Well, our soils don't allow it.

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Limitations to Root Growth

Aside from the genetic morphological differences among rootstocks mentioned above, there are numerous factors that affect root development and depth. Soil hardness is one of the major factors, and according to leading soils expert **Alfred Cass**[2], roots can penetrate soil up to a resistance of 2 MPa (about 300 psi). Soil hardness/penetration resistance is largely a function of soil water content, so it does make sense to have moist soil available to encourage root development. That is a good application of a "big drink" irrigation approach in an arid climate like the Central Coast, at least during the period where roots are elongating (but not when we are trying to stress the vines for quality—see my January article).

But soil penetrability by roots is also influenced by other factors, including soil structure and porosity, which are very important. Roots cannot thrive where oxygen is limiting, so waterlogging and lack of porosity (e.g., subsoil with massive structure) will restrict root development in those depths and below.

Another factor that can limit rooting depth is soil stratification. Abrupt changes in soil texture or structure, or rock content, can serve as a boundary to root growth. It does not have to be a hardpan or claypan to cause this effect, though either of those can and will limit root exploration below them. But a change from a coarse-textured soil (sandy or gravelly) to a finer-textured soil (e.g., loam or clay loam) can be a motivation for roots to stay in the upper layer. The reverse is true also: a change from a finer-textured soil to a coarse-textured one (especially if a gravel layer) will definitely stall roots from elongating past that boundary.

Soil chemistry can also stall root elongation. At very low soil pH levels, the aluminum in some soils can become soluble. As aluminum is quite toxic to grapevines, it will certainly reduce root development but also could be quite threatening to the viability of the vines. That said, I have seen some extremely shallow rooting depths in very acidic soils (pH in high 4s and low 5s) where the vines were performing extremely poorly. While liming of soils can correct soil pH, lime is quite insoluble and will only be effective exactly where it is placed. Spreading lime on the soil surface doesn't do much of anything, and ripping or disking it in will help but, again, only to the depth it can incorporate the material.

An effective way to manage very low pH soils with toxic levels of soluble aluminum, especially when calcium levels are also low, is to apply gypsum. Gypsum is sparingly soluble but, nonetheless, will solubilize over time and then move down the profile. Gypsum (calcium sulfate) will not change soil pH but its ions will dissociate and form an insoluble complex with the aluminum, thereby making it unavailable to the vine roots[3].

Soil Pits are Essential

While we can ascertain soil chemistry from soil samples taken by a soil auger, soil pits are essential to truly understanding the physical composition of the soil, and there is really no technology available to take the place of soil pits. Ideally, growers should enlist the assistance of a soil expert: a soil scientist or agronomist/viticulturist with a solid soils background. These individuals will see things in your soils that you will not and may catch something of importance. But that should not stop you from digging some pits on your own.

For purposes of determining rooting patterns of a vineyard, digging soil pits in the vine rows is perfect. Choose a location that is representative of the vineyard or, better yet, choose locations where vine growth is ideal, as well as where vine growth is substandard and, again, where vines are overly vigorous. It is best to dig soil pits centered around a vine to observe rooting patterns near the vine trunk as well as away from it, including under the drip emitters. Dig them as close to an existing vine as possible. I've never seen a vine harmed by digging a pit on one side of it, so don't be afraid. We usually dig the pits about 5 feet deep, though **OSHA** regulations may supersede that suggestion.

If you are exploring a site that is being considered or planned for vineyard development, it is even more important to consult with a soil expert, who will see features of the soils that an untrained person would not. They will also be able to better identify where to dig the pits, since there is no vineyard there for reference.

Looking at Rooting Patterns

A soil pit dug near a vine will have two perpendicular planes: one along the vine row and the other perpendicular to it. It is important to note where the roots are in both dimensions. Use a tape measure and identify the various horizons in the soil—layers where the soils change in some respect, such as color, texture, friability, gravel/rock content and density. Use a geologist's hammer or mattock to chip away at the soil. The backhoe/excavator will compress the soil against the face, and you want to be sure to look at the undisturbed soil. As you are likely not a soil expert, you won't necessarily be able to identify the structure, but can note if it is crumbly or if it breaks apart easily into consolidated units. Non-structured soils are usually either very gravelly, sandy or have a high clay content. Roots prefer to grow in pore spaces in well-structured soils.

Note the type of roots seen in each layer. Thick roots are important and show that the root system has been there for a while, but thick roots do not take up water. Water and nutrients are taken up by fine roots, so note how many coarse, medium and fine roots there are in each soil layer you've identified. You should be able to identify where the roots are growing. Usually, if you find a layer where roots are not present, you won't see any below that level.

Identifying why roots grow to a certain depth requires expertise but look for the contraindicative characteristics I mentioned above. The most common features I've seen that limit root depth, at least in the North Coast, are clay layers or clay subsoils with massive structure or abrupt changes in soil characteristics. Stratified soils are very common near waterways and alluvial fans. I frequently see roots growing horizontally along those interfaces; often the larger roots stick out from the pit face, a clear indication that the roots hit an interface and stayed in the horizon above the impediment.

Investigating Rooting Depths

An abrupt change in soil physical properties can be difficult to manage in an existing vineyard. In fact, it may be an incurable condition. Water from drip emitters in many cases does not percolate across an abrupt boundary, and so delivering water deeply may be difficult or impossible. This condition is best noticed before the vineyard is established. It can be mitigated somewhat by ripping but only when using a ripping shank that has a wing. A straight ripping shank will do little to blend the horizons. Even a winged-tine ripping shank will only alleviate some of the problem, but it will do a much better job of it than a straight shank. Only a plow will bring up and mix soil horizons, though it may also destroy soil structure in so doing. In an existing vineyard, one can try using a pair of small ripping shanks near the vine rows but, again, the shank must be one with wings.

Look at the face parallel to the vine row to note the extent of rooting with distance away from the vine trunk. The distribution should be uniformly decreasing away from the trunk without roots heavily clustered under the drip emitters. A proliferation of roots under the drip emitters could be a sign of excessive irrigation.

I also suggest looking at the roots, not only on the side closest to the vine but also on the other side of the pit. See if there are roots out in the space between vine rows. Ideally, roots from mature vines should proliferate throughout the soil volume, not only near the vine rows. Having a scarcity of roots in the row middles could point to soil compaction under the wheel tracks, or excessive or early-season irrigation that reduces the development of roots away from the emitters.

The best time to examine soil profiles is before the vineyard is developed. But, if you plan on replanting a vineyard due to old age or disease, you would be missing out on a treasure trove of information if you don't dig soil pits prior to developing a replanting plan. **WBM**

References

1 Smart, D. R. et al. 2004. Grapevine Rooting Patterns: A Comprehensive Analysis and a Review. Proceedings of the Soil Environment and Vine Mineral Nutrition Symposium. American Society of Enology and Viticulture. L. P. Christensen and D. R. Smart, Editors. Pp. 153-169.

2 A. Cass. 2004. Effects of Soil Physical Characteristics on Mineral Nutrient Availability, Movement and Uptake. Proceedings of the Soil Environment and Vine Mineral Nutrition Symposium. American Society of Enology and Viticulture. L. P. Christensen and D. R. Smart, Editors. Pp.3-11.

3 D. Roberts. Viticultural Practices for Very Acidic Soils. Proceedings of the Soil Environment and Vine Mineral Nutrition Symposium. American Society of Enology and Viticulture. L. P. Christensen and D. R. Smart, Editors. Pp.109-112.

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Vineyard Row Orientation

Factor in microclimate, physiology, growth and yield

Kobus Hunter, Cornelis Volschenk and Roberto Zorer

Kobus Hunter is a specialist researcher and **Cornelis Volschenk** is a researcher in the Viticulture Division, ARC Infruitec-Nietvoorbij, Stellenbosch, South Africa. **Roberto Zorer** is a researcher in the Biodiversity and Molecular Ecology Department, Research and Innovation Centre, Fondazione Edmund Mach, San Michele all'Adige, Italy.

Key Points

- Vine row orientation influences canopy microclimate and affects grapevine leaf function, bud fertility, yield, berry development, temperature and composition, shoot lignification and whole vine health, thus driving sustainable yields and grape composition.
- Growth balances and carbon partitioning vary with growing season and row orientation.
- Row orientation is determined at planting and is expensive to modify.
- Soil, climate, topography and cultivation practices need to be considered as the ideal orientation depends on crop load and grape and wine style objectives/targets.
- Vine row orientation complements other viticulture practices, which must be optimized to obtain the influence of the chosen vine row orientation in final wines.

SOIL, CLIMATE AND VITICULTURE practices have layered and integrated effects on growth, yield, grape and wine quality and cost-efficiency. Incorrect choices and poor practices may compromise sustainability and product consistency. The light and temperature profiles in vine rows and inside canopies are determined by the angle of the sun, trellis system, vine spacing, shoot orientation/positioning, and the vineyard site macro- and meso-climatic and topographic conditions.

Complete layout of the experiment vineyard with four row orientations and replicated five times, at the Robertson Experiment Farm of ARC Infruitec-Nietvoorbij, Breede River Valley, Robertson, South Africa.

Climate and landscape topography generally dictate row orientation with vineyard mechanical cultivation adding a further layer of complexity to decision-making and expected outcomes. As a result, complex terroirs where aspect, slope, relief, erosion potential and ease of practices are determining factors in row orientation, may lead to single or multiple (contoured, curved) row orientation in the same block and necessitate opposing/sub-optimal row orientation decisions regarding suitability for specific cultivars and vineyard product objectives. Despite the importance of row orientation as a basic consideration in grapevine cultivation, sustainable production and quality/style of grapes and wine, scientific evidence on its implications is scarce.

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Vineyard and Measurements

A trial was planted in the Breede River Valley, Robertson, South Africa (33°49'35'' Latitude S/19°52'53'' Longitude E/159 m a.s.l.) where the effects of row orientation were evaluated [north-south (NS); east-west (EW); northeast-southwest (NE-SW); northwest-southeast (NW-SE)]. Each vine row orientation was replicated five times on a flat site of approximately 3 hectares (6 acres), with tractor rows 2.7 meters (9 feet) wide and vines spaced 1.8 meters (6 feet) apart. The vertically trellised Shiraz vines on 101-14 Mgt were planted in 2003 and spur-pruned (two buds). The maximum length of vine rows was EW 20 meters, NS at 40 meters, and NW-SE and NE-SW rows were 28 meters long.

Vines were trickle-irrigated weekly, vertically shoot positioned and topped. Meso- and microclimate profiles were continuously monitored in three consecutive years. Meso photosynthetic active radiation (PAR) was recorded on top of vine rows and micro-canopy filtered radiation and temperature (° C) in the fruit zone. Mid-morning, mid-day and afternoon leaf water potential and photosynthesis were recorded for three consecutive years approximately six weeks after *véraison* on all treatments and replications.

Shoots (including clusters) were sampled at three grape ripeness levels (approximating 23° Brix, 25° Brix and 27° Brix) from each canopy side per treatment replicate and used to monitor vegetative and reproductive growth; cane mass was measured in winter. These parameters were recorded in seven consecutive years.

Results

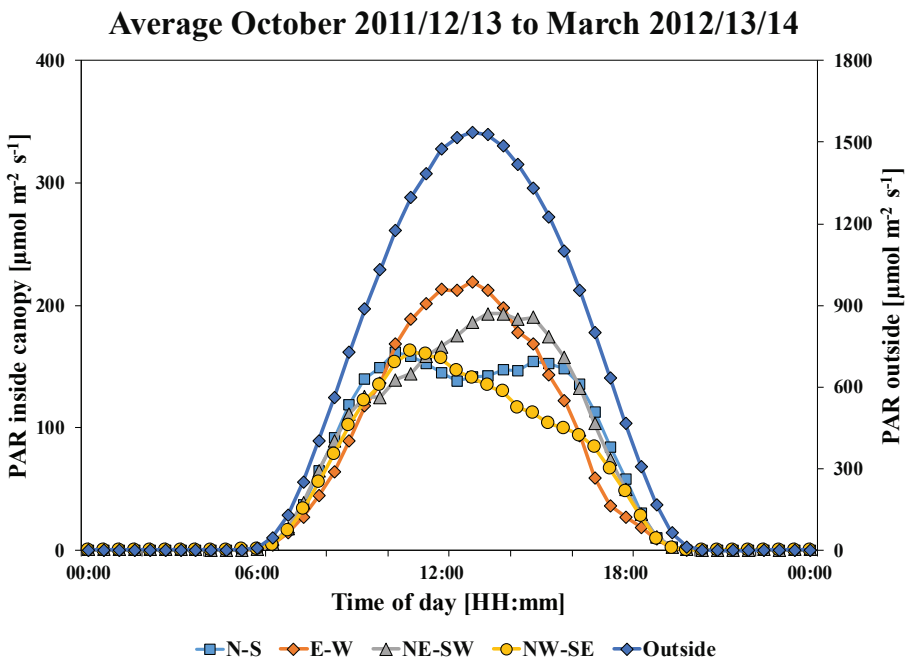
REGIONAL MACROCLIMATE

The Breede River Valley experiences semi-arid conditions. A maximum temperature of 27° C to 30° C (80.5° F to 86° F) is experienced pre-*véraison* (September/October up to first half of January) and a maximum temperature above 30° C (86° F) post-*véraison*. Temperatures above 25° C to 30° C (77° F to 86° F) under field conditions are unfavorable for optimal photosynthetic activity and the supply of various compounds associated with quality grape and wine composition. Above 35° C (95° F) there is a risk of organic acid respiration, high pH, and poor color and flavor development.

VINEYARD MESOCLIMATE AND CANOPY MICROCLIMATE

The mesoclimatic PAR was highest during November to January and reflected the macroclimate (see FIGURE 1). Seasonal PAR in the fruit zone at the microclimate level showed that EW-rows maintained lower interior canopy light interception than other row orientations (see FIGURE 1), decreasing during the season as canopies developed and peaking just after mid-day. The NS orientation displayed highest values, peaking in the morning and afternoon, respectively, whereas NE-SW and NW-SE orientations showed peaks primarily in the afternoon and morning, respectively.

FIGURE 1, Hourly mean canopy micro photosynthetic active radiation.



Micro hourly mean photosynthetic active radiation of a Shiraz on 101-14 Mgt rootstock vineyard planted to four different row orientations at Robertson Experiment Farm of ARC Infruitec-Nietvoorbij, South Africa.

Average soil surface reflected radiation, during the grape ripening period, showed similar trends, but canopy light interception shifted towards the afternoon for NS and NE-SW orientations, whereas EW and NW-SE orientations showed uniform trends with optimal at mid-day (data not shown). Reflected radiation quantities may change with different soil types, such as clay compared to calcareous or stony or sandy soils, potentially affecting far-red:red ratio of the light spectrum and radiant heat received by leaves and berries, in turn affecting the enzyme activity involved in primary and secondary metabolism in these organs.

Canopy vegetative characteristics were relatively uniform and interior temperature of the treatments was similar and primarily driven by diurnal ambient air temperature.

Although the quantity (and likely quality) of light is very different between EW and NS orientations, these treatments may generally be considered as causing most uniform diurnal canopy light distribution. However, row orientation may result in different canopy disease severity. Exposed leaves with higher polyphenolic concentration may have greater resistance to downy mildew. Likewise, berry phenolic composition reacts positively to judiciously controlled sun exposure, and such exposed grape bunches may have reduced *Botrytis* severity. These are critical actions during pre-*véraison* canopy development stages when pathogen infection should be prevented to achieve a healthy, efficient and sufficient canopy during grape ripening. However, leaves should be managed in such a way that grapes are not over-exposed; if so, positive effects may likely be nullified, even reversed.

Fisheye photo of a cordon and spur-pruned canopy of the row orientation experiment during grape ripening showing the adjacent rows with good canopy light microclimate to which the grapes are exposed.

CANOPY PHYSIOLOGY

The EW orientation displayed highest (approximately -1,250 kilopascal) (kPa) and NW-SE orientation lowest (approximately -1,500 kPa) leaf water potential mid-morning. The other two orientations were similar at -1,430 kPa. Water potential of the EW orientation stayed higher, whereas other orientations decreased to similar values mid-afternoon. Diurnally, NS, NE-SW and NW-SE orientations displayed lower water potential (approximately -150 kPa), than EW orientation. The EW row orientation had highest average photosynthesis, in agreement with high stomatal conductance and transpiration (data not shown).

The most uniform canopy photosynthesis occurred in NS and NW-SE orientations. Photosynthesis trends in the different canopy sides paralleled diurnal light profile trends, practically following sun movement over vine rows. Sides of canopy facing west, south, southeast and southwest displayed lower average photosynthesis and photosynthetic efficiency (photosynthesis-transpiration ratio/carbon assimilated/water loss). A higher overall photosynthesis in the EW row orientation corresponded with higher canopy water retention.

Measurements were done during the ripening period when the sun azimuth was already mostly in favor of the northerly-exposed canopy side. Considering the seasonal sun path, canopy density of EW-rows would be critical during the entire season and should be well managed to favor photosynthesis and other viticulturally important factors (such as bud fertility, shoot lignification for spur- and cane-pruning and grape ripening).

GROWTH CHARACTERISTICS

Primary and secondary shoot characteristics showed minor differences between row orientations and canopy sides. Primary shoot lengths and primary leaf area:secondary leaf area ratios averaged 110 to 120 cm (3.5 to 4 feet) and 0.80 to 0.90, respectively, indicating good canopy height and leaf age composition. Each primary shoot had approximately 11 primary leaves and nine secondary shoots. Since vines were topped pre-*véraison*, primary growth was controlled and secondary shoot growth stimulated as a compensation mechanism for excess vigor.

The secondary leaf area of the primary shoots on south and southwest sides tended lower. The southwest canopy side displayed generally lower values for most characteristics. The EW-vines showed a higher total leaf area per leaf mass, mainly attributed to significantly higher secondary leaf area per leaf mass. The NS and EW orientations had higher cane mass, an average of 3.84 tons per hectare compared to 3.57 tons per hectare for NE-SW and NW-SE orientations. The average cane mass per vine was approximately 1.8 kg (4 pounds).

Although bud fertility, berry set and general bunch morphology were largely unaffected by row orientation, less than two clusters per shoot were generally found on EW vines. Canopies were clearly not fully developed during the period of inflorescence primordia formation, initiation and differentiation. The vines were suckered during this time.

Row orientation (and concomitant light intensity and quality) may therefore not have had pronounced impact on these processes. Cluster and berry mass and volume progressively decreased during ripening for all row orientations. During the period of increasing grape ripeness, rachis mass (average of all orientations = 9.7 grams [3.5 ounces]) decreased by only 5 percent, whereas cluster mass (average of all orientations = 196 grams [7 ounces]) decreased by 15 percent. Berry mass at approximately 23° Brix, 25° Brix and 27° Brix was 1.51 grams, 1.38 grams and 1.27 grams, respectively.

The berry mass of the east-west orientation was, respectively, 5 percent, 7 percent and 6 percent higher than average for the other row orientation treatments at different ripeness levels. The east-west row orientation (south side in particular) resulted in consistently higher berry mass and volume.

Canopy radiation profiles at critical times during the day (and season) were most likely impacting factors on berry size and for east-west, more favorable whole vine water relation status may have been a primary causal factor. Total leaf area (10-12 cm^2) per gram fresh mass values showed equal balance for differently orientated vines, aligned with generally acknowledged viticulture criteria; secondary leaf area was the largest contributor to the ratio. Primary, secondary and total leaf area values per gram of fresh berry mass confirmed the significant role that secondary leaves may play in overall canopy capacity, in extending the harvest window and in build-up of reserves after harvest, irrespective of row orientation.

YIELDS

Highest yields were consistently obtained from NS rows (Table 1). Yields from other row orientation treatments varied according to year and ripeness level, but the overall average decreased for NW-SE followed by NE-SW and EW (TABLE 1). Yields from alternate sides of the canopy showed minor differences that progressively diminished the higher the grape ripeness. In line with berry mass, EW vines showed lowest overall yield losses from low to high ripeness levels. Considering cane mass, lowest ratio of yield:cane mass was found for the EW orientation treatment (4.48), increasing for NW-SE (4.82), NS (4.90) and NE-SW (4.91).

INTEGRATIVE COMPLEMENTARY ASPECTS

Sunlight exposure and ambient temperature have differential effects under field conditions and are well-known regulating drivers of the whole vine and berry size (along with water availability, evapotranspiration and transpiration, etc.) and the myriad of biochemical/physiological processes occurring pre- and post-*véraison* in canopy and grapes. Enological quality potential of grapes is largely determined by these environmental factors that have already been linked to the matrix of sugars, anthocyanins, flavonols, flavanols/tannins, terpenes, carotenoids and methoxypyrazines in red and white grapes.

The capacity for sustained and predictable yields and protection from extreme environmental/climatic events that may be detrimental to berries at physical/morphological, sanitary and physiological/biochemical levels should be maintained.

TABLE 1. Row orientation and ripeness level effect on yield of Shiraz on 101-14 Mgt rootstock [at ripeness levels: 1 (approximately 23° Brix), 2 (approximately 25° Brix) and 3 (approximately 27° Brix)].

Row orientation	Average yield (2007/08 – 2013/14)					
	Ripeness 1 (ton/ha)	Ripeness 2 (ton/ha)	Ripeness 3 (ton/ha)	% Yield loss Ripe 1–Ripe 2	% Yield loss Ripe 2–Ripe 3	Total % yield loss Ripe 1–Ripe 3
NS	19.99	18.22	16.50	8.87	9.40	17.44
EW	18.37	17.05	15.87	7.18	6.91	13.60
NE-SW	19.41	16.75	15.19	13.73	9.30	21.75
NW-SE	18.95	17.39	15.86	8.23	8.78	16.29
Avg.	19.18	17.35	15.86	9.50	8.60	17.27

Different cultivars may vary in vegetative and reproductive response to vine row orientation. Reaction may depend primarily on cultivar sensitivity to the main factor steered by row orientation, such as meso- microclimate (especially diffused and direct radiation, according to altitude and solar path at any given latitude).

Energy/heat balance and concomitant canopy and grape physiological processes would naturally respond. If cultivar sensitivity to direct radiation and temperature is high, yield may be lower. Management practices that lead to over-exposed canopies and grapes may enhance quantitative losses with further grape ripening, while eventual taste and flavor profiles of grapes and wine of both red and white cultivars may change, most likely negatively.

Vine row orientation and choice of training system (such as bush/goblet, vertical or horizontal canopy) has a critical role in the quest for grape and wine quality/style. **WBM**

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References

Script details are in the following scientific articles (and references therein):

1 Hunter, J.J., Volschenk, C.G. and Zorer, R., 2016. Vineyard row orientation of *Vitis vinifera* L. cv. Shiraz/101-14 Mgt: Climatic profiles and vine physiological status. Agr. For. Meteo. 228, 104–119.

2 Hunter, J.J., Volschenk, C.G. and Booyse, M., 2017. Vineyard row orientation and grape ripeness level effects on vegetative and reproductive growth characteristics of *Vitis vinifera* L. cv. Shiraz/101-14 Mgt. Eur. J. Agron. 84, 47-57.

Zorer, R., Volschenk, C.G. and Hunter, J.J., 2017. Integrating Geographic Information Systems and hemispherical photography in the assessment of canopy light profiles in a vineyard. Agr. For. Meteo. 232, 672 – 681.

Hunter, J.J. and Volschenk, C.G., 2017. Chemical composition and sensory properties of non-wooded and wooded Shiraz (*Vitis vinifera* L.) wine as affected by vineyard row orientation and grape ripeness level. J. Sci. Food and Agric. DOI 10.1002/jsfa.8763.

Carlomagno, A., Novello, V., Ferrandino, A., Genre, A., Lovisolo, C. and Hunter, J.J., 2018. Pre-harvest berry shrinkage in cv 'Shiraz' (*Vitis vinifera* L.): understanding sap flow by means of tracing. Sci Hortic. 233, 394-406.

In France, Researchers are Putting Resistant Grape Varieties to the Test of Sustainable Development

Christelle Zamora

Based in Languedoc (France), **Christelle Zamora** is a journalist specializing in tourism and the wine industry.

BY THE YEAR 2050, the French wine industry will have to adapt to global warming. This situation will, without a doubt, significantly modify wines and their production conditions. Among the research areas currently underway to prepare for climate change are resistant grape varieties, which will help growers reduce the use of phytosanitary products.

In collaboration with inter-trade bodies, France's **National Institute for Agricultural Research** (INRA) and the **Institute for Vines and Wines** (IFV) have launched, regional experimentation programs dedicated to resistant winegrape varieties. This is a necessary development in line with France's environmental policies and Europe's mandatory limitation plan concerning phytosanitary products. The Ecophyto II plan, in accordance with European directive 2009/128, has set the goal of reducing the use of pesticides in France by half before 2025. These resistant varieties are an innovation capable of fighting against fungal diseases, such as mildew and powdery mildew.

According to scientists, resistant vines enable the use of pesticides to be reduced by 80 percent, but their organoleptic potential has to be improved upon. Moreover, the French research community is divided into two camps. In the south, the Languedoc growing region wants to make use of the work carried out since the 1970s by the late **Alain Bouquet**. In the north, the Alsatian branch of INRA in Colmar is focusing on seemingly more reliable polygenic vines, containing several genes that are resistant to these two diseases.

To this end, four new grape varieties came onto the market in 2018: Artaban, Floreal, Vidoc and Voltis. When it comes to the Bouquet varieties, they are still being evaluated—that is to say their winemaking qualities have to be validated before being sold to growers. However, the Languedoc wine industry is convinced that these vines are adapted to the weather conditions in the south of France and Mediterranean vineyards.

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In France, Researchers are Putting Resistant Grape Varieties to the Test of Sustainable Development

signed a partnership agreement in May 2017, in view of deploying the resistant winegrape varieties developed by INRA and IFV. At the heart of an observatory, varieties that are resistant to mildew and powdery mildew are going to be evaluated via a system of participatory grape growing over a period of several years. If the necessary reduction in vineyard pesticides makes sense, putting resistant vineyards into place is going to take several decades. According to INRA, more than 30 resistant varieties will be on the market by 2023; however, legislation is not clear when it comes to new grapes and planted surface areas. In addition, public research and private initiatives in France are up against European competitors that are already marketing new varieties and wines elaborated from these alternatives.

Existing Hybrids and Varieties

The hybridization of winegrape varieties started at the beginning of the 19th century when plant material was imported from the United States to Europe. Before being grafted on American phylloxera resistant rootstock, the *vitis vinifera* species was vulnerable to mildew, powdery mildew, phylloxera and black-rot. As of 1930, the generations of hybrids developed at the **University of California, Davis** drew the attention of France, Germany, Hungry, Italy and Switzerland. However, as their standard of quality was not good enough, these first generation hybrids were excluded from the legislation governing French AOCs and PGIs. INRA launched a program dedicated to "The genetic improvement of vines" in 1972 led by Alain Bouquet.

Three genetic sources are resistant to mildew and powdery mildew—American *vitis*, Asian *vitis* and *muscadinia rutondifolia*. Alain Bouquet decided to cross the *muscadinia* variety with *vitis vinifera* over a period of 35 years, thereby creating new plant material. After selecting resistant strains, he used the sexual reproduction of vines to create varieties and rootstocks.

"Alain Bouquet is the only person conducting experiments with the *muscadinia* hybrid. Decades of crossings led to back-crossings with *vitis vinifera* varieties (Grenache, Chazan, Merlot, Cabernet Sauvignon, etc.), the percentage of which, represents up to 99 percent, attesting to the quality of the resistant varieties that are closer to *vitis vinifera* than hybrids. No other country is at this level," said **Hernan Odeja** at INRA's **Pech Rouge** vineyard in Gruissan, Languedoc.

The observatory, set up in the south of France, comprises 33 parcels planted with INRA varieties but also provides an opportunity for growers to plant European varieties. The surface area and wide range of Protected Geographical Indications in Languedoc have allowed the region to become a major actor in this innovation effort. At present, French varieties called ResDur® (polygenic) and Bouquet varieties (monogenic) are being skillfully introduced by INRA. These two types of resistant varieties are both derived from Alain Bouquet's work. If research has taken two directions, the wine-growing areas have the choice between one and the other of these varieties, depending upon the soil and climate of their terroirs.

"The ResDur® varieties are Bouquet's fourth and fifth generations crossed with German varieties that have several resistant genes—a thesis favored by INRA," said **Christophe Schneider**, a research scientist for INRA in Colmar, Alsace. But with 8 hectares of resistant vines already planted, INRA's Pech Rouge site is a resource for Languedoc. "Bouquet's vines have never been circumvented and most of the resistant European varieties are monogenic," explained Hernan Ojeda.

Over the past few years, **Vignobles Foncalieu**, a major group of winegrowers in Aude (Languedoc) has been cultivating varieties from these two selection programs (ResDur® and Bouquet). This leading cooperative entity is a regional forerunner in this domain. Vignobles Foncalieu has opted for European varieties of German origin, that is to say, Souvignier Gris and Monarch Rouge. As it prepares to launch wines made from resistant Artaban in 2018 and Vidoc in 2019, it is pleased about the successful introduction of the Bouquet vines that are unaffected by mildew and only require two treatments per year. These encouraging results have without a doubt incited the **Languedoc Wines Trade Board** to back the research carried out by INRA at Pech Rouge.

"Over the past five years, we have donated 10,000 Euro per year to the institute in view of saving the Bouquet collection, and promoting wines made from these varieties that are adapted to the Mediterranean basin," pointed out managing director, **Jerome Villaret**. Eighty winegrowing entities in the south of France have volunteered to take part in the observatory. "We are thinking about planting 3 hectares per variety in 2018, exponentially over a period of three years. The first vintage is scheduled for 2021. The agro-ecological cooperative winery of Vergèze near Nimes counts among the selected projects," he added.

Elsewhere, trade boards are studying the adaptation of varieties to the specificities of their growing areas. In the region of Charentes, the **Central-Loire Valley Wine Trade Board** and **Martell Cognac** (**Pernod Ricard**) have asked the national catalogue to recognize four Bouquet varieties that are similar to Ugni Blanc. The **Champagne Wine Trade Board** has adopted a program involving generalist ResDur® varieties that it is going to tailor to the regional style of its wines in view of limiting the rise in alcohol content and the loss of acidity brought about by global warming. Other growing areas, like Ardèche or Provence, have decided to create experimental sites to adapt these resistant varieties to their terroirs. And even small appellations like Picpoul-de-Pinet in Languedoc are highly interested in them.

In France, Researchers are Putting Resistant Grape Varieties to the Test of Sustainable Development

A Complex Legal Structure

The use of resistant varieties is a difficult subject as it concerns several segments of the wood and vine plant industry. The creation of varieties concerns first of all researchers, breeders, multipliers and nurseries, before involving winegrowers. But the initiative may be public or private.

"Over the past 40 years, INRA's vocation has been that of creating winegrape varieties with IFV, which is in charge of clonal selection. Private selecting in France is allowed for traditional varieties. A trial period of 10 years is required before submitting them to the catalogue," stressed **Laurent Mayoux**, a spokesperson for the **Permanent Selection Technical Committee**.

Copyright is rarely mentioned when it comes to grape varieties; however, the creation of new ones generates royalties. Vignobles Foncalieu's CEO, **Michel Servage**, has planted Floréal-resistant varieties for his private use. He is surprised that this variety does not require treatments compared to his Grenache vines that require three or four a year. But it is more expensive to introduce—Euro 2.10 instead of Euro 1.45 for a standard plant. "That extra 65 cents amounts to 3,000 euros per hectare, and before spending an additional 3,000 euros per hectare on crop protection products, negotiations are called for," he said.

If 400 varieties of vines are included in the national catalogue, most of the 77 submissions over the past 10 years involved resistant varieties. Under French law, a new variety can be added, following the authorization of the **Ministry of Agriculture**, once the Permanent Selection Technical Committee has given its opinion. This is the necessary condition to multiply and distribute plant material.

"A dozen INRA varieties (5 ResDur and 7 Bouquet) are currently being added to the catalogue. The definitive or temporary classification determines the plantation surface areas, the framework of which is more or less strict," said Christophe Schneider.

In order to be marketed, the variety has to be added to the definitive or temporary list, a determining factor for growers who can then receive subsidies for vineyard restructuring. The variety has to meet with Agronomical, Technical and Environmental Value requirements and Distinction, Homogeneity and Stability norms. A 10-year assessment period is followed by an admission procedure of 5 years. This delay is shortened down to a couple of months for historic varieties or those already recognized in another member state. After a request made by the **Pays d'Oc Wine Trade Board** and the **Federation of Great Wines of Bordeaux**, a decree dated 19 April 2017 definitively added 12 resistant foreign varieties to the French catalogue: four white grape varieties and eight red varieties[1].

As of 2016, the advisory board of **FranceAgriMer** accepted the definitive classification of 31 grape varieties of Greek, Spanish and Italian origin, including 10 that cannot be mentioned on a brand's label (including Cabernet Cortis and Sauvignon Rytos). Like Italy, the Pays d'Oc Wine Trade Board wants to use the name of well-known varieties to promote the resistant ones. But to be listed in the catalogue, these new varieties have to be first validated by the Permanent Selection Technical Committee. However, the sale of wines made from varieties that are not officially recognized is possible if their experimental nature is indicated on the label. Germans, Austrians, Italians and the Swiss have been growing resistant varieties over the past 20 years.

In these countries, research is well advanced and plants have already been multiplied. France has relied on regulation (EU) n° 1308/2013 to prohibit the use of AOP and AOC designations for wines made out of *vitis non-vinifera* varieties, whereas Germany has considered resistant varieties, despite their hybrid origins. When it comes spirits, the **Cognac Trade Board** and the house of **Martell** have decided to introduce these varieties by 2034 in the Cognac appellation area. Trials within AOP zones could therefore initially begin with

spirits, especially as the **National Institute for Origin and Quality** (INAO) has authorized the experimental use of resistant varieties in the production of French appellations. Their introduction will be limited to 5 percent of an estate's planted surface area and to 10 percent of a wine's blend.

"After being assessed by appellation trade bodies and INAO, only the varieties entirely meeting adaptation objectives will be adopted," explained the institute in a press release.

A Pioneering Estate

Over the past 10 years, **Vincent Pugibet** has been experimenting with close to 30 resistant varieties, including Cabernet Blanc, Muscaris and Souvignier Gris, planted on 40 hectares next to Béziers. Curious about this initiative, **Domaine Ducourt** recently decided to do the same and has just elaborated its first Bordeaux wines from varieties that are resistant to mildew and powdery mildew.

"The future is in resistant varieties. Their environmental and public health significance is unquestionable. This alternative to chemicals, organic growing and pesticide residues meets with the objectives of the Ecophyto plan. Our most fragile plants require two treatments per year," said Vincent Pugibet. Since 2011, **Domaine de la Colombette** has been selling the first French wines via the Piwi network[2].

"Consumers are going to be won over by these healthy wines. German, Swiss or Italian plants are available in exchange for royalties. Large scale experiments can be undertaken for these varieties are easy to grow, and display agronomic and organoleptic qualities."

Pugibet elaborates wine under the following designations—vin de France, organic, without sulfites and made from experimental vines. The latter are sold on brand-oriented export markets. Distributed in Germany by Edeka and the store chain, **Jacques Wein**, these wines are already sought after at an affordable price in the United States. When it comes to products without geographical indications, it is possible to blend resistant varieties, according to rule 85/15 of the European regulation 753/2002.

If creating varieties is one of the levers that grape growing can use to adapt, French research is behind as some countries have already authorized resistant grape varieties in the production of their appellations. However, the INAO in France believes it is important to support alternatives to chemical control, meaning vine grape nurseries are going to have to follow this direction. Growing regions are already investing in this strategy, and the southeast of France in particular boasts a wide range of segments, guaranteeing markets for these new types of wines that have to become accepted within the next 30 years. **WBM**

References

1 The decree of 19 April 2017 authorized the following—seven German white grape varieties and one Italian white grape variety: Cabernet Blanc, Bronner, Johanniter, Muscaris, Saphira, Solaris, Soreli (Italy), Souvignier Gris and four German red grape varieties: Monarch, Cabernet Cortis, Pinotin, and Prior.

2 Piwi: A European association promoting resistant varieties.

Wineries Create Custom Glass Bottles to Build Brand Recognition

Achieving sales success through the impact of glass shape and design on ultra-premium and luxury-tiered wines

Stacy Briscoe

Key Points

- Custom glass creates brand recognition — in the tasting room, in the supermarket and online
- Glass manufacturers and suppliers offer advice on custom designs for wine businesses of any size
- Winemakers share their custom glass successes and challenges

SEVERAL ULTRA-PREMIUM AND LUXURY brands have found success in creating custom glass bottles. "From what we hear from our clients, custom bottles seem to be the preferred bottles purchased in the DTC marketplace," said **Franck Collet**, president of **Saverglass, U.S.**, going on to say that once brand recognition occurs, these purchases then translate into significant increases in wholesale orders.

Collet, along with his colleague **Régis Maillet**, group marketing director for Saverglass, said they've seen an increase in custom glass orders from wine clients that want to add an identifiable personal touch to their bottles. "They want bottles to be instantly identified as their own," Collet said. And, yet, he also acknowledges that the market is "quite traditional when it comes to code and design."

John T. Shaddox, general manager, wine at **Ardagh Group North America**, agreed, saying, "The wine industry, out of all the beverage alcohol categories, probably has the most history in its glass bottle shapes." He called out the classic Bordeaux and Burgundy shapes specifically, noting they continue to appeal to the majority of wine consumers. "People appreciate the rich history of the shape," he said. "Despite the rise in popularity of alternative packaging, like bag-in-a-box, traditionalists will always want wine in a traditional glass bottle."

So how can a winery or wine brand maintain the nostalgia and consumer expectation while simultaneously providing the "wow" factor and demand consumer attention?

Advice from the Manufacturers

Shaddox suggests leveraging that history, elegance and romance of the traditional bottle shape by employing simple changes to the frame, such as a unique neck taper, a pronounced punt or an engraved signature or emblem. One "trend" Shaddox said he's seen resurge is embossing, embedding a wine's insignia or emblem by blowing the design directly into the glass. "You can do this with a stock mold at a reduced cost," he said. "Don't just assume it's not worth looking into because it can be highly effective."

He does warn, though, when considering an embossing embellishment, to be aware of the bottle shape's "contact areas." These are spots on the glass, such as the shoulder or the heel, where the bottles will touch when set side by side, as in a bottling line. "The bottles are created to withstand contact, but embossing should be done on a smooth, flat area designed for it," Shaddox said.

For clients concerned about the look, feel and functionality of the final product, Shaddox noted that Ardagh supplies both 3D renderings and/or small sample orders of custom glass designs.

According to Collet and Maillet, many of their clients want to rush development. Collet explained the timeframe for product completion and delivery is dependent on the complexity of the bottle being designed; but as a rule of thumb, clients should give themselves approximately six months for the development of a full custom bottle. "Lead times are shorter if we are only personalizing the base plate or the ring finish," Collet added.

The most important piece of advice all experts agree on is that those looking to invest in custom glass bottles for the first time need to plan ahead: Take time to develop a story and solidify who the target audience is before beginning the designing process; Be aware of the time it will take to develop a design from scratch and turn that design into reality; Ensure winery equipment, such as bottling lines and labelers, will be able to accommodate any unique shapes or molds; And, of course, choose a glass supplier that can best accommodate specific needs and expectations, including budget.

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What's Working for Winemakers?

Harken Ancient History

Modus Operandi 2011 Orange Wine

"I'm always thinking about how to market wine and stand out in the crowd," said **Jason Moore**, winemaker at **Modus Operandi**, adding that marketing is another passion of his. In 2011, Moore decided he wanted to try his hand at making his first orange wine. It was a "super funky and weird" experiment from the start.

Moore said the winemaking method was a nod to the way wine was made three to four thousand years ago in ancient Greece, Rome or Syria. He utilized 100 percent destemmed Sauvignon Blanc, skin-fermented the grapes in upright open-top French oak barrels and gently hand-pressed over his pump-over screen at 12° Brix. The wine then aged in 100 percent French oak barrels, one new and one used, for three years.

After the first six months of aging, Moore and his colleagues taste-tested the experiment. The general consensus: "That is gross." But Moore kept the experiment going. A year later, his colleagues' opinions became more adamant: "You need to dump those barrels. They are nasty." Still, Moore waited.

"Two years later, I tasted it—I couldn't believe how much of a corner it turned," he said. "It really started to come together." Six months after that, for a total of two-and-a-half years of aging, Moore was "blown away" by the results.

"In my mind, I knew the exact bottle I had to use," Moore said. Moore had first seen the uniquely shaped bottle at the **Bruni** stand during the **Unified Wine & Grape Symposium**. To him, the shape was reminiscent of the clay amphorae pots used in traditional Georgian or Syrian winemaking. "It's an ode to that sense of history," he said. "It tied together the story of ancient wine production to this one."

Though the bottle was one of the company's stock molds, called Bacchipectus, it was still considered a custom order and took six months to ship from the manufacturer's Italy-based factory. It cost Moore $3 per bottle, $36 per case. "It's the most expensive glass I've ever put wine into," he said. "Totally worth it."

Moore only produced 50 cases of the orange wine, and it was sold exclusively DTC through his wine club at $125 per bottle. But, he said, if this wine ever was on the shelf, he's confident that the bottle alone would be enough for someone to pick it up. "There's a huge ocean of competition out there. What are you going to do, as a brand, to have a customer pick up a bottle and explore more? That's what I think about," he said.

The orange wine, which released in spring 2015, sold out "basically immediately," according to Moore, and he said he still hears from customers who have held onto the empty bottle as decoration and a few who haven't even opened it yet because they view it as such a collector's item.

Moore admitted he did lose one wine club member who drank the wine and "didn't get it." Upon release, Moore created a **YouTube** video for his customers, explaining the difference in the wine's fermentation process and warning that the wine does not taste like a classic Sauvignon Blanc. The lost club member did not watch the video.

Mix it Up with Modernity

Adobe Road Winery 2016 'Shift'

"Red wine may—or may not—raise your adrenaline levels, but this new series of four exceptional wines will definitely start your engine!" So reads the **Adobe Road Winery**'s marketing materials for the winery's new "Racing Series," a series of four red blends aimed at the mass-consumer marketplace.

Race car driver, race team and winery owner, **Kevin Buckler**, said that the idea for this high-production series is one he's always "toyed with" but was hesitant because he's protective of his petite brand. Founded in 2002, Adobe Road Winery today produces 4,000 cases annually with an average bottle price of $48, selling approximately 60 percent of their wines DTC. "It's hard to get much traction in the distributor market," Buckler said. "They're working with a lot of 'big guy wines' that can sell 10 times what we have."

To rev up his marketing game, Buckler, along with his winemaker **Garrett Martin**, changed trajectory to create the new portfolio, crafting wines normally out of their wheelhouse and designing packaging to match.

While two of the four red blends are vesseled in traditional Bordeaux bottles and one in a Burgundy bottle, the appropriately named "Shift" ($56) is by far the stand-out design — both inside and out.

The blend is comprised of Zinfandel, Barbera, Grenache, Petite Sirah and Carignan. "I like to watch the wine business from afar," Buckler said. "I see what the 'young buck' winemakers are doing—interesting, sometimes odd blends." Buckler remembers when blends like this were categorized as cheap table wine. Today, he noted, winemakers are seeing success with innovative blending. "And selling them at top dollar," he added.

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Buckler and Martin employed this same tactic when creating the blends for the new portfolio. "The idea with Shift was Zinfandel as the backbone then using varieties that usually take a back seat to enhance the flavor profile" he said. The two worked on the blend for over a month, playing "chemist" and taste-testing each other's creations blind. "There were no preconceived notions, no expectations, other than let's create a delicious red blend," Buckler said.

The name is a reference to the out-of-the-norm winemaking process for Adobe Road Winery as Buckler and Martin "shift" away from the single-variety, single-vineyard offerings Buckler built his business and brand on.

Of course, the name is also a nod to Buckler's other passion, racing. The bottle, which is a Bordeaux port-shaped bottle (the supplier/manufacturer information is proprietary, according to Buckler), includes a metal label that resembles a vintage, gated shifter. The cork is topped with a five-speed shift knob.

These two elements, designed by Buckler himself, had to be applied to the petite bottle by hand. "Because of the uniqueness of the label the application had to be so precise. It was time-consuming and a bit expensive, but we like doing things right," Buckler said. The first few bottles that were shipped directly from the winery's offices were hand-labeled by the Adobe Road Winery team. But Buckler said the fulfillment house and warehouse for distributor sales completed the majority.

Adobe Road Winery produced 5,000 cases of the racing series, and Buckler plans to double that next year. As of this writing, the wines haven't been released in the marketplace yet, but Buckler has already garnered the interest of consumers because of the packaging, and the wines themselves have received top marks from critics.

"We crafted a fine wine, good packaging and tied it all back to our successful story," Buckler said. "This opens up the market for us and will help our distributors sell our product."

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Say it with Subtlety

Larkmead Vineyards 2013 Bottle Redesign

In 2013 **Larkmead Vineyards**, which produces approximately 10,000 cases annually with an average bottle price of $113, implemented an entire package re-design, which included minute, easily over-looked changes to the winery's bottles.

The bottom of the bottle now includes an inscribed mold that reads "Larkmead Founded in 1895." "It can be looked at as a custom design feature, but also an identifying feature in matters of authenticating the bottle in a 'post-Rudy' world," said winemaker **Dan Petroski**. He said the redesign was not something the winery self-promoted, instead it was intended as a "subtle find" for the drinkers of Larkmead's wines.

Larkmead's winery relations manager, **Erinn Maloney**, called the decoration an "Easter Egg" for the winery's customers. "They don't find out about the customization until their orders arrive at their home and they are putting the bottles away in their cellar," she said.

Maloney said the winery hasn't tracked whether the custom glass has motivated customers to purchase again or sign up for memberships. "But we can say that those who comment on it find it a really innovative, creative way to add branding and security to our wines," she said.

The redesign also included a re-crafted bottle lip, intended to improve both style and functionality. Petroski said the previous lip had a high, thick ring that caused a great deal of dripping along the bottle when pouring the wine, resulting in a stained label. The new current bottles have a thinner ring placed lower on the neck of the bottle. "It made the neck and lip slightly more elegant," Petroski said.

Build Brand Consistency

Quintessa

Quintessa winemaker **Rebekah Wineburg** wasn't on staff when the winery bottled its first 1994 vintage, so she can't speak to the bottle's design conception or development. But what she can say for a fact is that the bottle design has been consistent from that first bottling through the current day.

"Quintessa was founded and developed by the **Huneeus** family, whose goal was to establish a vineyard and winery that would be a timeless classic. Everything we do is a reflection of that," Wineburg said. The bottle, she added, is a perfect example of that mission statement.

"A custom bottle like this reflects something about us — the winery, the wine inside," she said.

Quintessa is renowned for its Bordeaux-inspired blend, with each vintage containing some or all of the five Bordeaux varieties grown on the organic and Biodynamically farmed property: Cabernet Sauvignon, Merlot, Cabernet Franc, Petit Verdot and Carménère. The bottle is a traditional Bordeaux shape, the cartouche a common embellishment from the region.

From the consumer standpoint, Wineburg said that the classic, consistent look has allowed customers to connect with the total package design. She said she's had customers send her pictures of their birthday cakes—shaped like a Quintessa bottle. "One customer just the other day brought me a drawing his 10-year-old son did for him. It was a Quintessa bottle," Wineburg said.

"Everything, from the shape to the label, is recognizable," she said. "And readable," Wineburg added, referring to social media. While the bottle doesn't evoke any "wow" factors per se, the sizeable 'Q' on the shoulder and the clearly scripted winery name on the label are easily visible when scrolling through the ream of wine brands now showcased on **Twitter**, **Instagram** and **Facebook**. "This is where people are making friends over wine now…people share experiences and recommendations," Wineburg said, emphasizing the importance of brand consistency and recognizability with an online presence.

But Wineburg does caution wine industry colleagues who are considering implementing a custom mold into their permanent portfolio that "it is a big commitment." "It will be a marriage between you and that glass supplier," she said. "It's your brand, your bottle, but their mold." She warned that this relationship can be a potential difficulty if one doesn't work closely with their supplier and maintain open communication.

Everything, from price increases ("You can't bargain hunt when you have a custom mold," Wineburg said) to scheduling ("Bottle production schedule doesn't line up with winery bottling schedule," she added) can impede a winery's production process.

She also advises running any change to a bottle—big or small—by the winery's bottler. "An idea may sound great, it may even look great—but at 70 to 80 bottles a minute, certain beautiful designs are not always feasible," she said. She recommends asking the glass supplier for a sample to show the winery's bottle mechanic or mobile bottler—he or she will be able to discern whether the machinery can accommodate the glass mold. **WBM**

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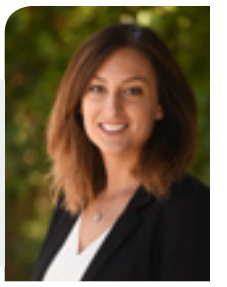
Finding Top Tasting Room Talent in a Talent Deficit

The root causes of one of the toughest hiring markets in recent memory, and what you can do to solve it

Erin Kirschenmann

Erin Kirschenmann is managing editor for *Wine Business Monthly* and has been with the magazine since 2012. In addition to production responsibilities for the monthly trade magazine, she writes about wine industry trends, including business, technology and sales and marketing topics for *WBM* and *Winebusiness.com*. She graduated from Sonoma State University with a bachelor's degree in communications with a journalism emphasis. She can be reached at *erin@winebusiness.com*.



2 LADS WINERY

HOW MANY OF YOU are struggling to find qualified talent, particularly in the tasting room?

Why is this happening?

According to **David Newlin**, founder and CEO of **Newlin and Associates**, an executive recruiting firm, there are four macro factors that are making this a rather tough hiring market: a historically low unemployment level, a generationally driven smaller talent pool, more wine companies chasing that smaller talent pool and companies expecting more from candidates.

The economy experienced positive growth in 2018, leading to one of the United States' lowest unemployment rates in recent memory. As a result, the recruiting process for most employers, wineries included, has changed from weeding through excessive amounts of resumes in order to find the right candidate, to actively hunting down people with the necessary skills and experience.

It's a trying task, particularly for smaller employers without dedicated human resources teams, as well as those who operate in regions of the country with astronomically high costs of living (here's looking at you, Bay Area).

When it comes to management and executive level positions, most wineries are feeling the strain of a smaller Generation X, Newlin said. Baby Boomers, typically the holders of the top positions within a company, are moving into retirement age, leaving a large number of positions open. Millennials, typically referred to as the future replacement for Boomers (whether in consumption, purchasing or, well, pretty much everything else) are not necessarily ready for these top roles—they just haven't had as many years of experience.

The growth of the wine industry has also become an issue, at least when hiring. With more than 10,000 bonded wineries fighting for the same, small talent pool, potential employees have their pick of the winery they would like to work for. This problem is magnified in the tasting room, where it's preferable to hire someone who knows a thing or two about the wine they are pouring, while also being a top salesperson. The number of candidates who come into the position with the knowledge at hand is often limited, particularly in regions that are still developing their tourism and direct-to-consumer reputation.

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> "If you don't have a career page, you've got to get one. The people who decide they're going to start looking for a job or the people who decide they might want to work at your company are going to check you out online first."
>
> **Nicole Cummings,** director of human resources, Cakebread Cellars

Lastly, Newlin reports that companies are raising the bar when it comes to the level of talent they're willing to hire. It makes it difficult, he says, to "settle" for a candidate that has potential and is likely good for the job but might need a bit of coaching or training to reach their stride.

"When we're in a talent deficit period, the first impact we notice is that job seekers have all the power. And they know it, don't they? They're negotiating harder. If they know they are sought out, they know they can demand a lot more in terms of compensation and benefits and they're going to ask you for it, I guarantee it," he said.

With these factors causing a talent deficit, it doesn't help matters much to know that 50 percent of hourly new hires quit or are fired within their first six months, according to **Humetrics**. Overall, 46 percent of all new hires fail within the first 18 months.

So, what is an employer to do?

Change the recruiting process and develop initiatives to retain valuable employees.

The Problem with the Recruiting Process

As Newlin puts it, the recruiting and interviewing process is broken. Many employers are moving along with the same old recruiting processes, tools and questions that they've been using for decades. In his mind, no one has ever really thought to re-engineer them.

Newlin has spent the last 30 years in the recruiting world. He's seen it through recessions and economic booms, and through talent surpluses and deficits. Likewise, **Nicole Cummings**, director of human resources at **Cakebread Cellars**, spent a number of years working in HR at Cakebread before taking a few years to work corporate HR at some financial service companies, learning about their methods and recruiting/hiring practices. She then returned to Cakebread Cellars to take on her current role as the HR director.

Following her return to the wine world, Cummings realized that she couldn't just post a job listing and receive hundreds of qualified applicants, like she did 10 years ago. Instead of being reactive, she put in place proactive measures to ensure the right talent was being brought into the winery. To start, she built up the employer brand.

"I sat down and worked with our marketing team on our employer brand, because we weren't so good at capturing the people who were following Cakebread or liked the way Cakebread did something," said Cummings. She wanted to capitalize on brand interest by giving those who had an interest in the company a place to go to learn about the great benefits and culture Cakebread offered.

Cummings built a Careers page on the Cakebread website, hosted through the ***Winejobs.com*** Application Tracking System, as a way to capture the interest of anyone who engaged with the brand via the company site, even if looking up the location of the tasting room or searching for a wine to buy. [Disclosure: ***Wine Business Monthly*** owns and operates winejobs.com]

"If you don't have a career page, you've got to get one. The people who decide they're going to start looking for a job or the people who decide they might want to work at your company are going to check you out online first," she said.

According to a **Glassdoor**-commissioned survey performed by **The Harris Poll**, 35 percent of job seekers preferred hearing about a new job through a company's career page. When they start looking for a job, they go to the brands and companies they already know and love first.

Cakebread also moved away from traditional job descriptions, because she knew the right candidates cared about bigger questions, like what the company's employees would say about working for them, what that company does to better themselves and the surrounding community, why the company is a great place to work and what the promotional opportunities are.

"If all you're using are traditional online job postings and job descriptions, those are mostly going to be appealing only to 'B' and 'C' players," said Newlin. "It's not enough to get access to top performers. You have to do something above and beyond to rely upon those traditional tools."

To fix this, Newlin offered four suggestions:

- Define the job by using five- to six-year key performance objectives, rather than job descriptions (which he said are just checklists of desired skills and experiences).
- Create interview questions that probe and validate exceptional performances on similar, past assignments.
- Write out an "Ideal Candidate Value Proposition," which explains why this would be a great opportunity, in order to reach and engage top performers.
- Start out all potential engagements with candidates this way. Don't save all this information for the second interview.

For Cummings, accessing those top performers means engaging her best network, the one that's already engaged and ready to serve as her brand ambassador: current employees. She bumped up the employee referral program, offering higher dollar bonuses for promoting employment at the winery.

"If all you're using are traditional online job postings and job descriptions, those are mostly going to be appealing only to 'B' and 'C' players. It's not enough to get access to top performers. You have to do something above and beyond to rely upon those traditional tools."

David Newlin, Newlin and Associates

OTHER FACTORS THAT INCREASE APPLICATIONS

The Glassdoor survey also found that 48 percent of workers/job seekers will apply if an employer lists attractive benefits on the job listing, 47 percent respond to a convenient commute and 46 percent will apply if an "attractive salary" is listed.

Other than immediate benefits, the perception of long-term potential of a job is a factor. Glassdoor asked what factors were most important when considering applying for a position and 39 percent said, "information about growth opportunities," 37 percent said, "knowledge of company promoting from within" and 35 percent said, "positive sentiments in employee reviews."

According to Newlin, top performers care about two criteria before compensation, benefits or title: what they will be challenged to do in the first year, and how their career will be in a better place three to five years in the future if they join a new company.

To reflect this, Cummings made one addition to the questions she asked when hiring for top talent: What is it you're looking for in your next position?

"Most people don't say 'You know, I really want to get to know your POS system,' right? They're looking for challenges, they're looking for growth and development."

Retention and the Compensation Conundrum

Two years seems to be the average employment span of a tasting room employee. For those wineries that would love to retain their employees for longer periods of time, there are ways to create better brand loyalty—and it starts with taking a look at compensation culture.

"Employees want to like your culture and they don't want to feel like they're being treated wrongly," said Cummings. "It's an expensive place to live and, at the end of the day, employees still have bills to pay and financial obligations. If the winery next door is offering tip lines or commissions and you're not, they may make that move simply because they can make a few more bucks at that winery."

Thinking about earnings as a retention strategy takes more than just bumping up pay or benefits, Cummings said. She partnered with **Great Places to Work** to perform an employee survey in order to establish a baseline of employee satisfaction. From there, she engaged her employees to participate in the process of building a culture and a compensation packaged that would encourage them to remain at Cakebread. Now, she's looking at metrics to see if the company is delivering on what matters to the employees: Is employee satisfaction going up?

Cummings also looked at it from the company's perspective: Is our brand awareness going up? How are we doing on the cost of hiring and, more importantly, how are we doing on the quality of the hiring we've done?

Having the opportunity for growth or promotion turned out to be huge for her employees, and so Cummings developed a system to match. She uses a Nine Box Talent Assessment Tool (see page 125) which helps managers evaluate leadership potential and performance contribution in order to pick out those who have the ability, aspiration and engagement necessary to grow within.

"People are beginning to know some of the things that we're doing with our high-potential talent," she said. "We don't necessarily have to employ David [Newlin] for all of the positions that we have open. We can grow that talent within our organization. We can communicate with them where our talent time lines exist."

Box 7 - Too New	Box 4 - Solid Performer/Strategic Role	Box 1 - Excellent Performer/Strategic Role
Definition: Progressing as expected on technical skill development	**Definition:** Strong leadership with solid job performance, clear demonstration of strategic leadership competencies.	**Definition:** Demonstrates exceptional leadership competiencies; consistently over-achieves on job expectations; experienced professional with broad knowledge of the company.
Box 8 - Low to Mediocre Performers	**Box 5 - Solid Performer/Tactical Role**	**Box 2 - Excellent Performer/Tactical Role**
Definition: Inconsistent performance. May perform will enough to just get by. Does not show strong initiative.	**Definition:** Solid job performance with tactical leadership competencies.	**Definition:** Consistently over-acheives on job expectations with tactical leadership competencies.
Box 9 - Poor Performer	**Box 6 - Solid Performer**	**Box 3 - Excellent Individual Contributor**
Definition: Not meeting expectations. Clear performance deficiencies.	**Definition:** Fully competent, solid performer. Consistently meets all and exceeds some job expectations	**Definition:** Consistently over-achieves on job expectations. Routinely delivers A+ quality work. Seasoned professional.

Leadership Potential ↑

Performance Contribution →

From there, she encourages her managers to guide employees by matching their skills and interests with opportunities, have frequent communication about performance and development, coach as often as possible, and implement individual development plans.

Individual development plans, she said, are an essential tool to help employees grow their careers and personal advancement. They are designed to guide them toward short- and long-term goals and better job performance and, most importantly, are incredibly helpful in making an employee feel like a valued member of the team whose needs and interests are being met.

Cummings suggested other methods to help employees develop their skills as well: rotational assignments, so they can learn more about winemaking or grape-growing in addition to tasting room requirements; special projects or action learning; supplemental readings; speaker forums; paid days to attend conferences; and, most importantly, details and mentoring from current senior leaders.

Wise Words

"Duct tape is not a hiring strategy and hope is not a plan," said Newlin. For those recruiters and employers who take active steps to reframe their hiring strategy and actively seek out top talent, Newlin said they will find success. Waiting for a solution to fall into your lap, however, will not. **WBM**

Master Distiller Lance Winters Addresses the Wine Industry at 2019 Unified Wine & Grape Symposium

Distilled Spirits Council Reports Record Spirits Sales in 2018

Kerana Todorov

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MATT SALVO

ST. GEORGE SPIRITS' TASTING room fills up with visitors on weekends when the staff gives tours of the distillery in a hangar that once housed military aircraft in Alameda near Oakland. But the company started in 1982 in far more modest quarters in Emeryville, where founder **Jörg Rupf**, a German immigrant, established **St. George Spirits** and began producing "eau de vie" products. In 1996, Rupf hired **Lance Winters**, a former nuclear scientist and brewer. Winters' résumé: a bottle of homemade whiskey.

Winters is now the master distiller at St. George, where he and his team continue to experiment in a leased 65,000-square-foot hangar just walking distance from abandoned landing strips across the Bay from San Francisco. They've been there since 2004: stills, barrels, tanks and all.

After all these years, working at St. George remains a passion project, and one where he has the ability to make great product. "I make things that make me happy," said Winters, 53, during a keynote address at the 2019 **Unified Wine & Grape Symposium** in January in Sacramento. He brought this ardor to Unified and started off by leading a tasting of St. George Spirits' Pear Brandy, Terroir Gin and Baller Single Malt Whiskey. He then spent much of his time answering questions from the audience of winemakers and grape growers.

The Art and Fun in Distillation

Winters was inspired to craft Terroir Gin after smelling the forests, the wild fennels and the dusty trails when he picked up his son from camp. "For me, distillation is a form of self-expression," Winters said.

Winters and his team do have a sense of humor, and labels are designed to show that they do not take themselves too seriously. Terroir Gin's label include an etching of a bear with a cowbell around its neck. The bear represents Winters' wife, **Ellie**, whose maiden name was Behrstock. "Putting a cowbell around her neck was for my safety," Winters said, as the crowd laughed.

The labels invite a second look and show the company does not take itself seriously, Winters said, adding only "We take what we put in the bottle seriously."

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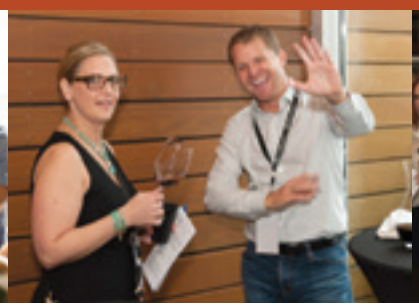


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SLEIGHT OF HAND CELLARS
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WALLA WALLA VINTNERS
THE WALLS
WOODWARD CANYON WINERY

Benefiting Washington State University Viticulture and Enology research.

BEN KRANTZ

Along with Terroir Gin, St. George creations visitors taste during their tour include Green Chile Vodka, Dry Rye Gin, California Citrus Vodka, as well as Spiced Pear Liqueur, Raspberry Brandy and Absinthe Verte.

Though Winters approves of the spirits, not all creations have remained on the market. The company has not produced Agricole Rum in years. "It's not that there isn't a market for it," said Winters. "It's because the distillery cannot get the sugar cane for it," noting that Agricole Rum is made with California sugar cane from the Imperial Valley. Most drinkers in the United States like neutral to sweet rums. "And this one doesn't do that."

Eight times of out of 10, rum drinkers find it disgusting. But, more importantly, the other two love it, Winters said.

KERANA TODOROV

Obstacles: i.e., Distribution Challenges and Competition

What is the biggest challenge to the business? "Probably it's me," Winters said in jest as he answered the question from another attendee, but on a more serious note, Winters cited consolidation of distributors.

"As more and more distributors consolidate, it's harder and harder to capture their attention," Winters said. 'The goal for us is to try and find distributors that are as passionate about what we do—or close to it."

Another concern, he said, is the proliferation of whiskey producers who are trying to expedite the aging process, as well as those who use small barrels and are "overextracting the hell out of wood character and basically building a frame over the picture instead of around the picture."

The word "craft," Winters also said, has become a buzzword. "I tend to stay away from buzzwords; and if I start to say something that I hear myself starting to sound buzzwordy about, I think about what the importance of those words would be and try to mitigate that."

Winters is grateful for state legislation that makes it possible to sell distilled spirits at the distillery. Visitors who come to the distillery see what they do. "It's an absolutely vital part of what we do," Winters said, as he addressed on-premise retail. The business produces 50,000 9-liter cases a year. It has no marketing budget. Social media is handled in-house.

What Wineries Can Learn from Distillers

Winters joked during his keynote he was not sure why he was there. But it was no mistake: **Tom Collins**, assistant professor at **Washington State University** and chairman of the conference's program development committee, said inviting Winters was an "opportunity to hear something different" from other speakers. Winters is not the first non-vintner or grower to give the keynote speech at the symposium; after all, **Starbucks** co-founder **Jerry Baldwin**, addressed the luncheon in 2014.

"We've always wanted to have the door open to have other speakers from outside the industry – but hopefully from something close by," Collins said. "This time, it was an opportunity to hear about somebody who has done

some really innovative, interesting things in another part of the alcoholic beverage industry."

According to **Nielsen**'s data, the off-premise wine market continues to grow but at a slower rate, to 2.1 percent in value and down 0.2 percent in volume over the past year.

In February, the **Distilled Spirits Council** reported record spirits sales in 2018 for the ninth year in a row. Supplier sales rose by more than 5.1 percent to $27.5 billion; volumes increased 2.2 percent to 231 million cases.

"These robust results show adult consumers are continuing to favor spirits over beer and wine, particularly among Millennials," said **Chris Swonger**, Distilled Spirits Council president and chief executive officer. "The spirits sector is benefiting from Millennials who demand diverse and authentic experiences, and desire innovative and higher-end products."

Winters does not view wine or beer as competitors. "I wouldn't say that we're competing with wine," Winters said recently. "I'd say that we're making up ground that had been lost since 1933. With very few notable exceptions, the spirits industry was content to just coast after the repeal of Prohibition. Now that we and distillers like us are actually putting true passion into making things, customers see real value in the category." **WBM**

Retail Sales Analysis:
Off-Premise Sales Increase in Value, Slip in Total Volume

Wines Vines Analytics

Wine Sales Increase Nearly 2 Percent by Value

Total off-premise wine sales value rose 1.8 percent to $14.4 billion in the past 52 weeks ended Feb. 23, according to scan data tracked by **Nielsen**. Sales value in in the four weeks ended Feb. 23 totaled $1.1 billion an increase of 3.3 percent compared to the same time last year.

Sales Volume Continues Slide

Off-premise sales volume fell by 0.7 percent to 162 million 9L cases in the past 52 weeks, but in the latest four weeks ended Feb. 23, increased 0.4 percent over the previous year and totaled 12.3 million.

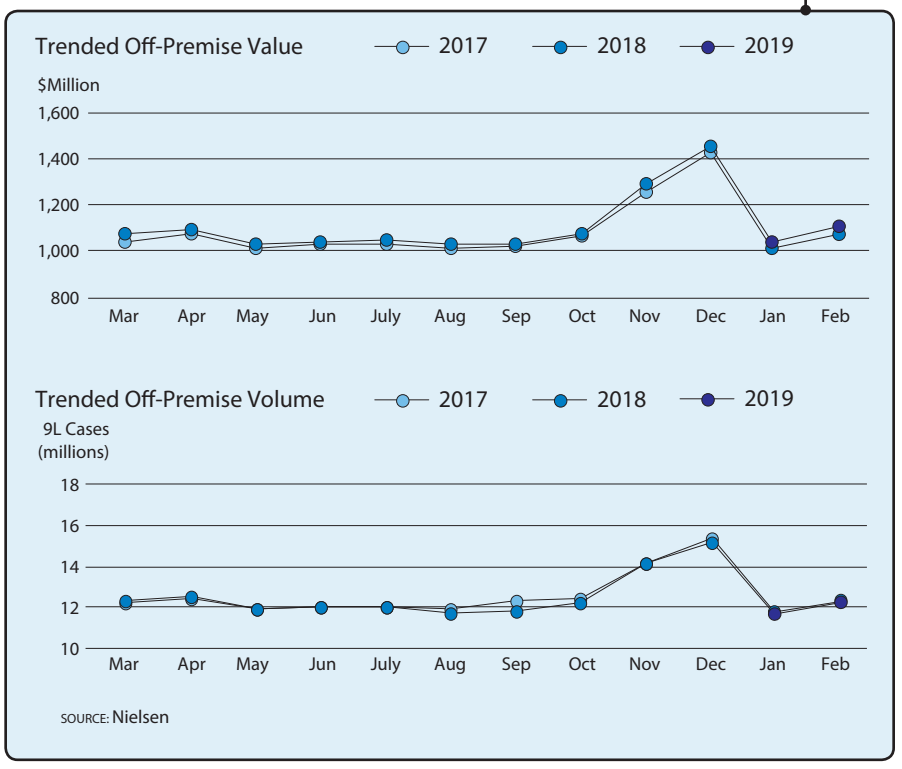
Oregon Leads Domestic Wine Sales Growth

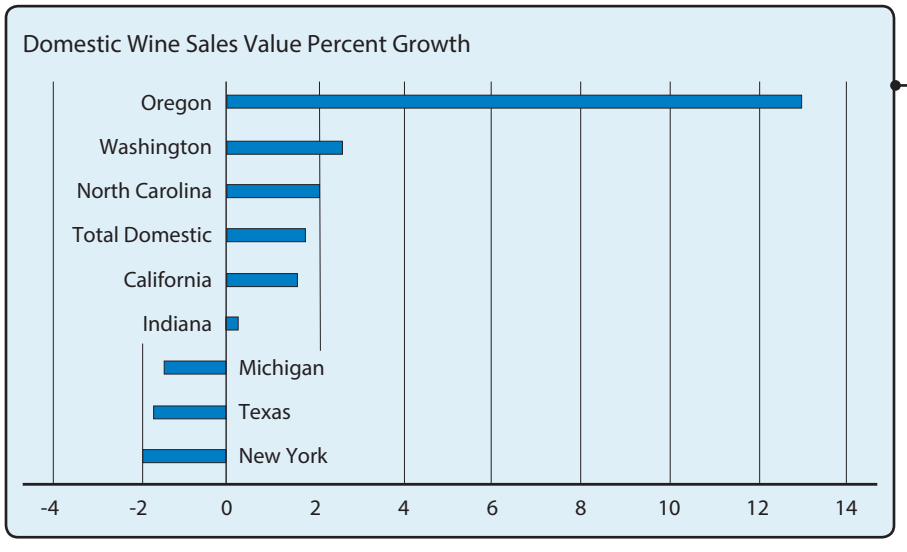
The state of Oregon led other domestic wine regions with a 13.6 percent increase in sales value in the past 52 weeks and a 16.7 percent increase in the four weeks ended Feb. 23. While Oregon showed the strongest growth, it's total sales value for the past 52 weeks of $196 million is just 2 percent of the $9.5 billion worth of Californian wine sold in the same period. By volume, Oregon wine sales were 1 million in the past 52 weeks and 76,748 in the past four.

California sales value was up 1.6 percent in the past 52 weeks, and by volume, Californian wine sales dipped 1 percent to 113 million cases in the past 52 weeks and rose 0.6 percent to 8.7 million in the latest four week period.

Total domestic wine sales came to $10.6 billion in the past 52 weeks and $819 million in the past four weeks ended Feb. 23, increases of 1.8 percent and 3.7 percent respectively. By volume, total domestic sales saw a decrease of 0.8 percent to 122 million 9L cases in the past 52 weeks but an increase of 0.6 percent to 9.3 million in the latest four week period.

Oregon wine sales likely helped boost total Pinot Noir sales 3.1 percent in value to $1.1 billion in the past 52 weeks and 6.3 percent to $88 million in the past four weeks. By volume, Pinot sales increased 0.7 percent to 8.5 million cases in the past 52 weeks and rose 2.9 percent in the past four weeks to reach 679,620. **WBM**





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 **February 23, 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 02/23/19	Latest 4 Wks - W/E 02/23/19	Latest 52 Wks - W/E 02/23/19	Latest 4 Wks - W/E 02/23/19	Latest 52 Wks - W/E 02/23/19	Latest 4 Wks - W/E 02/23/19	Latest 52 Wks - W/E 02/23/19	Latest 4 Wks - W/E 02/23/19	Latest 52 Wks - W/E 02/23/19	Latest 4 Wks - W/E 02/23/19
	TOTAL TABLE WINE	**14,363,029,719**	**1,102,295,447**	**1.8**	**3.3**	**162,036,766**	**12,333,816**	**-0.7**	**0.4**	**7.39**	**7.45**
PRICE TIERS BY CONTAINERS	BOX	1,361,067,374	109,258,124	4.9	7.5	33,481,936	2,630,281	2.3	4.1	3.39	3.46
	$0-$3.99	572,139,315	44,137,728	-2.1	-1.0	20,177,329	1,540,020	-2.4	-1.6	2.36	2.39
	$4+	788,928,060	65,120,396	10.7	14.1	13,304,607	1,090,260	10.3	13.5	4.94	4.98
	Total Table Wine Glass	12,753,015,080	974,687,336	1.3	2.7	125,339,214	9,478,128	-1.7	-0.6	8.48	8.57
	Value Glass $0-$3.99	687,555,474	52,259,206	-4.0	-6.2	17,282,651	1,297,204	-5.5	-8.0	3.32	3.36
	Popular Glass $4-$7.99	3,246,708,855	244,788,149	-4.9	-3.7	49,466,925	3,707,308	-5.2	-3.9	5.47	5.50
	Premium Glass $8-$10.99	3,381,543,803	259,991,226	-0.6	0.4	29,902,118	2,281,522	-1.1	0.1	9.42	9.49
	Super Premium Glass $11-$14.99	2,756,167,330	213,137,580	8.2	10.9	18,250,787	1,401,207	7.7	11.1	12.58	12.67
	Ultra Premium Glass $15-$19.99	1,364,766,006	105,921,987	7.8	9.8	6,657,194	511,454	6.6	9.1	17.08	17.25
	Luxury Glass $20-$24.99	562,233,067	41,064,978	7.4	7.9	2,156,734	154,155	5.8	6.1	21.72	22.19
	Super Luxury Glass $25+	747,215,108	56,372,729	4.5	5.3	1,575,629	117,372	1.5	2.8	39.50	40.01
IMPORTED	IMPORTED	3,797,056,605	283,098,573	2.0	2.0	40,304,284	3,040,877	-0.2	-0.2	7.85	7.76
	ITALY	1,190,075,157	90,062,339	1.8	3.2	10,516,182	788,060	-0.5	0.6	9.43	9.52
	AUSTRALIA	731,237,510	59,755,991	2.5	-0.2	12,021,451	970,567	-0.1	-1.9	5.07	5.13
	FRANCE	460,955,347	27,671,897	9.9	4.9	2,983,231	174,076	9.2	2.1	12.87	13.24
	CHILE	257,460,786	19,764,356	-4.0	-2.6	3,849,275	297,978	-2.9	-1.2	5.57	5.53
	SPAIN	165,626,295	12,437,390	-1.7	-1.4	2,087,728	159,705	-0.8	-0.7	6.61	6.49
	GERMANY	83,606,595	5,733,714	-4.5	-2.0	825,041	56,466	-1.5	2.0	8.44	8.46
	NEW ZEALAND	472,649,649	34,368,927	9.0	10.9	3,407,882	246,013	8.3	11.3	11.55	11.64
	ARGENTINA	342,761,342	27,141,004	-7.4	-3.8	3,766,369	292,973	-9.2	-5.7	7.58	7.72
	SOUTH AFRICA	24,443,203	1,787,254	-8.7	-1.0	211,770	15,368	-9.4	-4.2	9.62	9.69
	PORTUGAL	41,615,261	2,717,005	12.0	12.1	455,324	28,526	7.0	5.6	7.61	7.93
DOMESTIC	DOMESTIC	10,565,973,114	819,196,873	1.8	3.7	121,732,482	9,292,939	-0.8	0.6	7.23	7.35
	CALIFORNIA	9,519,239,563	740,790,818	1.6	3.6	113,035,807	8,654,221	-1.0	0.5	7.02	7.13
	WASHINGTON	619,119,209	46,424,585	2.4	2.5	5,173,292	381,830	1.9	1.3	9.97	10.13
	OREGON	196,231,955	15,426,606	13.6	16.7	1,001,990	76,748	12.7	14.7	16.31	16.74
	TEXAS	32,222,197	2,469,280	-1.8	2.5	394,419	30,250	-4.4	2.2	6.81	6.80
	NEW YORK	36,125,553	2,186,181	-2.0	-8.7	499,244	32,511	-4.5	-9.8	6.03	5.60
	NORTH CAROLINA	40,749,751	2,917,122	2.0	5.1	425,099	30,345	1.2	3.2	7.99	8.01
	INDIANA	23,747,359	1,881,767	0.2	5.3	263,383	20,503	-0.7	3.4	7.51	7.65
	MICHIGAN	22,283,853	1,497,804	-1.5	2.5	243,223	16,201	-0.9	3.6	7.63	7.70
TYPES	RED	7,427,253,937	601,984,371	1.4	3.5	74,767,181	5,985,068	-1.2	0.4	8.28	8.38
	WHITE	5,847,018,987	429,605,398	0.6	2.1	70,813,987	5,202,407	-1.1	0.0	6.88	6.88
	PINK	1,087,434,372	70,694,798	12.7	9.0	16,441,417	1,146,219	4.0	2.6	5.51	5.14
VARIETALS	TOTAL CHARDONNAY	2,548,206,894	190,064,356	0.2	1.4	30,201,266	2,243,541	-1.6	-0.9	7.03	7.06
	TOTAL CABERNET SAUVIGNON	2,641,999,458	216,733,306	4.0	6.2	24,770,287	2,025,466	1.2	3.2	8.89	8.92
	TOTAL PINOT GRIGIO/PINOT GRIS	1,311,162,569	96,682,152	1.6	3.8	17,113,738	1,269,050	1.0	3.2	6.38	6.35
	TOTAL PINOT NOIR	1,085,307,057	88,408,544	3.1	6.3	8,475,691	679,620	0.7	2.9	10.67	10.84
	TOTAL MERLOT	745,114,930	58,244,307	-5.7	-4.0	10,403,241	807,144	-6.6	-5.9	5.97	6.01
	TOTAL SAUV BLANC/FUME	947,379,951	68,567,957	6.4	7.9	8,350,512	603,049	4.6	6.3	9.45	9.47
	TOTAL MUSCAT/MOSCATO	650,517,827	49,475,920	-1.5	-0.3	9,948,922	745,605	-2.8	-1.7	5.45	5.53
	TOTAL WHITE ZINFANDEL	286,045,711	20,873,407	-7.7	-6.3	5,806,492	420,749	-8.5	-6.9	4.11	4.13
	TOTAL MALBEC	265,133,896	21,222,601	-7.0	-4.2	2,494,934	197,017	-8.2	-6.0	8.85	8.97
	TOTAL RIESLING	245,904,859	17,281,020	-5.2	-4.3	2,733,893	192,438	-5.1	-4.5	7.49	7.48
	TOTAL ZINFANDEL	229,181,673	18,298,367	-1.3	1.9	1,642,021	128,551	-4.7	-1.5	11.63	11.86
	TOTAL SHIRAZ/SYRAH	153,598,345	13,090,175	-4.9	1.8	1,766,730	150,226	-8.5	-2.5	7.24	7.26
	WHITE BLENDS (ex. 4/5L)	227,295,024	15,645,864	-4.6	-4.1	2,771,872	197,644	-3.8	-4.0	6.83	6.60
	RED BLENDS (ex. 4/5L + CHIANTI)	1,864,235,689	152,888,695	3.3	4.9	17,251,278	1,409,654	1.8	3.4	9.00	9.04
	ROSE BLEND	511,992,408	27,668,526	41.1	36.2	4,423,192	256,764	44.5	38.6	9.64	8.98
GLASS SIZES	750ML	10,360,668,582	794,239,127	2.7	4.1	83,089,230	6,316,261	0.3	1.7	10.39	10.48
	1.5L	2,111,097,265	159,560,094	-4.3	-3.2	36,521,814	2,747,646	-5.0	-4.2	4.82	4.84
	3L	63,528,085	4,829,240	-8.3	-8.5	1,672,817	124,983	-9.6	-11.1	3.16	3.22
	4L	80,620,053	5,832,494	-8.0	-10.6	2,582,028	183,539	-10.9	-13.7	2.60	2.65
	187ML	107,396,167	7,832,067	-1.3	-3.3	1,323,522	95,314	-2.8	-3.7	6.76	6.85
	375ML	17,716,992	1,414,737	7.0	15.4	68,936	5,049	8.2	4.6	21.43	23.37
BOX SIZES	ex. 4/5L	871,017,219	71,801,724	9.2	12.5	15,564,204	1,275,409	8.2	11.3	4.66	4.69
	1L	29,385,504	2,369,255	9.7	18.1	445,370	35,402	7.4	15.5	5.50	5.58
	1.5L	14,747,475	1,161,744	3.9	6.3	240,036	18,951	4.5	8.1	5.12	5.11
	3L	636,399,729	52,981,062	8.2	12.5	12,310,278	1,021,060	7.6	11.7	4.31	4.32
	5L	490,047,815	37,455,798	-1.9	-0.9	17,917,666	1,354,855	-2.4	-1.8	2.28	2.30
	TETRA	220,240,446	17,680,278	13.1	13.1	3,017,426	235,577	11.6	9.9	6.09	6.26

Source: Nielsen

Large Wine Companies Continue to Be the Top Grapegrowers in Napa County

Kerana Todorov

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THE FOLLOWING TABLE IS an unscientific survey, a sketch of winegrape-growing in Napa Valley. The table reflects the number of acres of planted vineyards owned by wineries, grape-growing companies and others. It was compiled thanks to publicly available data from the **Napa County Agricultural Commissioner**, the **Napa County Assessor**, the **Napa County Tax Collector** and other agencies as well as information from various wine companies and news clips.

Napa Valley's biggest grapegrower is **Treasury Wine Estates**. The company farms the most acres even though the company is capital light. The Australian giant leases most of the 3,000 acres it farms in Napa County, including the **Gamble Ranch** near Yountville.

TIAA/Silverado Investment Management Co., the **Laird** family of Napa, **Constellation Brands**, **E&J Gallo** of Modesto, and **Beckstoffer Vineyards** of St. Helena, each farm hundreds of acres throughout the county.

Growers and wineries have been replanting vineyards. Among them is **Opus One**, which now has 170 acres of vines planted. The winery will have a smaller production after the 2019 growing season as more than 10 acres are slated to be replanted. The blocks will lie fallow for about a year, said **Christopher Barefoot**, vice president of communications and guest relations at Opus One.

So how many acres of vine grapes are being planted in Napa County?

One tool we can use to answer that is **Allied Grape Growers**' annual nursery survey. The survey tallies the number of vines that have been sold in California either for re-plant or new vineyard developments.

The most recent survey indicates the total number of vines sold in Napa covered 1,500 to 2,000-plus acres for Napa over the past year. There were 43,584 bearing acres of winegrapes in 2017 in Napa County, according to the Napa County Agricultural Commissioner's crop report.

Data is based on top nursery vine sales by major variety. The survey does not specify whether the vines are sold to replant a vineyard or to develop new acreage and the assumption is there are 1,200 to 1,800 vines per acre, depending on the vine spacing.

Most of the vines sold in Napa County over the past year were Cabernet Sauvignon, according to the Allied Grape Growers' survey. That means between 900 and 1,400 acres of vineyards were planted in Cabernet Sauvignon in Napa County.

Allied Grape Growers' data also indicate 140 to 220 acres of Pinot Noir vines were planted in Carneros. In addition, 100 to 150 acres of Chardonnay vines, 60 to 100 acres of major Bordeaux blenders, 40 to 60 acres of red blenders, and 60 to 90 acres in Merlot were also planted.

In the meantime, Cabernet Sauvignon remains king in Napa County.

"I will stop short of saying that people should stop planting so much Cabernet Sauvignon in Napa, but will point out that new plantings of Cabernet Sauvignon continue to eclipse other varietal plantings in the county," said **Jeff Bitter**, president, Allied Grape Growers. "Since we know there isn't a whole lot of virgin ground being planted, it is likely that the majority of these new acres are replacing old vineyards – some Cabernet Sauvignon and many other varieties too."

Are wineries planting more grapes? Bitter thinks so. It has been getting "harder and harder" for two independent entities like growers and wineries in Napa to both make money or achieve a desired return on investment because of "escalating" costs such as labor, land taxes and regulations, Bitter said.

"So a result is vertical integration, whereby the profits traditionally enjoyed by two independent entities are only sufficient for one entity. As margins continue to be squeezed, it is likely we will see more of this," Bitter said.

"Another way to look at this is that if you are an investor trying to get in the vineyard business in Napa, you should have a plan for the destination of the grapes other than to just 'sell them in the marketplace.' The stakes are way too high with the cost of acquisition and startup to not have a brand or some way to effectively sell the end product," Bitter said.

	Company	Acreage	Source/More Information
1	**Treasury Wine Estates**	3,020	Treasury Wine Estates farms 3,020 acres in Napa County, according to the company. The Australia-based wine company is capital light; most of the land is leased, including the Gamble property near Yountville. The company owns about 469 acres, according to public records.
2	**Laird Family**	2,200	The Laird family owns about 2,200 acres of planted vineyards in Napa County, according to the company.
3	**TIAA/Silverado Investment Management**	2,100	TIAA/Silverado Investment Management Co. owns about 2,100 acres of planted vineyards in Napa County, according to public data. That figure is likely to change as the company continues to buy and sell vineyards.
4	**Constellation Brands**	1,229	Constellation owns about 1,229 acres in Napa County, according to the company.
5	**E&J Gallo**	1,165	The Gallo family owns about 1,165 acres of planted vineyards in Napa County, including Stagecoach, according to public records.
6	**Beckstoffer Vineyards**	1,014	Beckstoffer Vineyards owns 1,014 of planted vineyard acres in Napa County, according to the company.
7	**Antica/Antinori California**	550	Antica owns 550 acres of planted vineyards in Napa County, according to the company. The winery is at the end of Soda Canyon Road east of Napa.
8	**St. Supéry Vineyards and Winery/Chanel Inc.**	534	St. Supéry Vineyards/Chanel Inc. owns about 534 acres of planted vineyards in Napa County, according to public records.
9	**Yount Mill Vineyards/ Napa Wine Company**	520	Yount Mill Vineyards/Napa Wine Company owns 520 acres of planted vineyards in Napa County, according to the Hoxsey family. The vineyards include Rock Cairn in Oakville and Ghost Block in Yountville.
10	**Huneeus Vintners**	480	Huneeus owns about 480 acres of planted vineyards in Napa County, according to the company.
11	**Cakebread Cellars**	469	The Cakebread family owns about 469 acres of planted vineyards in Napa County, according to the company.
12	**Jackson Family Wines**	457	The Jackson family owns about 457 acres of planted vineyards in Napa County, according to the company and the Napa County Agricultural Commissioner. The family leases just under 100 acres.
13	**The Hess Collection**	455	The Hess Collection owns about 455 acres of planted vineyards in Napa County, according to the company. That includes 155 acres near American Canyon in south Napa County. In addition, Hess leases another 112 acres.
14	**Trefethen Family Vineyards**	440	Trefethen's vineyard acreage totals 440 acres of planted vineyards in Napa County, according to the company. Some of the land is fallow but is slated to be soon replanted.
15	**Heitz Wine Cellars**	425	Heitz Cellar owns about 425 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner. The Heitz family in 2018 sold the company to Arkansas billionaire Gaylon Lawrence Jr.
16	**Domaine Chandon, Inc./ Newton Vineyard/LVMH**	393	Domaine Chandon owns about 303 acres of planted vineyards in Napa County, along with Newton Vineyard, about 90 acres, according to public records. LVMH owns the two companies.
17	**Charles Krug**	392	Charles Krug owns 392 acres of planted vineyards in St. Helena, Yountville, Howell Mountain and Carneros, according to the company.
18	**Joseph Phelps Vineyards**	390	Joseph Phelps Vineyards controls and farms 390 acres of vines on eight vineyard sites in Napa Valley, according to the company.
19	**Usibelli Vineyards Inc.**	376	The company owns about 376 acres of planted vineyards in Napa County, according to public records.
20	**Grgich Family**	366	The Grgich family owns about 366 acres of planted vineyards in Napa County, according to the company. The family owns Grgich Hills Estate in Rutherford.
21	**V. Sattui/ Castello di Amorosa**	365	V. Sattui owns about 280 acres of planted vineyards in Napa County and Castello di Amorosa, another 85, according to the company.
22	**Nord Family**	350	The Nord family owns about 350 acres of planted vineyards in Napa County, according to the family. The family farms another 450 acres in the Wine Country.
23	**Vintage Wine Estates**	350	Vintage Wine Estates owns about 350 acres of planted vineyards in Napa County, according to the company. The Santa Rosa-based wine company's winery holdings include Clos Pegase.
24	**Silverado Vineyards**	340	Silverado Vineyards owns 340 acres of planted vineyards in Napa County, according to the company.
25	**Far Niente/Nickel & Nickel**	303	Far Niente/Nickel & Nickel owns 303 acres of planted vineyards in Napa County and leases another 84 acres, according to the company.

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Large Wine Companies Continue to Be the Top Grapegrowers in Napa County

	Company	Acreage	Source/More Information
26	Flora Springs - Komes and Garvey families	300	Flora Springs' owners own 300 acres of planted vineyards in Napa County, according to the company.
27	Trinchero Family Estates	265	Trinchero owns 265 acres of planted vineyards in Napa County, according to the family-owned company.
28	Caymus/Wagner/Emmolo	263	Caymus and the Wagner family and other related entities own about 263 acres of planted vineyards in Napa County, according to public records.
29	Truchard Vineyards	260	Truchard Vineyards owns 260 acres of planted vineyards in Napa County, according to the company.
30	Frank Family Vineyards	250	Frank Family Vineyards owns about 250 acres of planted vineyards throughout Napa County, according to the company.
31	Markham Vineyards	240	Markham Vineyards owns about 240 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
32	Boisset Collection	238	Boisset Collection, which includes Raymond Vineyards, owns 238 acres of planted vineyards in Napa County, according to the company. The company leases another 58 acres.
33	Duckhorn Wine Co.	233	Duckhorn owns 233 acres of planted vineyards in Napa County, according to the company.
34	Lotusland Investment Holdings Inc.	232	Lotusland Investment Holdings Inc./Langtry Farms has 232 acres of planted vineyards in Napa County, according to public records. The company wants to develop a mixed-use project in Guenoc Valley, Lake County.
35	Diane Wilsey Trust	225	Art philanthropist Diane Wilsey owns about 225 acres of planted vineyards in Napa County, according to public records.
36	Rombauer Vineyards	225	Rombauer Vineyards owns 225 acres of planted vineyards in Napa County, according to the company. The family-owned company leases another 111 acres.
37	Spring Mountain Vineyard	225	Spring Mountain Vineyard owns 225 acres of planted vineyards on Spring Mountain, according to the company.
38	Shafer Vineyards	220	Shafer owns about 220 acres of planted vineyards in Napa County, according to the company.
39	Peju Province Winery	220	The Peju family owns about 220 acres of planted vineyards in Napa County, according to public records. The family's holdings include Peju and Calmére.
40	Terlato Wine Group	218	Terlato Wine Group owns about 218 acres of planted vineyards in Napa County, according to the company: 104.9 acres in Stags Leap District, 58.6 acres in Rutherford and 54.6 acres elsewhere in the Napa Valley.
41	Cuvaison Inc.	210	Cuvaison owns 210 acres of planted vineyards in Napa County, according to the company.
42	Round Pond	202	Round Pond owns about 202 acres of planted vineyards in Napa County.
43	Hall Wines	200	Hall Wines and the Hall family own about 200 acres of planted vineyards in Napa County, according to the company.
44	Hyde Family	192	The Hyde family owns about 192 acres of planted vineyards in Carneros, according to the company.
45	Hudson Ranch	185	Hudson Ranch owns 185 planted vineyard acres, according to the company. The vineyards are in Carneros.
46	Clos du Val Vineyards	183	Clos du Val owns about 183 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
47	Moskowite Family	175	The Moskowite family owns about 175 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner. The family includes the late Harold Moskowite, a Napa County supervisor.
48	Opus One	170	Opus One has about 170 acres planted in Napa County, according to the company
49	Silver Oak/Twomey	169	Silver Oak and Twomey own about 169 acres of planted vineyards in Napa County, according to the family-owned company.
50	Chateau Ste. Michelle	169	Washington-based Chateau Ste. Michelle owns 169 acres of planted vineyards in Napa County, according to the company. Holdings in Napa County include Stag's Leap Wine Cellars and Conn Creek Winery.

Large Wine Companies Continue to Be the Top Grapegrowers in Napa County

	Company	Acreage	Source/More Information
51	Lede Family Wines	158	Lede Family Wines owns 158 acres of planted vineyards in Napa County, according to the company. The holdings include 52 acres in the Stag's Leap District, 20 acres in Calistoga; and 86 acres in Carneros.
52	Artesa Winery	152	Artesa owns about 152 acres of planted vineyards in Napa County, according to the company.
53	Turnbull Wine Cellars	151	Turnbull owns about 151 acres of planted vineyards in Napa County, according to the company.
54	Labcar, Inc.	144	Labcar owns 144 acres of planted vineyards in Napa County, according to public records.
55	Frediani Vineyards	143	Frediani Vineyards owns about 143 acres of planted vineyards in Napa County, according to public records.
56	Regusci	142	The Regusci family owns about 146 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
57	Bartolucci Family	141	The Bartolucci family owns abut 141 acres of planted vineyards in Napa County, according to public data.
58	Long Meadow Ranch	140	Long Meadow Ranch owns 140 acres of planted vineyards in three locations in Napa County, according to the family-owned company.
59	PlumpJack Group	140	he PlumpJack Group owns about 140 acres of planted vineyards in Napa County, according to public records. Another 46 acres are leased. The PlumpJack Group includes Cade, Odette and PlumpJack.
60	Burdell Properties	137	Novato-based Burdell Properties owns 137 acres of planted vineyards in Wooden Valley, according to public records.
61	Pine Ridge Winery	137	Pine Ridge owns 137 acres of planted vineyards in Napa County, according to public records.
62	Groth Vineyards and Winery	136	Groth Vineyards and Winery owns about 136 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
63	Midnight Sun Inc. III/ Olympic Sun LLC- Washington State Investment Board/ UBS AgriVest	136	UBS-affiliated entities own about 136 acres of planted vineyards in Napa County, according to public data.
64	Chateau Montelena/ Barrett family	135	The Barrett family owns about 135 acres of planted vineyards in Napa County, according to public records.
65	Kenefick Ranch	125	Kenefick Ranch owns 125 acres planted to vines in Napa County, according to the company.
66	Rodgers Land and Development Co.	124	Rodgers Land and Development Co., a company based in Walnut Creek, owns about 124 acres of planted vineyards in Napa County, according to public records.
67	Iron Corral	123	The Dallas Police and Fire Pension System owns about 123 acres of planted vineyards at Iron Corral, according to public records.
68	Trubody Ranch LLC	122	The Page family of Trubody Ranch owns 122 acres of planted vineyards in Napa County, according to public records. John Trubody established the ranch in 1860, according to the Napa County Historical Society.
69	Carpenter Family Trust	117	The Carpenter family owns 117 acres of planted vineyards in Napa County, according to public records. Different entities manage the land. Carpenter Vineyards farms about 75 acres near St. Helena.
70	Kenzo Estate	117	Kenzo Estate owns about 117 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
71	Rowan Trust	117	The Rowan family trust owns about 117 acres of planted vineyards in Carneros, according to public records. Mumm Napa has been sourcing fruit from the family's Devaux Ranch since 1991.
72	Acumen Wines	116	Acumen owns 116 acres of organically certified vines spread across two vineyards on Atlas Peak, according to the company.
73	Chappellet Winery	110	Chappellet owns 110 acres of planted vineyards in Napa County, according to the company.
74	Larkmead Vineyards	110	Larkmead owns 110 acres under vine on a 150-acre estate, according to the company.
75	Inglenook	108	Inglenook has 108 acres of planted vineyards in Napa County, according to public records.

Large Wine Companies Continue to Be the Top Grapegrowers in Napa County

	Company	Acreage	Source/More Information
76	Frog's Leap Winery	107	Frog's Leap owns about 107 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner. The company also leases land. Altogether, Frog's Leap dry farms 200 acres, according to the winery.
77	Hendry Family	106	The Hendry family owns about 106 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
78	The Cambay Group Inc.	104	The Cambay Group owns 104 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner. The Cambay Group is also involved in large-scale real estate development, such as River Islands, a 4,800-acre residential and business park development near Tracy in San Joaquin County.
79	York Creek Vineyard	102	York Creek Vineyards owns about 102 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
80	Homestead Capital LLC	101	San Francisco-based private equity firm Homestead Capital owns about 101 acres of planted vineyards on Lower Chiles Valley Road in Napa County, according to public records.
81	Foley Family Wines	100	Foley Family Wines owns about 100 acres of planted vineyards in Napa County, according to the company. The company plans to replant about 10 acres after the 2019 growing season.
82	Hine Ranch LLC	100	Hine Ranch LLC owns about 100 acres of planted vineyards in the Pope Valley area, according to public records.
83	Cattani Vineyards	100	Cattani Vineyards owns about 100 acres of planted vineyards in Napa County, according to public records.
84	Darioush	94	Darioush owns 94 acres of planted vineyards in Napa County, according to the company.
85	Harlan Estate	92	Bill Harlan owns about 58 acres of planted vineyards at Promontory and another 35 acres at Harlan Estates, according to public records.
86	Dominus Estate	92	Dominus Estate has about 91 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
87	Bancroft Family	89	The Bancroft family owns about 89 acres of planted vineyards in Napa County, according to public data.
88	Vineyard Estate Properties Inc./ David Freed	89	The company owns about 89 acres of planted vineyards in Napa County, according to public records.
89	Stanley Cheng Trust/ Hestan Vineyards	88	The Cheng family owns about 88 acres of planted vineyards in Napa County, according to public records.
90	Cain Cellars Inc.	87	Cain Cellars owns about 87 acres of planted vineyards in the Spring Mountain District, according to public records.
91	Leonardini Family	82	The Leonardini family owns about 82 acres of planted vineyards in Napa County, according to public records. The family's holdings include Whitehall Lane Winery.
92	Abruzzini Family	79	The Abruzzini family owns about 79 acres of planted vineyards in Napa County, according to the Napa County Agricultural Commissioner.
93	Merryvale Family of Wines	75	Merryvale Family of Wines owns 50 planted acres in Carneros and 25 planted acres in St. Helena, according to the company.
94	Bettinelli Vineyards	74	The Bettinelli family owns about 75 acres of planted vineyards in Napa County, according to public data.
95	Turley Wine Cellars	73	Turley Wine Cellars owns 73 acres of planted vineyards in Napa County, according to the company.
96	Phillips Family/ Vine Hill Ranch	73	The Phillips family owns about 73 acres of planted vineyards at Vine Hill Ranch in Oakville, according to public records.
97	Pacific Union College	72	Pacific Union College owns about 72 acres of planted vineyards in Napa County, according to public records.
98	Whisky River Ranch/ The Hillcore Group	70	The Hillcore Group, of Vancouver, Canada, owns about 70 acres of planted vineyards in Pope Valley, according to public records.
99	Pahlmeyer	69	Pahlmeyer has about 69 acres of planted vineyards in Napa County, according to public information.
100	Temple Family Vineyards	67	Temple Family Vineyards owns about 67 acres of planted vineyards in Pope Valley and near St. Helena, according to public records.

Trucking Industry Faces Labor Shortage, More Regulations

California Trucking Association: Dynamex Decision is Most Problematic

Kerana Todorov

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THE CALIFORNIA TRUCKING INDUSTRY continues to face challenges in 2019, including labor shortages and a host of costly new regulations. The shortage of drivers, now at 50,000 nationwide, could reach 160,000 by 2026, according to trade organizations including the **California Trucking Association**.

Other challenges include the implementation of electronic logs, which restricts the number of hours drivers can operate. Convoys of truckers staged blockades through the nation to delay the implementation of the electronic logging devices. Small operators had concerns on how electronic logging would impact their businesses, **Eric Sauer**, senior vice president of government affairs, said during his presentation on the trends in the trucking industry at the 2019 **Unified Wine and Grape Symposium**.

By 2023, all trucks in the state will need to be equipped with a 2010 or newer model year engine, Sauer also said. Other new regulations are anticipated, according to the California Trucking Association, including new rules for refrigerated trailers that are plugged in while stationary, a new smog check-like program for trucks and new lower standards for nitrogen oxide pollutants.

The California Trucking Association introduced provisions in the California state transportation bill, Senate Bill 1, which was signed into law in 2017. Language included the ability for truckers to operate their new, compliant trucks for 13 years or for 800,000 miles without having to comply with new air quality control rules from the **California Air Resources Board**.

Butch Cameron Trucking, Inc., based in Santa Rosa, California, operates nationwide, hauling wine, spirits, juices—but no dairy. The company has had to replace 40 trucks to be compliant in California. Each truck was about $155,000, he said.

Key Points

- The truck driver labor shortage is expected to increase over time.
- Independent drivers may be considered employees.
- The industry faces costly anti-pollution regulations.
- Electronic logging devices are replacing paper logs.

Electronic Logging Devices Limit Time Spent on the Road

Electronic logging devices, which replace paper logs, are meant to create a safer work environment for drivers, according to the California Trucking Association, which represents 1,100 carrier members and 400 allied members.

Electronic logging also means more restrictive hours for drivers, **Butch Cameron**, owner of Butch Cameron Trucking, said, adding that waiting at wineries or in Bay Area traffic counts against a trucker's hours of service.Still, the labor shortage is among the most vexing challenges his company faces, filling open spots with qualified drivers to fulfill the orders, said Cameron.

As of mid-March, Cameron's company, which had 35 employees on the payroll, was short 20 drivers. "That's a lot," Cameron said. His drivers are all employees. His wages are probably the highest among companies that haul wine, according to Cameron. However, he said the cost of living in Santa Rosa is "astronomical."

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Trucking Industry Faces Labor Shortage, More Regulations

Cameron, who operates nationwide, does not sugarcoat trucking. "You can't change the industry of what it is. It's on the move, long hours," Cameron said. "We're fighting an uphill battle all the time to get people interested."

His company does not hire contractors to transport bulk wines, juice and other commodities in California and nationwide. But others who do are concerned about another development—the ramifications of the 2018 **California Supreme Court** ruling in **Dynamex Operations West Inc.** v Superior Court that could re-classify independent contractors as employees.

Dynamex

The California Trucking Association and other industry groups oppose efforts to codify the 2018 Dynamex decision. Dynamex would mean that independent truckers would be employees under state law. Under the decision, a worker is an independent contractor only if the paying company can prove the three-prong test, also known as the "ABC test":

- The worker is free from control and direction from the hiring business;
- The worker performs work outside the scope of the hiring entity's usual business;
- The worker must have an independent trade, business or occupation of the same nature as the work performed.

"It's going to affect all of you," **Michael Miiller**, director of government relations at the **California Association of Wine Growers**, told wine and vineyard managers in Lake County earlier this year. "If you're a grape grower and you also have a truck and do some trucking, or contract out for trucking services, that trucking contractor may now be an employee and not an independent contractor anymore."

Trucking Companies Have Spoken Publicly Against Dynamex

"It seems so irrational to me," said **Alicia Yandell Hamilton**, vice president at **Yandell Truckaway** in Benicia, which hires contractors to haul wine and food in the region. "A lot of these people have an entrepreneurial spirit," said Yandell Hamilton, whose family has owned Yandell Truckaway since 1945.

California Assemblywoman **Lorena Gonzalez**, D-San Diego, in December introduced Assembly Bill 5 based on the decision. The bill would add the "ABC test" to state law.

Gonzalez said in a written statement that the state has to care for workers who "fall under the uncertainty of independent contracting" when they get sick, cannot find a job or retire. The **California Division of Labor and Enforcement Standards** found "that misclassification of workers as independent contractors costs the state $7 billion annually," Gonzalez said. "Individuals are not able to make it on three side hustles. That shouldn't be the norm. That shouldn't be accepted," Gonzalez said. "In a state with one of the country's highest poverty rates, this court decision is crucial to helping Californians maintain solid employment in an economy that's left millions struggling."

Sauer said that the three-pronged test is nearly impossible to meet, not just for trucking but "pretty much" every business in California. Independent contractors have had a long-standing operational model for the trucking industry for more than 70 years. The Dynamex decision impacts workers' compensation, unemployment tax, state wage and hour laws, and state tax laws.

Lawsuits have been filed over the Dynamex decision. The trade association in October filed a federal lawsuit against the State of California over the decision, arguing federal law pre-empts the "ABC test" law in dealing with independent motor-carrier drivers. The federal complaint seeks a court order to prohibit the State of California from enforcing provisions of the Dynamex decision.

California Trucking Association members rely on independent contractors to "fulfill their customers' specialized needs and respond to the fluctuating demand for services," according to a court filing submitted by the plaintiffs. "Effectively compelling motor carriers to stop using independent-contractor drivers in California will significantly affect the prices, routes and services that they can offer and will impede the transportation of goods across California's borders." The State of California's efforts to dismiss the case had failed as of mid-March.

Conclusion

The California Trucking Association is tackling a number of issues this year, including finding solutions for the shortage of transportation labor, including supporting federal legislation that would lower the age of drivers to haul interstate freight from 21 to 18. Other priorities include tracking pollution control regulations and the aftermath of the Dynamex decision that, if codified into California law, could obligate companies to treat independent contractors as employees. **WBM**

people

Winemaking & Wineries

Henrik Poulsen

Alpha Omega welcomed **Henrik Poulsen** back to the winery as head winemaker. Poulsen, who spent seven years as Alpha Omega's assistant winemaker working with Alpha Omega winemaker **Jean Hoefliger**, steps into the lead position as Hoefliger shifts to consulting winemaker for all three brands in the **Alpha Omega Collective**. For nearly 14 years, Poulsen and Hoefliger made wine together, working side-by-side at **Newton Vineyard** for six years then jointly arriving at Alpha Omega to launch vintners **Robin** and **Michelle Baggett**'s winery in 2006. The duo handcrafted critically-acclaimed wines which quickly placed Alpha Omega among Napa Valley's upper-echelon labels. In 2010, Poulsen founded his own label, which is produced at Alpha Omega, and a wine consulting business. He departed Alpha Omega in 2013 for **Acumen Wines**, reuniting him with **Denis Malbec**, Acumen's founding winemaker and Alpha Omega's former consulting winemaker. Poulsen was selected as director of winemaking and executive manager at Acumen.

Terlato Wine Group (TWG) announced the retirement of **Doug Fletcher**, one of the wine industry's most respected winemakers, after 32 years of dedicated service. After graduating from the **University of Oregon**, Fletcher started his winemaking career at **Martin Ray** in California's Santa Cruz Mountains. In the mid-1970s he went on to help **Steltzner Vineyards** launch a small winery in the Stags Leap District. In 1986 he joined **Chimney Rock Winery**, overseeing the property and managing the replanting of the original estate vineyard, as well as 65 acres of subsequent plantings. The Terlato family became partners of Chimney Rock Winery in 2001 and fully acquired the property in 2004. In 2006, Fletcher was promoted to vice president of winemaking; overseeing the winemakers and viticulturists for all of the Terlato's family owned brands including **Alderbrook**, Chimney Rock, **Rutherford Hill**, **Sanford Winery & Vineyards**, and **Terlato Family Vineyards**. Fletcher was also a consultant to Terlato's joint venture with **Michel Chapoutier** in Australia.

Constellation Brands, Inc. announced that **Matt Stanton** has been appointed as senior vice president, public affairs. Stanton will be responsible for leading Constellation's government relations team, overseeing the company's relationships with key policy influencers across the country on topics including beverage alcohol laws and regulations, international trade policy, and emerging markets such as cannabis. In addition, Stanton will head up the community affairs team, which oversees Constellation's charitable giving and social responsibility programs. He will be a member of the legal leadership team and report to **Jim Bourdeau**, executive vice president and general counsel. Stanton is based in Washington D.C. Stanton joins Constellation from **Under Armour**, where as vice president, global public policy, he was responsible for creating and executing the company's public policy agenda.

Scheid Family Wines (SFW) hired **Miles Johnson** as the company's new director of marketing. In his new role Miles will lead all marketing efforts for SFW's portfolio of private labels and national brands. He will oversee pricing, packaging, advertising, promotion, public relations, digital and social media marketing, market research, and new product development. Prior to joining SFW, he held high-level marketing positions at some of the world's most significant wine companies including marketing director for **Purple Wine & Spirits** and field marketing director for **Rémy Cointreau USA**.

Scheid Family Wines also hired **Michelle McPherson** and **John Smylie** to be the new sales managers for Texas. McPherson is a 20-year industry professional most recently employed by Multicarte, Inc. as their regional manager in Texas. McPherson has a strong knowledge of the alcohol beverage industry and has extensive experience working with both suppliers and distributors. Prior to her role at **Multicarte, Inc.**, McPherson worked for **Glazer's Wholesale Distributors** as the category manager for **Spec's Liquor and Fine Foods**. Smylie is a 30-year wine industry veteran who most recently worked with **Cuvaison Wine Estates** representing the Central South Region (TX, CO, LA, OK, NM, AR). Prior to that, he worked for Constellation Brands in Texas managing the off-premise and on-premise channel of trade. Smylie's industry experience spans from supplier to wholesaler to retail networks across a multi-state area.

Matthew Perry was appointed national sales manager of **Lail Vineyards**. A successful sales professional with wine industry experience spanning two decades, Perry will oversee Lail Vineyards' national sales and distribution, focusing on Lail's Blueprint Cabernet Sauvignon and Sauvignon Blanc, J. Daniel Cuvée and Georgia Sauvignon Blanc. In his previous position with **Diamond Wine Importers**, Perry was the East Coast sales manager where he oversaw and coordinated the distribution network for 10 wineries, a distillery and a brewery. He customized incentives and programs and grew the market through innovative, high-touch events such as in-depth seminars, dinners and tastings, wine festivals and trade shows.

Foley Family Wines named **Ryan Stewart** as director of international sales. In this role, Stewart will be responsible for developing the Foley Family Wines export sales on a global basis. Prior to accepting this assignment, Stewart served as area sales director, Asia Pacific for **Delicato Family Vineyards**. He most recently lived in Japan, and previously opened the regional office for Delicato in Bangkok, Thailand, in 2011. Prior to that Stewart managed all international business for the Heck Estates portfolio of fine wines, including **Kenwood Vineyards**. He holds a **WSET** Level III with Distinction for wine and spirits, and graduated from **San Diego State University** with a dual major in international business and Japanese language.

DAOU Vineyards & Winery hired veteran wine sales executive **Nebojsa "Neb" Lukic** to the position of president, all channels. He comes to DAOU from **Southern Glazers Wine & Spirits** (SGWS), where he spent 16 years and most recently served as vice president of on sale. At SGWS, he led the largest on-premise market network in the United States and recorded year-over-year sales growth during his entire tenure. Lukic helped co-lead the company's sales charge behind DAOU's flagship Cabernet Sauvignon, Soul of a Lion aided by the American Wines & Spirits group lead by **Jon Newlon**, who was first to meet the Daou brothers and understand their vision and passion. At DAOU, Lukic will work closely with active proprietors **Georges** and **Daniel Daou**, and be responsible for directing all sales channels. **WBM**

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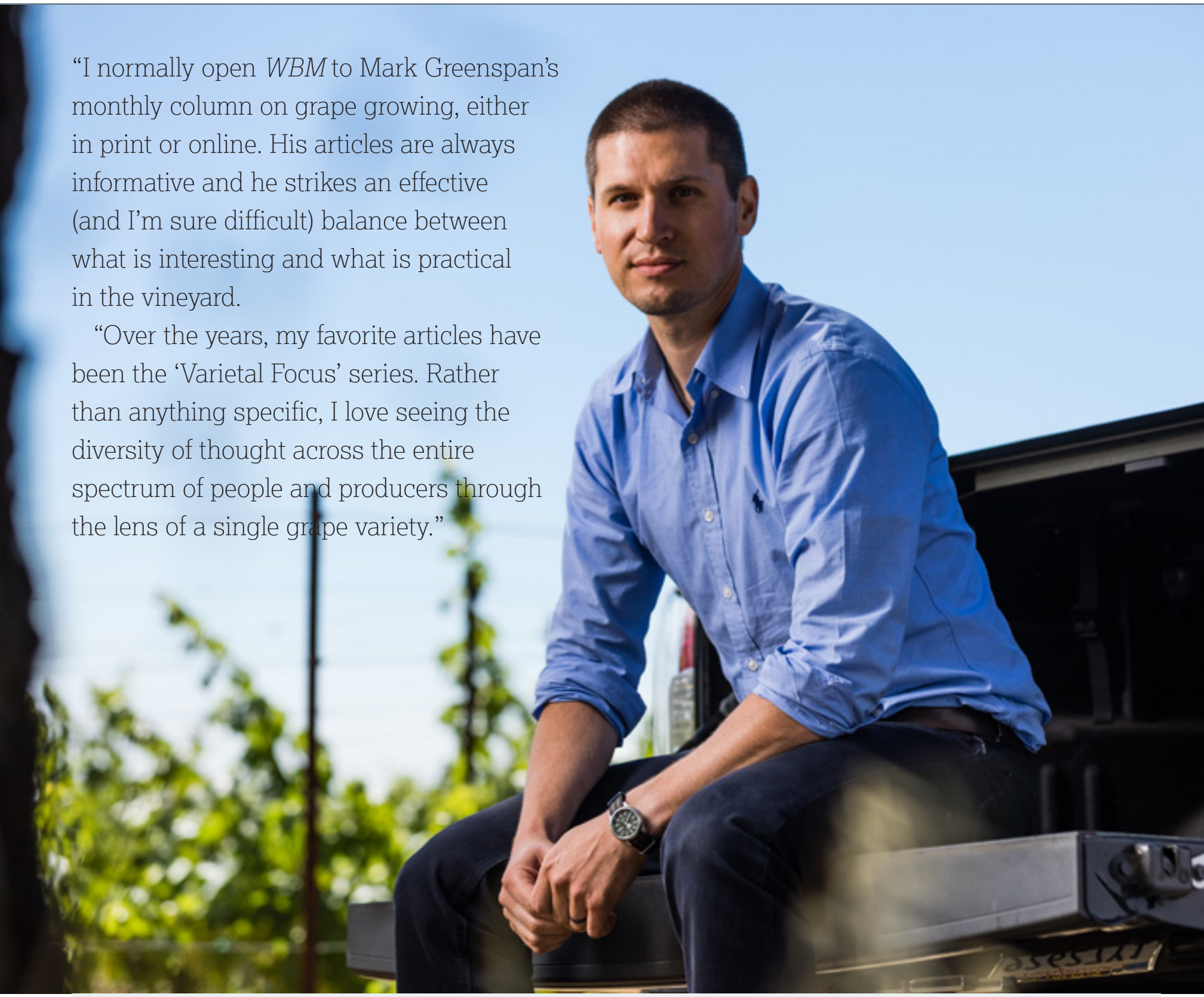
Matt Crafton, winemaker, Chateau Montelena, Calistoga, CA



"I normally open *WBM* to Mark Greenspan's monthly column on grape growing, either in print or online. His articles are always informative and he strikes an effective (and I'm sure difficult) balance between what is interesting and what is practical in the vineyard.

"Over the years, my favorite articles have been the 'Varietal Focus' series. Rather than anything specific, I love seeing the diversity of thought across the entire spectrum of people and producers through the lens of a single grape variety."

NAME AND TITLE: Matt Crafton, winemaker

WINERY NAME AND LOCATION: Chateau Montelena, Calistoga, CA

ANNUAL CASE PRODUCTION: 40,000 cases

PLANTED ACRES: 200

CAREER BACKGROUND: I started at the very bottom, dragging hoses in the Virginia wine industry, with a degree in economics from UVA, naturally. But I loved every minute of it. I learned early on to seek out effective people, winemakers and viticulturalists who've found success through high standards and tenacity. That path led me though vineyards and cellars in both Napa and Sonoma over the next few years. After graduating from UC Davis in 2008, I found myself with a one-year position at Chateau Montelena, which is now approaching year 11.

WHAT HAS BEEN YOUR BIGGEST PROFESSIONAL CHALLENGE? I wish there were only one. I would say listening more effectively and inspiring greatness in others. I think many of us have succeeded because we are makers, used to controlling efforts and outcomes. But I've realized that relationship isn't linear, especially at our level. More control doesn't always lead to better outcomes. So, now, as we drive quality and excellence in the winery, I focus on making smarter decisions while cultivating ownership and creativity in our people, which all starts with listening.

VARIETIES THAT YOUR WINERY IS KNOWN FOR: Cabernet Sauvignon, Chardonnay, Zinfandel and Riesling

Cassoulet

ILLUSTRATION BY BOB JOHNSON

JAKELYN'S MOM AND I love to travel, and we have been traveling for most of our lives. When we go to foreign countries, Jake Lorenzo learns some basic phrases in the native language. It's not like this detective gets fluent, but I practice some simple greetings. I explain that I do not speak the language—in their native language, then I ask if they speak any of the languages that I do know. Whatever the country we visit, I insist on knowing how to say, "Yes. No. Can you help me? Where is …?" and most importantly, "Thank you."

Not only does Jake Lorenzo learn some basic phrases, but I practice them with people I know from that country until I learn how to say them with the proper accent. I have a good ear for accents, and I pride myself on sounding like I speak more of a language than I really do, simply because of my accent. Marco at the fruit Basket on Sonoma Highway always brightens up when I speak some Greek. Once in a taxi on the way to the airport in Buenos Aires, I was speaking to the driver in Spanish. He turned and asked, "What part of Mexico are you from?" This detective can really stun Africans from Kenya when I order a beer in Swahili.

I have a knack for picking up bits of languages, but one of the hardest for me is French. We like going to France. It is a beautiful country with wonderful museums and centuries of history. The food is usually terrific, and the wine is sublime. It took lots of work for Jake Lorenzo to learn how to pronounce, "Je ne parle pas français." My pronunciation of that phrase is so good, that French people immediately start to talk to me in French, even though I have just told them. "I do not speak French."

No matter how much you practice, there is no way to correctly pronounce the town of "Reims." Even the French argue about the proper pronunciation. Maybe it is not the language, it could be the French people. Let's face it, while many French people are friendly and hospitable, others can be patronizing and condescending. Try as I might to pronounce Reims, French people always shrug their shoulders, and disdainfully say the word exactly as I have, while insisting that I have mispronounced it. Jake Lorenzo is no fool, and I don't like being played for one. So Jakelyn's mother and I no longer go to the unpronounceable Reims. We go to Epernay instead, where no one complains about pronunciation. True, we don't get to visit Tattinger, Luis Roederer or Krug, but we can make do with Moet Chandon, Perrier Jouet and Pol Roger.

Just to make the French language more difficult, the French add extra letters to a lot of their words. They are not pronounced. They are just there. Cahors is a lovely region in the south of France along the river Lot. The "h" is silent, so is the "s," so it is pronounced Ka-ore. Two things Jake Lorenzo loves about Cahors is that they grow Malbec and they serve it with cassoulet, one of the greatest comfort foods on the planet, at least until you realize you shouldn't have gone back for seconds and the beans start to swell in your stomach.

Last week we held a tasting at Jake Lorenzo's house. We compared five Cahors Malbecs and five Argentine Malbecs. Old World versus New World. We started with the Cahors wines. All were rich and dark with good acidity. Some exhibited blue fruit, others floral components and almost all had an earthy or mineral component. From the first to the last, the wines showed tannins, often astringent and harsh. As we made our way through the five wines, residual tannins intensified until a chalky, mouth-drying sensation filled our mouths to the exclusion of fruit or textural richness. It was as if we'd been chewing on olives straight from the tree.

The Argentine Malbecs emphasized dark red and black fruits. The mouthfeel was rich and velvety with smooth finishes almost devoid of tannic bite. Acids were low or had that texture of acid added to wine. Half of the wines exhibited way more oak than necessary. They were lush and pleasant but lacked the gritty character of Cahors.

After the tasting we all dug into lunch. Chuy outdid himself starting with caviar and Champagne to clear our palates. He then served a lovely salad with winter greens, fennel, orange slices, toasted walnuts and a lychee nut vinaigrette. Those dishes were just the tease. He brought out dinner plates, passed them around and then plunked down a giant, well-aged casserole pot that must have weighed 12 pounds. He lifted the lid to expose a cap of perfectly browned breadcrumbs surrounded by bubbling beans. The rich aromas of duck fat, sausage and pork filled the room. Behold, the Chuy Palacios Cassoulet.

In the wine world, certain pairings of wine and food work well together, and some can be other-worldly.

Chuy scooped hefty servings onto each plate, placed toasted French bread alongside and we all dug in, re-tasting the wines as we went. The Argentine Malbecs were good with the cassoulet. The rich fruit and lush body of the wines paired well with complex, fatty flavors. Argentine Malbec and cassoulet liked each other well enough, but there was no fire, no excitement, no transformation.

On the other hand, the Cahors Malbecs were a revelation. Somehow, the cassoulet flavors completely softened the astringency of the tannins. The aromas and flavors of the wines were complex and married well with the dish, which had completely transformed that mouth-drying tannin into the most complex, satisfying accompaniment. All five of the Cahors Malbecs improved dramatically with cassoulet. It was a match made in heaven, or the South of France.

In the wine world, certain pairings of wine and food work well together, and some can be other-worldly. Good chefs working with talented sommeliers can often put food and wine together in a way that dazzles. On occasion Jake Lorenzo pairs a wine with a dish and the combination lifts the appreciation of both to another level.

In France, more than any other wine growing region, certain wines live and breathe together with the local food. You cannot enjoy the oysters of Normandy without a crisp Muscadet. A hot Choucroute would not be as enjoyable without Alsatian Riesling, and why bother flaming a perfectly ripe Munster if you don't have a dry Gewurztraminer to serve with it? Cahors wine and cassoulet are a perfect match, full of history and flavor. If you have one without the other, you are compromising both. C'est comme ça. That's the way it is. **WBM**

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