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Going Green

JUNE: Things are moving along quickly, not just here at Wine Business Monthly, but in the vineyard. For many it's a good time to keep an eye on the soil, to think about irrigation, mowing the cover crop and about getting equipment ready for the coming harvest.

The 2019 Facilities Survey Report in this issue focuses on energy use and monitoring. Surveys like these allow wineries to benchmark themselves and see what their peers are up to. Before a company can start to reduce energy use, though, it is helpful to monitor how much it's using. Only 45 percent of survey respondents confirmed that they monitor their energy use. That said, the survey shows wineries are becoming more energy conscious. Roughly a third of wineries, for instance, have now deployed solar energy systems.

The Green Medal Award winners for the fifth annual Sustainable Winegrowing Leadership Awards were recently announced. The awards recognize the leadership of wineries and vineyards committed to sustainability. They are presented by the California Sustainable Winegrowing Alliance (CSWA), California Association of Winegrape Growers, Wine Institute, Lodi Winegrape Commission, Napa Valley Vintners, Sonoma County Winegrowers and the Vineyard Team. The 2019 winners are Silver Oak Cellars, Scheid Family Wines, Smith Family Wines, and Domaine Carneros. Congratulations to the award winners. Having served as a member of the judging committee, I know how vigorous the process is and that so many excellent applications were considered.

The judging panel was impressed by the range of practices used to conserve water and energy, maintain healthy soil, protect air and water quality, preserve wildlife habitat and enhance relationships with employees and communities.

As Allison Jordan, CSWA executive director said in announcing the award winners, "The hardest part is selecting only four recipients from the many amazing applications received from vineyards and wineries of all sizes from throughout California."

This issue also includes an essay —a call to arms if you will— by Ted Lemon, who makes the case that the global vinicultural community really should be doing more to nurture and support biodiversity in and around vineyards. He argues that the monoculture of tens, hundreds, even thousands of hectares of vineyards, without trees, without hedges and without wild lands is no longer tenable.

This month's cover shot features old-vine Zinfandel in the Lodi region of California. There's concern about the removal of old vines that no longer make economic sense to their owners. Our report shares information and advice from winemakers who produce Lodi Zinfandel and from growers who supply them. The bottom line concerns economic sustainability: Making outstanding-quality wines that command sustainable prices is key to preserving heritage vines.

Cyril Penn – Editor

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Zelma Long, winemaker, Vilafonté, "Zelma Long—IQ Lifetime Innovator Award Winner," page 14

"I've come to understand the tremendous complexity in simply growing and tending to plants and then making all the decisions; from planting then nurturing through each season to produce the fruit the winery needs each vintage."

Tegan Passalacqua, winemaker, Turley Wine Cellars, "Best Practices for Lodi Zinfandel," page 18

"To me, a lot of Lodi's 'signature' comes from the sandy soils, which offer a lot of texture that people in Sonoma and Napa can only dream of. There are real suave tannins that roll over the palate in Lodi Zinfandels."

Dan Fishman, winemaker, The Donum Estate, "Technical Spotlight: The Donum Estate," page 30

"I don't like it when I taste a wine and I know what kind of barrel it came from. I don't want the barrel to have that much signature in the wine."

Mike McCay, winemaker, Lot 13 Vineyard, "Best Practices for Lodi Zinfandel," page 30

"Before the Lodi Native project, most people thought of Lodi being generally flat and not capable of producing different styles. Our entire goal has been to demonstrate that that's just not the case."

John Seethoff, vice president of marketing, luxury brands, Constellation Brands, "High-end Magnums: Popular and Relatively Rare," page 90

"Anyone who brings a magnum of Champagne to a birthday party or a magnum of Cabernet Sauvignon to a dinner party is instantly a hero."

Charles Day, regional manager, Rabobank, "Flush with Cash, Banks See Some Plateauing of High Vineyard Prices," page 100

"You have a combination of a fairly large harvest and high volume in the premium areas. That has dampened the drive to lock in fruit sourcing and created more flexibility for the larger wine companies."

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Todd Graff, Winemaker & GM at Frank Family Vineyards

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Richie Allen, Winemaker at Rombauer Winery

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

2018 California Wine Grape Crush A Record Crop

California's grape growers in 2018 crushed more than 4.28 million tons of wine grapes—or 7 percent more than in 2017, the **US Department of Agriculture's National Agricultural Statistics Service** reported early April. The Chardonnay crop was up nearly 16 percent. Pinot Noir was up 19 percent, while Cabernet Sauvignon was up 13 percent and Sauvignon Blanc 10.6 percent. Grapes produced in District 4—Napa County—fetched the highest average price in the state at $5,571 per ton. Chardonnay remained the dominant variety, with 711,668 tons crushed. USDA also reported in April that California's wine grape acreage increased by 6.3 percent in 2018.

UC Davis Hires New Winemaker

The **Department of Viticulture and Enology at UC Davis** hired **Leticia Chacon-Rodriguez** as its new winemaker and winery manager. Leticia Chacon-Rodriguez has worked for two decades in the wine industry. She most recently was director of operations at **Safe Harbor Wines in Napa**. At UC Davis, Chacon-Rodriguez will oversee crush operations and wine production. She will also teach winery operations and assist with winemaking research projects and trials. Chacon-Rodriguez earned a BS in chemical engineering from the **Universidad Nacional Autonoma de Mexico** in Mexico City, and worked for **Allied Domecq**' Mexico production facility while she was a student. Chacon-Rodriguez then began graduate studies at UC Davis, where she earned in 2000 an MS degree in food sciences with an emphasis in enology. Chacon-Rodriguez succeeds **Charles "Chik" Brenneman** who retired in March after 13 years of service.

Iconic Napa Valley Winery Sold

Grace Family Vineyards, a winery that produced Napa Valley's first cult wines, has been sold after 40 vintages. Founders **Anne** and **Dick Grace** sold the winery, the Victorian house and the vineyard. No major changes are planned. New owner **Kathryn "Kate" Green** said the Grace family will continue to live on the property. **Helen Keplinger** remains on staff as winemaker. Dick and Ann Grace confirmed the sale of the property they purchased about 43 years ago in a letter. The Grace's first 1 acre vineyard was planted in 1976. Their first vintage was in 1978.

Napa County Approves Stricter Development Rules

The **Napa County Board of Supervisors** in April approved stricter rules to mitigate developments in watershed areas. The ordinance includes provisions to increase tree canopy retention from 60 to 70 percent near municipal reservoirs and extend the 70 percent retention rule to all agricultural watershed lands in unincorporated Napa County; requires a 35-foot setback along ephemeral streams; requires 500-foot buffer zones around Kimball and Bell Canyon reservoirs and 200-foot buffer around the other municipal water reservoirs; and increases tree mitigation ratio from 2:1 to 3:1 in most cases. The Napa County Board of Supervisors adopted the rules after multiple public meetings and hundreds of written and verbal testimonies.

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Zelma Long

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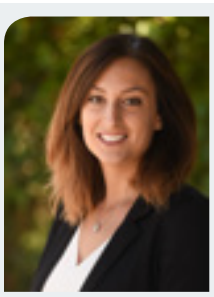
Long is honored for her passion for research, quality winemaking and groundbreaking contributions to the wine industry.

Erin Kirschenmann

WITHIN THE ALMOST 50 YEARS that **Zelma Long** has been making wine, the wine world has evolved. In the 1960s and 1970s the industry was developing its tools in the management of fermentation. Napa Valley was just getting its feet wet and setting itself up to be a world-class luxury wine production region. Today, we're moving into an era of true understanding of soil, clones, the science of wine and, increasingly, the business side of it, too.

What hasn't changed in that time, at least for Long, is her relentless pursuit of quality, and the desire to spread that knowledge across the globe.

Long's accolades are many. She is known as one of the pioneers of Napa Valley—an early advocate for research and mentor to many of today's iconic women winemakers. She's an international winemaking consultant and has produced wine in regions across the globe. But it was South Africa that captured her heart and where she has been producing ultra-premium wine and boosting the region's reputation for more than two decades.



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*.

"I've come to understand the tremendous complexity in simply growing and tending to plants and then making all the decisions; from planting then nurturing through each season to produce the fruit the winery needs each vintage."

Zelma Long

Long is one of America's best-known winemakers who also enjoys an enviable international reputation. She's won the prestigious **James Beard Award** for Wine Professional of the Year and the **Merit Award** from the **American Society of Enology and Viticulture**. One of the first women to study enology and viticulture at **U.C. Davis**, she began her winemaking career at **Robert Mondavi Winery**, rapidly working up to the chief winemaker position. Shortly after, she was recruited by **Simi Winery** as head winemaker and CEO.

It's near impossible to condense her work and her legacy into a few pages because, for many, she is irreplaceable. When ***Wine Business Monthly*** polled the **Innovation + Quality Advisory Board** to determine who the **Lifetime Innovator Award** winner would be, the answer was overwhelmingly Long. Long has been a constant, positive force in the wine industry and it has earned her the respect of nearly all who meet, know or even know of her.

The Early Days

Like many winemakers, Long got her start in winemaking through family. In 1966 her in-laws planted Chardonnay and Riesling in a vineyard above Lake Hennessey, in the eastern hills of the Napa Valley. It was there she and her husband, **Phil Freese**, got their winemaking starts.

In the 1960s, she attended UC Davis and audited courses taught by **Tim Cook**, the viticulture professor. Eventually she signed up for the master's program. Under the mentorship of three incredible professors—Cook, **Harold Burke**, the chair of the department, and **Verne Singleton**, a legend in the world of phenolics—she was taught the nature of winemaking, supported by enthusiastic professors. She was about halfway through the classes when she received a call from **Mike Grgich** to come work for him at Robert Mondavi Winery.

"At Davis, you learn the theory of fermentation or extraction. I also took viticulture classes, so I learned the underlying science. But in a winery, you learn to apply that. I think people assume you can go to school and then go right into winemaking successfully—but that's hard to do in any business these days. At Mondavi it was skill building, it was mentorship and it was palate development that I was able to learn."

There she came to understand what she called one of her most important lessons from Grgich and **Robert Mondavi**: To always strive for the best, for the highest performance, for excellence. "Bob was always an enthusiastic proponent of doing things better and different. We were always trialing new things," she said.

Thus, her formative years were spent studying and soaking up wisdom from some of Napa Valley's great winemakers. Those years engrained in her a passion for quality and constant improvement, and it's a lesson that she wants to pass on to those considering winemaking as a career: "I think it's important to start at a winery that represents what you want to achieve in your own winemaking," she said. "You will absorb the environment and it becomes a part of you."

She took those lessons and brought them back to the family business, **Long Vineyards**. "By 1977 the vineyards were 10 years old and producing lovely wines for other people. We decided we wanted to work with them. We started with the Chardonnay. In the end we produced a Chardonnay that sold for the exceptionally high price of $12," Long joked. (The skyrocketing price of wine is another aspect of the business that's changed just a bit during the course of Long's career.)

Lifetime Innovator Award Winner

Later, an opportunity at Simi Winery presented itself and provided a new challenge: managing the production of the winery—from set up of a fermentation facility, to revamping an old cellar, training a team and overseeing the winemaking processes as well as acquiring grapes. It was an activity she'd never participated in before, but in a short while she developed relationships with some of the regions great grape-growing families, such as the **Murphys** and **Sangiacomos**, to name just two.

Research and Winegrowing

Long has always been a proponent of research, a legacy shaped by her time at UC Davis and with Mondavi. Along with Simi viticulturist **Diane Kenworthy**, Long formed the **North Coast Viticultural Research Group**, a collective of wineries dedicated to helping fund research into what you can do in the vineyard to improve the wines. Each winery donated $4,000 to UC Davis in pursuit of that. For her and the other winemakers, this was an incredible chance to work with the viticulturists and enologists at the university to evaluate the wines they were making.

"We really tried to push the winegrowing knowledge of how we are affecting the chemistry of the grapes and how that translates to our wines," she said.

Essential to the spread of the information coming out of the research collectives and UC Davis was the **American Society of Enology and Viticulture**.

"At the end of the 80s it was a good time to think about these issues, as we were dealing with a bit of phylloxera. When the vineyards were replanted, they were replanted with a higher level of understanding. Beyond just varietal selection, we thought about clone, rootstock, row direction, spacing, canopies, soil management and layout and so on. We were able to take what we learned, for good or for bad, and use it in the replanting."

Today, she continues her push for research, particularly in the vineyard and spurred on by the facilities at UC Davis. "We haven't realized all the incredible value they have procured, the basic things they have created the knowledge around," she said, adding that the facility's ability to ferment in small lots and run true experiments to see how actions impact a wine's quality is crucial.

Through her years producing wine, Long's philosophy has shifted. With all the new knowledge of vineyards and viticultural practices, she feels that winegrowing has taken on a whole new meaning.

"Where we've missed the mark, where we haven't developed enough, is to have a strong group of winegrowers. We have hundreds of winemakers, but we don't have hundreds of winegrowers. That could be a real strength of ours once developed," she said.

"I've come to understand the tremendous complexity in simply growing and tending to plants and then making all the decisions; from planting then nurturing through each season to produce the fruit the winery needs each vintage," she said.

Full-time attention to the vineyard is something Long wishes we would see more of in the United States, particularly in Sonoma. As wineries continue to shore up grape supply and purchase vineyard land, rather than contract out grapes, she feels this may change. Long has a keen business and marketing mind and knows that it's not just enough to grow the grapes that are fetching the highest price per ton.

"You have to have a business plan that allows you to have the tools you need to achieve the market position you want to be in, you have to know that to know how to grow the grapes," she said. "You need to be different, you need to be new and have a segment you want to be in."

It's the attention to detail, knowing the type of wine you want to produce and where the right areas are to develop those wines that have made Napa a mature wine region in Long's eyes. Sonoma, she feels, is still growing sense of who it is, and developing the many different areas that grapes come from. "Sonoma has the benefit of varied terrain and terroir, from Alexander Valley to the Sonoma Coast to Carneros. Sonoma is doing a phenomenal development job, a partnership of entrepreneurs and growers focusing on vineyard and business development with communications on who Sonoma is, a more diverse wine and winegrape environment."

Terroir Expertise

Long consults for various winemaking projects in France, Washington, Mendocino and Israel (and is on track to earn her Ph.D. in ABD Performance Studies, with Designated Emphasis in Native American Studies, this year). But nowhere is Long's love of terroir and wine as evident as in her brand in South Africa, **Vilafonté**.

More than 20 years ago, Long was approached to speak at a symposium on barrels in winemaking in the New World wine region. She and Freese kept returning to the area, drawn to the winemaking scene there. In 1997, **Michael Ratcliffe** approached them to invest in a new project. From there, Vilafonté was born, and for 22 years it has been steadily raising the image of South African wine production. Just recently, single bottles of her wine fetched $1,730 at **Christie's Wine Auction**. "We were just thrilled," she said.

Vilafonté is a 100-acre estate full of ancient soils, some up to 1.5 million years old. It's planted to four Bordeaux varieties, Cabernet Sauvignon, Cabernet Franc, Merlot and Malbec, all densely planted to encourage smaller vines, lower yields and intensely concentrated fruit. She and Freese spend 2 to 3 months in the country each year, right around harvest and crush, in order to produce just two wines: Series C and Series M. The blend each vintage is highly dependent on how the growing season progresses and the grapes develop.

Her Legacy

Because Long had strong mentors, winemakers and professors willing to teach, shape and mold young minds and palates, she understands the value of a great teacher. While impossible to count the number of careers she's influenced, Long is well-known for breaking barriers for a number of the wine industry's most respected female winemakers. Her actions, both at Mondavi, Simi and with research organizations, have paved the way for **Dawnine Dyer**, **Genevieve Janssens**, **Margaret Davenport** and more.

In her mind, one of her greatest achievements has been passing on her knowledge—allowing the future generations of winegrowers and winemakers to flourish, push the boundaries and advance the global wine industry—and it would be hard to argue that it's not. **WBM**

BEST PRACTICES FOR

Lodi Zinfandel

Making outstanding quality wines is the key to preserving old vines

Jim Gordon

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

CONVERSATIONS ABOUT THE VALUE of old-vine Zinfandel in the Lodi region of California have grown louder in the past year, spurred by the removal of numerous mature plantings that no longer made economic sense to their owners. One of the deepest conversations on the subject took place in November 2018 on National Zinfandel Day, accompanied by a tasting of a wide variety of Lodi-grown wines, mostly from old vines.

In this report, *Wine Business Monthly* will share the information and advice provided that day by winemakers who produce Lodi Zin and the growers who supply them. Eight speakers weighed in on how to keep Lodi Zinfandel economically sustainable, and the main take-away was that making outstanding quality wines is the key to preserving the heritage vines.

GABRIELLE LURIE PHOTOGRAPHY

Keith Watts Vineyard, Mokelumne River, Lodi AVA

Lodi Zinfandel

The logic starts at the end of the line, with consumers. If they find and taste excellent Lodi Zinfandel, they'll be willing to pay $20 to $35 a bottle for it. Then the winemakers can afford to pay at least $1,200 a ton for the grapes, or even quite a bit more, and also age the wines in barrels, even French ones. At these per-ton rates that are 50 percent or more above the Lodi average, then the growers can afford to install efficient sub-surface irrigation, maintain low-ish yields, make more viticultural passes and still make a profit.

Profit is the ultimate incentive to keep the vines where they are, rather than uprooting them for more highly demanded commodity grapes, like Cabernet Sauvignon, Chardonnay and Merlot.

"Our goal is to keep these vineyards for generations to come by connecting them with winemakers across California and in other states, and find these grapes a home," said **Stuart Spencer**, executive director of the **Lodi Winegrape Commisson** and owner-winemaker of **St. Amant Winery**. "We also know that, with the cost of farming today, the grapes from these vineyards probably need to go into more premium-priced wines."

In the text that follows, we focus on eight of the wines tasted during the Nov. 14, 2018 technical workshop. These represent a range of sub-AVAs within Lodi, a range of retail prices from $10 to $35, vine age from five to 118 years and production size from 89 to 24,000 cases.

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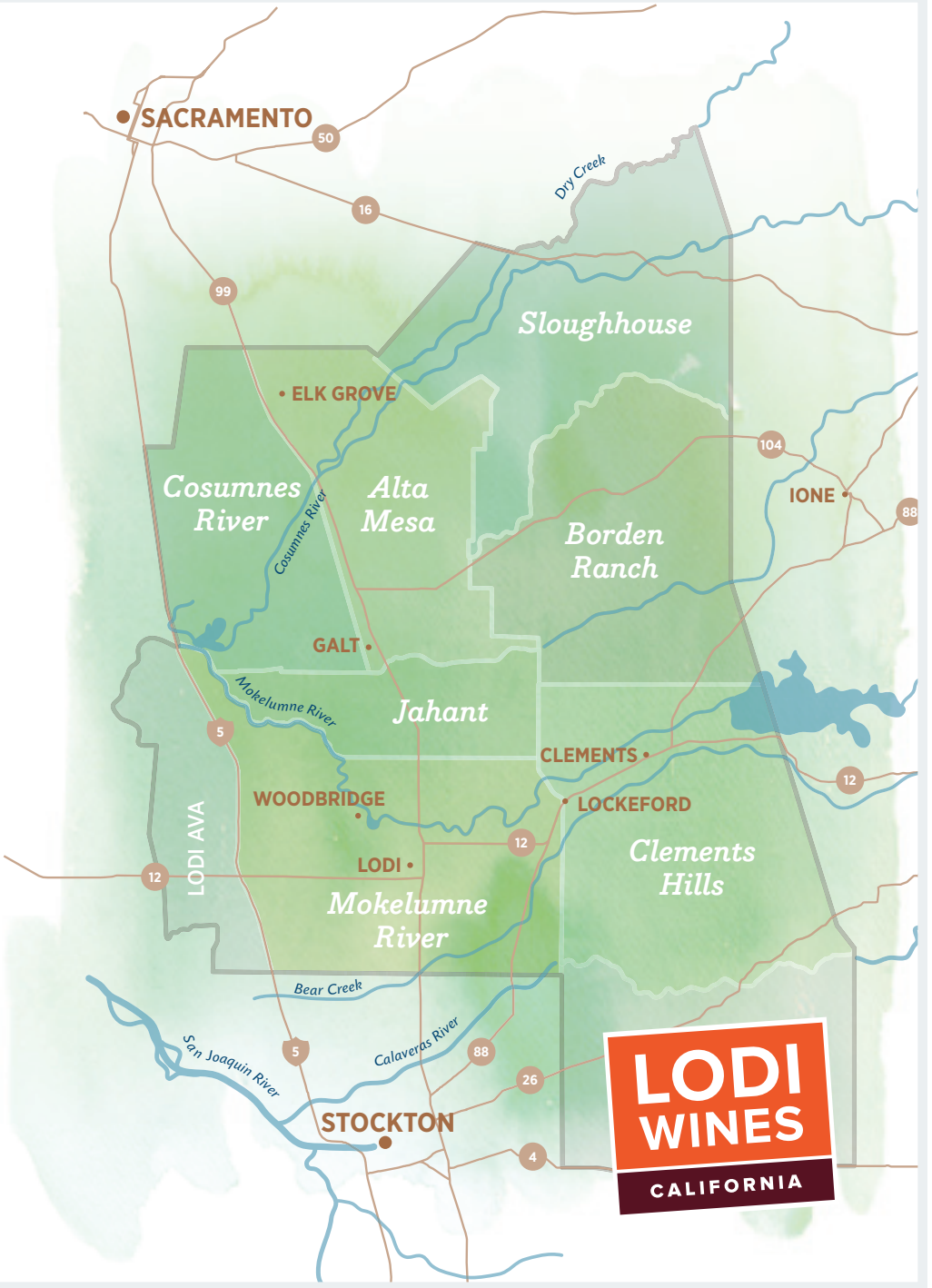

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Lodi Zinfandel

Baron Herzog Old Vine Zinfandel 2015

VINEYARD Keith Watts Vineyards
AVA/SUB AVA Mokelumne River, Lodi (west side)
SOIL TYPE Tokay fine sandy loam
YEAR PLANTED Oldest vines planted in 1940s
ROOTSTOCK St. George
VINEYARD PRACTICES Lodi Rules
HARVEST DATE August 19, 2015
BRIX 26.6°
PH/TA AT HARVEST 3.71/7.83
WINEMAKER Joe Hurliman
FERMENTATION Destemmed and inoculated with DV 10-SS; 9 days fermentation with pump-overs; ML not complete
AGING 100% FRO staves (medium plus toast) for 12 months
ALCOHOL 15.1%
BOTTLING DATE January 9, 2017
PH/TA AT BOTTLING 3.71/5.5
PRODUCTION 6,100 cases
RETAIL PRICE $10

Grower **Keith Watts** supplied fruit for the 6,100 cases of this $10 wine from his vines on the west side of the Mokelumne River sub-AVA of Lodi. This is flat land very near the streams and levees of the Sacramento/San Joaquin Delta. Here Watts' oldest vines were planted in the 1940s and are rooted in Tokay fine sandy loam. The Herzog wine, made in Southern California and pasteurized as part of the kosher process, was the least expensive retail-priced wine in the tasting.

"This is also one of the first vineyards in the region to be certified with Lodi Rules, which has been pretty rewarding," Watts said, referring to the certified sustainable farming program officially known as the Lodi Rules for Sustainable Winegrowing. Herzog puts the Lodi Rules seal on the label. The fruit also goes to four other wineries—**Michael David Winery**, **Macchia Wines**, **McCay Cellars** and **Watts Winery**.

"One hundred tons or so are picked for our biggest buyer, **Herzog Wine Cellars**," Watts continued. "It is crushed at a local winery, **LangeTwins Family**, and trucked down in tankers to their winery in Oxnard, CA. Their wine is flash-pasteurized as part of Herzog's kosher protocols and is value-priced for larger markets. Picking for them can be a little challenging because they have special holidays, but each year we get it done."

Picked at 26.6° Brix and 3.71 pH, the fruit was inoculated with a commercial yeast, spent nine days in fermentors and was later aged in tanks using French oak staves. It was the only wine in the tasting for which the winemaker acknowledged using oak adjuncts instead of barrels, a move that was probably important in achieving the low price point.

RANDY CAPAROSO

Keith Watts

Fields Family Stampede Vineyard Zinfandel 2014

VINEYARD Stampede Vineyard (Jeff and John Perlegos)

AVA/SUB AVA Clements Hills, Lodi

SOIL TYPE Tokay fine sandy loam (partially Kingdon sandy loam)

YEAR PLANTED Late 1920s primarily, early 1940s

ROOTSTOCK Own

VINEYARD PRACTICES Conventional

COMPOSITION/BLEND 98% Zinfandel, 2% Mission, Mourvèdre, Cinsault

WINEMAKER Ryan Sherman

AGING Neutral French oak

ALCOHOL 14.2%

PRODUCTION 100 cases

RETAIL PRICE $28

The **Stampede Vineyard** lies in the Clement Hills sub-AVA to the east of the city of Lodi where the foothills of the Sierra Nevada range begin to rise from the valley floor. Named for the **Clements Stampede and Horseshow** at the nearby rodeo grounds, the vineyard was planted largely in the late 1920s and added to in the early 1940s. As in many old-vine Lodi vineyards, the vines were not grafted, and have avoided phylloxera damage to their roots thanks to the sandy soils that discourage the pests.

Stampede Vineyard owner **Jeff Perlegos** said his family acquired the vineyard in 2012, and **Fields Family Wines** was their first grape buyer. "Everything we do with Stampede we do with the thought, 'What would a winemaker want?' We're wine lovers, and so everything we do is done with that in mind.

"Our vineyards typically give anywhere from 22° to 25° Brix, but our pH is consistently quite low, about 3.2, 3.3. The vineyard characteristically produces higher acid grapes. Part of the reason is because we really watch our irrigation and potassium—part of our philosophy of maintaining the vineyard in the way that our winemakers prefer."

Fields' winemaker **Ryan Sherman** aged the $28 wine in neutral French barrels, and the resulting moderate 14.2% alcohol reflects a relatively low Brix for this warm region, as Perlegos mentioned.

RANDY CAPAROSO

Jeff Perlegos

Lodi Zinfandel

McCay Lodi Native Lot 13 Vineyard Zinfandel 2015

VINEYARD Lot 13 Vineyard (estate owned and farmed)

AVA/SUB AVA Mokelumne River, Lodi (east side)

SOIL TYPE Tokay fine sandy loam

YEAR PLANTED 1915

ROOTSTOCK Own

HARVEST DATE September 2, 2015

BRIX 23.3°

WINEMAKER Mike McCay

FERMENTATION Lodi Native protocols: native yeast

ADJUSTMENTS None, unfiltered and unfined

AGING Neutral barrels

ALCOHOL 13.8%

BOTTLING DATE Nov. 21, 2016

PRODUCTION 89 cases

RETAIL PRICE $35

This selection comes from another Mokelumne River site but this time on the east side. **Mike McCay** made this non-interventionist wine as part of a small but attention-getting project called **Lodi Native**. He owns **Lot 13 Vineyard**, which was planted in 1915 on its own roots in sandy loam.

"For those of you less familiar with Lodi Native, this project started out in 2012 with six winemakers getting together to agree on following the same winemaking protocols, basically taking away the usual tools of the trade: no inoculation, no adjustments, no new oak—basically crushing grapes, fermenting on native yeast and putting the result in the bottle as-is. The goal, pure and simple, has been to showcase Lodi vineyards.

RANDY CAPAROSO

Mike McCay

"Before the Lodi Native project, most people thought of Lodi as being generally flat and not capable of producing different styles," McCay continued. "Our entire goal has been to demonstrate that that's just not the case. Lodi Zinfandel can produce many different styles depending upon where it's grown, not just depending upon who's doing the winemaking."

He calls the $35 Lot 13 wine "a true representation of Lodi's east-side Zinfandels" with brighter fruit and more floral accents. He typically does a first pick at 23.5° Brix and two more at slightly higher sugars. The 2015 wine was bottled at 13.8% alcohol.

Michael David Earthquake Zinfandel 2015

VINEYARD Primarily four growers at 12 percent each: Joe Peterson (18 acres), Alpine Rd.; Jon Graffigna Jr. (12 acres), Jahant Rd.; LangeTwins Family (38 acres), Turner Rd.; Phillips Farms, Woodbridge North Block

AVA/SUB AVA Lodi

YEAR PLANTED Various

VINEYARD PRACTICES Lodi Rules

COMPOSITION/BLEND 77% Zinfandel

HARVEST DATE Mid-September 2015

BRIX 28.5°

WINEMAKER Derek DeVries

FERMENTATION Standard winemaking procedures; seven-day ferment; UvaFerm 43

AGING 100% barrel age (47% new American oak); 18 months

ALCOHOL 15.61%

BOTTLING DATE Aug. 3, 2017

PH/TA AT BOTTLING 3.66/6.3

PRODUCTION 24,000 cases

RETAIL PRICE $26

Michael David Winery is one of the few Lodi wineries with national distribution and widely recognized Zinfandel brands. The owners, the **Phillips** family, sold their 700,000-case Zinfandel brand, **Seven Deadly**, to **The Wine Group** in 2018. While much smaller, their **Earthquake** production was still a sizeable 24,000 cases for this $26 wine.

Offering the only non-vineyard designate in the flight, winemaker **Derek DeVries** sourced primarily from four growers, all of whom use the Lodi Rules. One source is the Phillips family's own Woodbridge North Block, plus 18 acres of **Joe Peterson**'s vines on Alpine Road, 12 acres of **Jon Graffigna Jr.**'s **Jahant Road** vines and 38 acres of the LangeTwins' vines on Turner Road.

RANDY CAPAROSO

Derek DeVries

"The way we make wine at Michael David can be described as 'big'—big fruit to express the region," DeVries said. "One of the unique things we can do comes from having all the tank space we need. We are able to ferment all the individual vineyards farmed by our numerous growers separately. We don't have to make picking decisions earlier or later than what we want.

"This also gives us the freedom to freely make our blends. By working with both east side and west side fruit, we are able to see the distinct differences and then use that to our advantage. Often, by blending the characteristics together like we do in our Earthquake series wines, we find that the different vineyards can make a very nice match and balance each other out even in the bigger styles we try to achieve."

Earthquake is 100 percent barrel-aged, using 47 percent new American oak in 2015, much of it toasted medium-plus. The wine contains 77 percent Zinfandel bolstered by Petite Sirah and Petit Verdot. He said the percentages vary from vintage to vintage, as needed, to maintain a consistency of style, along with following certain winemaking protocols developed over the years.

The grapes reached 28.5° Brix on average, resulting in 15.61% alcohol and a pH at bottling of 3.66.

Lodi Zinfandel

Oak Farm Hohenreider Zinfandel 2017

VINEYARD Hohenreider Vineyard (Aaron Shinn)
AVA/SUB AVA Jahant, Lodi
SOIL TYPE Sandy loam/clay
YEAR PLANTED 1964
ROOTSTOCK Freedom
VINEYARD PRACTICES T-trellised; Lodi Rules
WINEMAKER Chad Joseph
FERMENTATION Destemmed to tank for cold soak; inoculated and tank fermented with regularly timed pump-overs
ADJUSTMENTS Brix YAN pH
AGING 80% neutral oak; 20% new French oak
ALCOHOL 15.48%
PH/TA AT BOTTLING 3.67/6.68, 0.31% residual sugar
PRODUCTION 244 cases
RETAIL PRICE $35

St. Amant Marian's Vineyard Zinfandel 2016

VINEYARD Marian's Vineyard (Mohr-Fry Ranches)
AVA/SUB AVA Mokelumne River, Lodi (south/west side)
SOIL TYPE Tokay fine sandy loam
YEAR PLANTED 1901
ROOTSTOCK Own
VINEYARD PRACTICES Lodi Rules; subsurface irrigation
COMPOSITION/BLEND 100% Zinfandel
HARVEST DATE Aug. 8, 2016
WINEMAKER Stuart Spencer
FERMENTATION Three-day cold soak; tank fermented at cool temperatures in two lots (native yeast and inoculated); natural ML finished in barrel
AGING 10 months, French oak (20% new)
ALCOHOL 14.8%
BOTTLING DATE Aug. 20, 2017
PH/TA AT BOTTLING 3.75
PRODUCTION 360 cases
RETAIL PRICE $24

The **Hohenreider Vineyard**, owned by **Aaron Shinn**, is one of the newer old-vine vineyards in Lodi, and produces one of the more expensive and exclusive wines. It was planted in 1964 on Freedom rootstock in sandy loam/clay soil. It's in the Jahant sub-AVA that lies just south of Dry Creek on the San Joaquin County side of the county line that it shares with Sacramento County to the north.

Winemaker **Chad Joseph** said that in the past the vineyard had been used primarily for white Zinfandel. **Oak Farm Vineyards** selected a portion of the property for a vineyard-designate wine and pays Shinn by the acre to farm it in a way that produces the quality Oak Farm wants. "In the Hohenrieder Zinfandel, you find a good ripeness along with interesting eucalyptus and spice notes unique to this vineyard."

RANDY CAPAROSO

Chad Joseph

Uniqueness and interest are the reasons for having a vineyard designation, Joseph said.

"I believe this will be the key to the future moving forward. We have found that certain vineyards lend themselves to certain styles. A lot of our progress has come from following protocols set by the Lodi Native project, which highlight the characteristics of individual vineyards."

The vines are T-trellised and farmed under the Lodi Rules. At harvest time, Oak Farm destems the fruit into a tank for cold soaking before inoculating with yeast and tank fermenting with timed pump-overs. Joseph doesn't hesitate to adjust Brix, YAN and pH as needed.

The 2017 vintage was aged in barrels, 80 percent of them neutral and 20 percent made of new French oak. At bottling the wine retained 0.31 percent residual sugar, measured 15.48% alcohol, 3.67 pH and 6.68 TA. Oak Farm bottled 244 cases that retailed for $35.

Marian's Vineyard was planted in 1901, making the own-rooted vines in this section of the **Mohr-Fry Ranches** property the oldest to produce wines presented at the workshop. Marian's is farmed under the Lodi Rules and has subsurface irrigation.

RANDY CAPAROSO

Stuart Spencer

St. Amant winemaker Stuart Spencer did a three-day cold soak of the grapes after harvesting on Aug. 8. He split the must into two lots and cool-fermented them—one lot with native yeast while inoculating the other. He barrel-aged the wine for 10 months in 80 percent neutral and 20 percent new French oak before bottling 360 cases with a finished alcohol of 14.8% and pH of 3.75.

Spencer said his family's relationship with the Fry family of Mohr-Fry goes back more than 20 years. "It was when our own vineyards in Amador County were dying of phylloxera, and my dad [the late **Tim Spencer**] was looking to supplement our St. Amant Winery production with Lodi grapes with 1 or 2 tons here or there.

"In typical Lodi fashion, one day **Jerry Fry** showed up with 7 tons of Zinfandel. He had started on a block, then decided to pick through the entire block. My dad was totally freaked out—he couldn't figure out how he was going to pay for it. Jerry said, 'Don't worry about it, just make the wine and we'll see what happens.' We made the wine and it turned out beautifully, so we bottled it as a vineyard-designate (Marian's Vineyard) in 1996. It won a bunch of awards and sold out within a few months. We've continued with that ever since, and now it's our largest production wine."

The 2016 vintage yielded 360 cases of the $24 wine.

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Lodi Zinfandel

Tizona by Bokisch Old Vine Seuss Vineyard Zinfandel 2015

VINEYARD Seuss Vineyard (Bokisch Ranches)
AVA/SUB AVA Clements Hills, Lodi
SOIL TYPE Tokay fine sandy loam
YEAR PLANTED Early 1920s (75%), early 1950s (15%), since 2013 (10%)
ROOTSTOCK Own-rooted 75%, St. George 15%, 110R 10%
VINEYARD PRACTICES Lodi rules
COMPOSITION/BLEND 97% Zinfandel
HARVEST DATE Aug. 25, 2015
BRIX 27°
PH/TA AT HARVEST 3.46/8.4 g/L
WINEMAKER Elyse Perry
FERMENTATION Destemmed to T-bins, fermented with D254 yeast; punched down twice daily; pressed when dry
ADJUSTMENTS Water
AGING 18 months in 15% new French oak and neutral oak
ALCOHOL 15.6%
BOTTLING DATE May 25, 2017
PH/TA AT BOTTLING 3.62/6.2 g/L
PRODUCTION 168 cases
RETAIL PRICE $29

The husband-wife team of **Markus** and **Liz Bokisch** made their name with grape varieties from Spain and Portugal grown in Lodi and did not produce Zinfandel until relatively recently. Markus said **Tegan Passalacqua** helped persuade him to add the region's signature grape to his portfolio of vines and wines.

Many Lodi winemakers embrace a high level of ripeness and the resulting high alcohol in their Zinfandels, and Bokisch does too. But at the low-yielding **Seuss Vineyard** in the Clements Hills sub-AVA owned by his family company **Bokisch Ranches**, he said acid, not sugar, is the key consideration at harvest time.

RANDY CAPAROSO

Markus Bokisch

Zinfandel was planted in Seuss on its own roots in Tokay fine sandy loam beginning in the early 1920s. A minor portion of vines was added in the 1950s on St. George rootstock. Under Bokisch ownership, 10 percent more vines have been filled in, grafted to 110R.

"It's ultimately more sustainable for the vineyard itself when you're not constantly trying to increase tonnage to improve revenue," Bokisch said. "For all the work put into it, we've only recently been able to get Süess up from 1 ton to 2.5 tons per acre.

"Of all our vineyards, Seuss is the only one that tends to have a tremendous amount of acid. More often than not, picking decisions are made based upon waiting for acids to drop rather than sugars to rise. That's a positive because it creates clean, fresh fruit. On the negative side, we not only have to wait for acidity to drop, but while the grapes' sugars are climbing, the birds are waiting things out, too."

Besides making the $29 Seuss wine, Bokisch sells Zinfandel to several wineries, including **Neyers Vineyards**, and said most prefer their Zinfandel picked at lower sugars and higher acids. "As a group, they tend to not want to do any acid or water additions. If you properly crop and bring your fruit in earlier, you can maintain that quality objective."

Turley Kirschenmann Vineyard Zinfandel 2016

VINEYARD Kirschenmann Vineyard
AVA/SUB AVA Mokelumne River,Lodi (east side)
SOIL TYPE Kingdon and Tokay fine sandy loams
YEAR PLANTED 1915
ROOTSTOCK Own
VINEYARD PRACTICES Organic conversion, no herbicides
HARVEST DATE Sept. 5 and 7, 2016
BRIX 25.3°
PH/TA AT HARVEST 3.58/6.2

WINEMAKER Tegan Passalacqua
FERMENTATION Native yeast; average 21 days on skins
ADJUSTMENTS None
AGING 15 months French oak; 20% new
ALCOHOL 15.3%
BOTTLING DATE Dec. 10, 2017
PH/TA AT BOTTLING 3.66/6.4
PRODUCTION 1,000 cases
RETAIL PRICE $35

RANDY CAPAROSO

Tegan Passalacqua

Tegan Passalacqua makes wine for **Turley Wine Cellars**, based in Napa, but in recent years has become a Lodi vineyard owner, too. After two decades of making Turley wines from Lodi grapes, Passalacqua bought the 15-acre **Kirschenmann Vineyard** in the east side of the Mokelumne River sub-AVA.

The vines were planted in 1915 on their own roots in Kingdon and Tokay fine sandy loams. The vineyard has been undergoing organic conversion. The grapes for this $35 wine were picked on Sept. 5 and 7, 2016, with harvest numbers of 3.58 pH and 25.3° Brix.

After a cold soak, native yeast performed the fermentation, and the wine stayed on its skins for three weeks. It aged for 15 months in French oak barrels, 20 percent of them new. When 1,000 cases were bottled in December 2017, the wine measured 3.66 pH, 6.4 TA and 15.3% alcohol.

Passalacqua explained, "Keep in mind that all the wines at Turley are made the same way. We don't do tricks, no enzymes or saignée, just cold soak and native yeast fermentation. We don't adjust acid or adjust with water. We don't fine, we don't filter; so what you see is what you get. I was already a fan of Lodi-style Zinfandel, but I immediately fell in love with what we were getting from **Schmiedt Ranch** in particular."

Schmiedt Ranch is a neighbor of the Kirschenmann Vineyard, and his love for the Schmiedt Zinfandel prompted him to buy Kirschenmann when it came up for sale in 2012. Having experience with Turley's many Zinfandel sources around the state, he has a unique perspective on Lodi Zin.

"To me, a lot of Lodi Zinfandel's 'signature' comes from the sandy soils, which offer a lot of texture that people in Sonoma and Napa can only dream of. There are real suave tannins that roll over the palate in Lodi Zinfandels. They are never really aggressive wines, but they can be sturdy.

"If anything, I think people need to recognize that the best wines in the world tend to be, for the most part, the opposite of manipulated," Passalacqua said. "They're not done in a chosen style picked at really high sugars for maximum flavor, then with added acid for freshness and oak chips for deeper flavor.

"If you travel around the world and see the wines that are making lesser-known regions rise up and finally be counted, these are movements associated with wines made more in a natural style that let wines and vineyards speak. I think this is the style that best showcases regions, led by winemakers who take a hands-off approach, while always knowing when to step in." **WBM**

Technical Spotlight:
The Donum Estate

Embracing "The Gift of the Land" in Carneros

Stacy Briscoe

Stacy Briscoe joined *Wine Business Monthly* in 2019. She has been writing about wine professionally since 2015, freelancing for multiple publications including The *San Francisco Chronicle*, *Edible Communities* and *Napa Sonoma Magazine*, among others. She also maintains her own website, *BriscoeBites.com*, dedicated to wine reviews and tasting notes. Outside of wine writing, she also contributes as a freelance editor for the independent publisher She Writes Press. Stacy has a Bachelor of Arts degree in English-language literature from the University of California, Santa Cruz.

KEY POINTS

- **After nearly 20 years, The Donum Estate opened its first winemaking facility.**
- **The latest and greatest winemaking equipment is housed in a former dairy barn.**
- **Pinot Noir clones are planted with vineyard specificity in mind.**
- **The production team plans for vineyard expansion.**

PHOTO: SCOTT SUMMERS

SCOTT SUMMERS

"The winery is more or less in the footprint of where the original milk barn was. I like it. It feels like we 'recycled' the site." – Anne Moller-Racke

"WHEN I SEE IT over there, it just puts a smile on my face," said **Anne Moller-Racke**, president and winegrower of **The Donum Estate** in Sonoma, CA. She's talking about her brand new, custom-built winery. "The Donum," which translates from Latin to "the gift of the land," was established by Moller-Racke as a brand and label back in 2001. Since that time, both the winery and its president have garnered a firm reputation for what Moller-Racke calls the "core" of The Donum Estate—winemaking that utilizes all estate fruit, grown with specificity of the site in mind.

It wasn't until March of this year that Moller-Racke's dream of having an estate winemaking facility came true.

Moller-Racke's connection to the now-117 acres of vines dates back even further, to the early 1980s, when the property was owned by **Buena Vista Carneros Winery**. In 1981 Moller-Racke immigrated from her native Germany with her then-husband, **Marcus Moller-Racke**, whose family had purchased the Buena Vista estate and winery. In 1983 Anne Moller-Racke became the winery's vineyard manager. Then in 1988, she was named director of vineyard operations and planted the estate's **Tula Vista Ranch** vineyard. By 1997 Anne Moller-Racke had been promoted to vice president of vineyard operations. During the course of her career at Buena Vista, she became intimately engaged with every crevice of the estate vineyard's rolling hills, windy climate and adobe clay soils.

When the Moller-Racke family sold Buena Vista in 2001, Anne Moller-Racke was able to maintain ownership of Tula Vista Ranch and renamed it , which launched The Donum Estate.

According to Moller-Racke, her original intention was to build a winemaking facility in 2001. "But then Sept. 11 happened, and it didn't seem the right time. We had all the plans drawn up," she said. But in 2002, she decided to put those plans away.

In 2011, The Donum Estate welcomed new owners **Allan** and **Mei Warburg**. Moller-Racke credits much of the winery's expansion and recent success to the Hong Kong-based couple. One of their most notable, and certainly the most noticeable, contributions, are the 40 art installations scattered on the Carneros estate property.

With the support of the Warburgs, Moller-Racke was able to bring up the discussion of building out the Sonoma property with both a hospitality and a winemaking facility. Landscaping began in 2015, followed by construction in 2016. The hospitality venue officially opened its doors in 2017 and the winery itself was finally completed in March 2019.

Initially, the winery was supposed to accommodate the 2018 harvest, but electrical complications, weather and construction hiccups prevented that from happening. But Moller-Racke and her current winemaker, **Dan Fishman**, are grateful for the delay. "It would have been too rushed. Now we'll be able to test-drive the equipment, get a feel for the layout all in time for harvest," Moller-Racke said. "Even though it's all brand new—it's all, well, brand new. There will be a lot of firsts."

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From afar, the white, linear structure does, in fact, look like an old-fashioned barn. Up close, one can see the building is actually wrapped in a perforated metal screen. The perforations vary in size and are arranged in circular patterns that line the building from roof to base. The design creates an artistic, somewhat hypnotic effect that is very much in concert with the property's modern art installations.

From Dairy Farming to Fermentation

The winery, as well as the acreage around it, maintains an element of nostalgia for the property's days as a dairy farm—which it had been from the turn of the 19th century until the first vineyard plantings in 1985. In fact, the milk barn was utilized as both office space and a temporary tasting room until the new hospitality building was completed in 2017.

Outside the new winery is a petite, but fully developed, vegetable garden managed by a private gardener, who sells the produce to local and San Francisco-based restaurants. Adjacent to the garden, sheep, chickens and even two donkeys graze next to a farmhouse that looks as if it's still standing in the middle of the Wild West. (It actually functions as additional office space for the winery.)

All of this, Moller-Racke said, "informed the dialogue" when planning both the hospitality and winemaking facilities with principal architect **Matt Hollis** of **MH Architects** in San Francisco, who implemented the Carneros farm history into his design. "It [the winery] is more or less in the footprint of where the original milk barn was," Moller-Racke noted. "I like it. It feels like we 'recycled' the site."

From afar, the white, linear structure does, in fact, look like an old-fashioned barn. Up close, one can see the building is actually wrapped in a perforated metal screen. The perforations vary in size and are arranged in circular patterns that line the building from roof to base. The design creates an artistic, somewhat hypnotic effect that is very much in concert with the property's modern art installations.

The winemaking facility is permitted for 20,000 cases, with a current capacity of 12,000 cases—the perfect size, Moller-Racke said, for the steady increase in production she and her team have planned. According to

Building the Winery

YEAR BUILT: 2019

SIZE: 12,000 sq. ft.

ARCHITECT: Matt Hollis, MH Architecture, San Francisco, CA; *matthollis.com*

GENERAL CONTRACTOR: KDC Construction, Sacramento, CA; *kdcconstruction.com*

ENGINEER: Mark III Construction, Sacramento, CA; *mark-three.com*

LANDSCAPE ARCHITECT: Bob Cleaver, Cleaver Design Associates, Lafayette, CA; *cleaverdesign.com*

FLOORING/DRAINS: Concrete floor with epoxy, cast-in-place drains

WASTEWATER: On-site Treatment

SOLAR: U.S. Green Energy; *usgreenenergy.com*

Moller-Racke and Fishman, The Donum Estate has produced around 4,000 cases annually for the last three vintages. The two estimate about a 6,000-case production from the 2018 vintage and "a bit more" from 2019 as they continue to expand their planted vineyard acreage.

Fishman describes the winery as having "not a ton of bells and whistles, but everything is clean and modern." The 12,000-square-foot space houses some of the latest and greatest in winemaking equipment, including a **Bucher Vaslin** Delta Ocyllis destemmer, 27 **La Garde** rectangular stainless steel tanks, custom pneumatic punch-down tools installed over the largest of the tanks and a 40 HL **Diemme** bladder press.

What the new facility doesn't, and won't, have is its own bottling line. Bottling will take place at The Donum Estate, but Moller-Racke and Fishman prefer to use a mobile bottling company. "We only bottle for a week, so it's not worth it to have our own bottling machine," Fishman said. He acknowledged the argument that in-house bottling provides quality control but added, "A good mobile bottling line—those guys use that equipment every day. I think you get better quality having an expert do it rather than trying to figure it out ourselves every year."

Fishman said the biggest difference, and the biggest advantage, of finally having the winemaking facility at the Carneros estate is that the majority of grapes will no longer need to be trucked. About 70 percent of The Donum Estate's total production comes from its Carneros vineyard. Since 2004, The Donum Estate has been making its wines at **Punchdown Cellars** in Santa Rosa, CA, an hour's drive from the winery's Carneros estate vineyard. "Now we can pick smaller quantities, and be more selective with the harvest timing for the different lots," Fishman said.

Managing Vines and Wines with Clonal Specificity

The ability to be more selective and time harvest decisions appropriately is of the utmost importance at The Donum Estate, where each block is dedicated to a specific clonal selection of Pinot Noir or Chardonnay based on aspect, soil and wind direction.

Moller-Racke said that when she first started The Donum Estate, she and her then-winemaker, **Kenneth Juhasz**, saw the project as "just one wine." They blended the fruit from the vineyard and created an all-estate Pinot Noir. But with the rise of Pinot Noir's popularity in the early 2000s, Moller-Racke noticed what she called a "split" in Pinot Noir production—the focus became single-vineyard designate wines. "Wineries started buying Pinot Noir from different vineyards, separating them during winemaking and selling them that way," she said. "But in our case, it's all Donum. It took us a while to form our vision."

That vision slowly evolved as Moller-Racke began paying close attention to the individual clones in her vineyard and how they responded to the Carneros topography. Having farmed the property for so long, and because she experimented with various clonal plantings throughout the site, Moller-Racke is now able to discern not just which clones are best suited to the vineyard location, but in which specific blocks each clone thrives best.

"When we started The Donum Estate, we grafted all the vines over to Pinot Noir," said Moller-Racke, explaining that while the original vineyard was planted to some Pinot Noir and Chardonnay, it also included Cabernet Sauvignon and Merlot. "We planted all the clones," she said, calling it The Donum Estate's "large-scale clonal experiment."

"This is a big part that the industry is coming to," Moller-Racke said. "We know how to farm well, we know which clones we like, but we need to find which clone is best in which place. We were able to come to that conclusion a lot faster this way."

Today, The Donum Estate's Carneros vineyard is planted to eight different Pinot Noir clones. Calera is the most planted throughout the vineyard, followed by the self-named Donum Selection (a massal selection of the Roederer clone Moller-Racke received through **Hermann J. Wiemer Nursery** in New York in the early 1990s), 667, Pommard, Swan, Mt. Eden, Martini and 115.

From that first vision of "just one wine," The Donum Estate's wine-making program now makes up to 12 different Pinot Noirs, depending on the vintage. "As new vineyards are coming online, we might add a few more bottlings," Moller-Racke said.

Moller-Racke also farms the winery's 16-acre **Windside Vineyard** in Sonoma's Russian River Valley and oversees operations at their long-term leased vineyard, **Angel Camp** in Anderson Valley—both sites are used in The Donum Estate portfolio. Additionally, The Donum Estate recently purchased a 100-acre parcel in Bodega, CA, called **Platt Ranch**, with 20 acres of plantable land. Moller-Racke and her team are in the process of finalizing their licensing and permits for the property and plan to start vineyard development in early 2020, planting 16 acres to Pinot Noir and 3 acres to Chardonnay. The first crop is expected in 2024 or 2025.

Harvest and Winemaking

With that clonal specificity in mind, all lots are kept separate throughout harvest and the winemaking process.

Harvest, which lasts about three weeks, from mid-September through early to mid-October, is all done by hand: "I don't even like leafing machines," Moller-Racke said. "For what we do in terms of our price point, we're very selective and very gentle." She estimates the Carneros vineyards yield about 3 to 4 pounds of grapes per vine, about 2½ tons per acre.

Grapes are brought into the new winery's crushpad and placed on what Fishman refers to as a "basic" Diemme belt sorting line. Because the sorting line is on wheels, the harvest team can take advantage of the floor-to-ceiling glass doors on either side of the building, and sorting can take place either inside or outside as needed.

Fishman said he limits sorting to clusters, preferring not to berry-sort Pinot Noir. "I think that with Cab it makes sense because you may have some truly green stuff in there with pyrazines. But for Pinot, some variability in ripeness gives it complexity," he said, adding that due to the consistency in The Donum Estate's farming, there's not a massive difference in ripeness, but the small range does "add something to it."

DONUM ESTATE

Donum Estate Vineyards

LOS CARNEROS APPELLATION: 128 acres
PINOT NOIR 106 acres
CHARDONNAY 22 acres

ESTATE WINDSIDE VINEYARD, RUSSIAN RIVER VALLEY
PINOT NOIR 14 acres
CHARDONNAY 2 acres

ANGEL CAMP, ANDERSON VALLEY
PINOT NOIR 10 acres

SCOTT SUMMERS

SCOTT SUMMERS

According to La Garde, these tanks hold about 30 percent more wine per tank when compared to a cylindrical tank with a similar footprint, as well as offers about 30 percent contact surface area between cap and juice.

Making the Wine

DESTEMMER/CRUSHER: Bucher Vaslin Delta Ocyllis, *bvnorthamerica.com*

PRESS: Diemme bladder press (40HL), *diemme-enologia.com*

TANKS: La Garde square stainless tanks: 3-, 5- and 7-ton with removable hard tops, *lagardeinox.com*

PUNCH-DOWN DEVICES: Pneumatic PD tools on rail system, designed by R.S. Randall

PUMPS: 1.5-inch impeller pumps from Burgstahler Machine Works, St. Helena, CA

BARRELS: 100% French Oak, various coopers

WINEMAKING SOFTWARE: InnoVint, *innovint.us*

SCOTT SUMMERS

Exterior crushpad

In general, all grapes are destemmed. Fishman estimates about 20 percent of whole clusters are included, and that is limited to smaller lots used for reserved wines.

All grapes go through a three- to seven-day cold soak at about 50° F with once daily pump-overs. The few days on skin, Fishman said, provide the juice with lighter, prettier aromatics. "The weight and body come later," he said. That weight and body comes as the Pinot Noir goes through an extended fermentation for anywhere between two to four weeks at 90° F.

The extended fermentation, Fishman said, is to help tannins develop during this time, as he does not utilize any pressed juices in his Pinot Noir. "At Donum we have the luxury that we don't have to use the press wine. When you extend the fermentation…you can get some nice stuff that you could potentially get from pressed juices, but here it's already integrated into the free run," he said. The winery does have and use their 40 HL Diemme bladder press, but pressed Pinot Noir is sold off as bulk wine.

The press is also used for The Donum Estate's Chardonnay; the white grape makes up approximately 17 percent of the acreage in the Pinot-Noir-focused Carneros vineyard. Chardonnay is whole-cluster pressed, chilled overnight and barrel-fermented on the lees. "The main thing that sets us apart is that we don't do malolactic fermentation for Chardonnay," Fishman said.

Wine is fermented in one of the winery's La Garde rectangular stainless steel tanks, which regulates the temperature with glycol jacketing and can be either open or closed-top as needed.

"When you see how much more tonnage you can fit into the square footage, it makes up for it [the cost] with its efficiency," Fishman said. According to La Garde, these tanks can hold about 30 percent more wine per tank when compared to a cylindrical tank with a similar footprint. The company also touts that the square shape offers about 30 percent contact surface area

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DONUM ESTATE

Dan Fishman, winemaker and Anne Moller-Racke, president/winegrower

Donum Estate

OWNERS/PRINCIPALS:
Allan and Mei Warburg, owners
Anne Moller-Racke, president/winegrower
Dan Fishman, winemaker

YEAR FOUNDED: 2001

YEAR BONDED: 2001

DIRECT-TO-CONSUMER SALES: 80%

WINERY CASE PRODUCTION: 6,000

AVERAGE BOTTLE PRICE: $80 to $90

between cap and juice. Fishman has talked to colleagues and tasted wines fermented in these tanks, but the 2019 vintage will be the first time he's used them for his own winemaking program.

Above the 5-ton and 7-ton tanks, the winery is equipped with pneumatic punch-down arms, designed by **Chris Randall** of **R.S Randall and Co.**, in Brisbane, CA. Fermenting Pinot Noir receives about three punchdowns during the peak of fermentation. "These are the days when the sugar is dropping quickly and the fermentation is vigorous and pushing up the cap a great deal" Fishman said, adding that this can occur anywhere between 20° Brix down to 1° to 3° Brix.

Both Pinot Noir and Chardonnay are "over-vintaged" at The Donum Estate, aging in 100 percent French oak barrels (60 to 65 percent new oak) for 15 to 16 months before bottling. Fishman calls his barrel selection a "pretty stringent" one. As he and Moller-Racke taste through the wines during the aging process, anything that doesn't make "The Donum cut" is sold off as bulk wine, along with the pressed Pinot Noir juices.

Fishman said he uses a lot of different coopers because he likes that diversity during blending. "I don't like it when I taste a wine and I know what kind of barrel it came from. I don't want the barrel to have that much signature in the wine," he said.

This is where Moller-Racke disagrees. The two work very closely on blending decisions, and the "great debate" during tasting trials is that she loves the idea of having a specific cooper dedicated to a certain block or a certain clone. "But Dan is dangerous in the vineyard and I am dangerous in the cellar," said Moller-Racke, who called the "beauty" of The Donum Estate winemaking program the close "marriage" between vineyard management and winemaking. "We push each other," she said. "Being estate-grown, I have control of all the vineyards, and all the decisions made in the vineyard are always made with the wine in mind," she said.

Moller-Racke and Fishman blind taste their clonal lots to decide which make "the Donum cut," which will be single-clonal bottlings, and which clones may benefit from blending. "There is no 'recipe,'" Moller-Racke explained. Some vintages will see more clonal blends, others will produce clones strong enough to stand on their own. "It's a fresh voice every year," she said.

"That is the world of Pinot. You want to bring out the site…you need to bring out the personality. And that happens in the small unit, not the large," Moller-Racke said.

Packaging

BOTTLING LINE: Mobile Bottling

GLASS: Ardagh Group, *ardaghgroup.com*

CORKS: Portocork ICON, *portocork.com*

CAPSULES: Amcor, *amcor.com*

LABEL DESIGNER: Anthony Laurino, *alaurino.com*
SCULPTURE: Ai Weiwei, *aiweiwei.com*

LABEL PRINTING: CCL Label Industries, *ccllabel.com*

LABELING MACHINE: ENOS T3 labeling machine, *enositalia.it*

SHIPMENTS: VinLux Transport, vinluxtransport.com

CASE GOODS STORAGE: Groskopf Sonoma, *groskopf.com*

POS SOFTWARE: Advanced Management Systems, *amssoftware.com*

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When you drive up the road leading to The Donum Estate, you cannot help but stare reverentially toward the meditating sculpture that seems to grow, seems to elongate the closer you approach. Though eyes closed, "Sanna, Giant Head," sculpted by **Jaume Plensa**, greets its guests, offering a sense of peace, tranquility and a stoppage in time.

As you walk the footpaths that line the property, the vineyard is nuanced with a variety of sculptures throughout its acreage—from "Love Me" by **Richard Hudson**, a stainless steel heart reflecting sunlight atop the estate's highest hill, to "Charging Bull" by **Arturo Di Modica**, strategically placed just feet away from where the estate's livestock roam, and "Non-violence," a revolver tied in a knot, created in memory of **John Lennon** but also serving as a nod to Carneros' "Wild West" history as a coach stop for those shipping produce into San Francisco.

In 2014, Allan Warburg was inspired to combine his passions for fine art and the art of wine by presenting artists from around the world in The Donum Estate property. According to Moller-Racke, the original plan was to have 10 sculptures; today the estate is home to 40.

"What the art allowed us to do was landscape," Moller-Racke said. "The vineyard is more or less the same, but the area in between wasn't really used. The art…has allowed us to make it so pretty."

The art does make it "pretty," but it has also influenced The Donum Estate's branding. Inspired by one of the first art installments, "Circle of Animals/Zodiac Heads" by **Ai Weiwei**, The Donum Estate changed their label art, starting with the release of the 2014 vintage. Each release features the zodiac animal associated with the vintage. With a special commission, the artist has designed these labels based on the sculpture. This implementation allows consumers to collect The Donum Estate wine bottles as they would art. Thus far, the winery has released vintages from the year of the horse, ram, monkey and, with the release of the 2017 vintage, the rooster. "In 12 years, you can get a case of one with each," Moller-Racke said. **WBM**

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DONUM ESTATE

"Sanna" by Jaume Plensa

SCOTT SUMMERS

"Hombre Caminante" by Fernando Botero

DONUM ESTATE

"Circle of Animals/Zodiac Heads" by Ai Weiwei

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"Mikado Tree" by Pascale Marthine Tayou

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PRACTICAL Winery & Vineyard

Fructophilic Yeasts

Consequences of Yeast Strain Selections

Jason Mabbett

Jason Mabbett is a technical applications manager for AB Biotek. He has been employed in this role for 10 years and, prior to moving to and focusing exclusively on North America three years ago, also oversaw South America. Prior to joining AB Biotek, Mabbett studied viticulture and enology at Lincoln University, New Zealand, and completed vintages in Argentina, Australia, New Zealand and the United States.

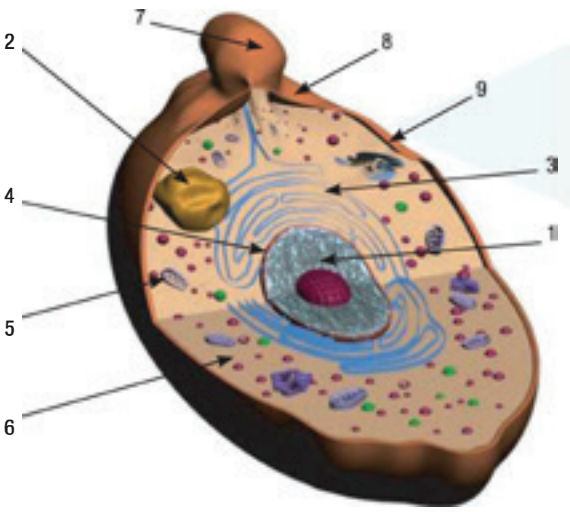
HISTORICALLY, THERE HAVE BEEN many causes attributed to stuck and sluggish ferments. These include such vineyard and viticultural factors (high-harvest Brix, nutrient deficiencies, fungal degradation and agricultural residues, including pesticides, fungicides and herbicides), cellar management (incorrect strain selection, incorrect rehydration procedures, incorrect fermentation temperatures, over-clarification of the must and yeast assimilable nitrogen [YAN] levels), inhibitory substances (ethanol, acetic acid, mid-chain fatty acids and sulfites) and physical factors (pH and temperature extremes).

As wine researchers and yeast manufacturers have achieved greater understanding of wine fermentations some of the above-mentioned issues have largely become redundant. The decrease attributed to these causative factors has seen a concomitant rise in one particular factor which is now viewed as being the predominant issue associated with stuck and sluggish fermentations: the ratio of glucose to fructose.[6] Anecdotal evidence suggests that in more than 90 percent of the cases (and some even characterize the incidence rate as much higher, about 95 percent)[4] where there is a stuck or sluggish fermentation, the glucose: fructose ratio is less than 1.0. That this should be the case is not surprising.

Saccharomyces cerevisiae is generally a glucophilic yeast, meaning it preferentially consumes glucose as opposed to other sugars. Many people believe that the use of a *Saccharomyces bayanus* strain will help avoid these problems; however, this is incorrect Basically, the old taxonomy of yeast was based on their ability to mate. When geneticists started finding multiple pieces of DNA sequences that arose from the *Saccharomyces* sensu-stricto group, they realized that this was not the best method. With the advent of DNA sequencing, a more accurate methodology could be used. This has shown that many yeast species/strains are a mix of multiple strains with one or two dominant parents.

During this process it was revealed that those strains being used in the wine industry, which were commonly referred to as "Bayanus," were not

Figure A. Internal organisation and compartments of a yeast cell.



KEY Figure A			
1	Nucleus	5	Mitochondria
2	Vacuole	6	Fermentation
3	Endoplasmic Reticulum	7	Budding daughter cell
4	Nuclear Membrane	8	Cell Division
		9	Cell membrane

Figure B. The phospholipid bilayer of a cell membrane.

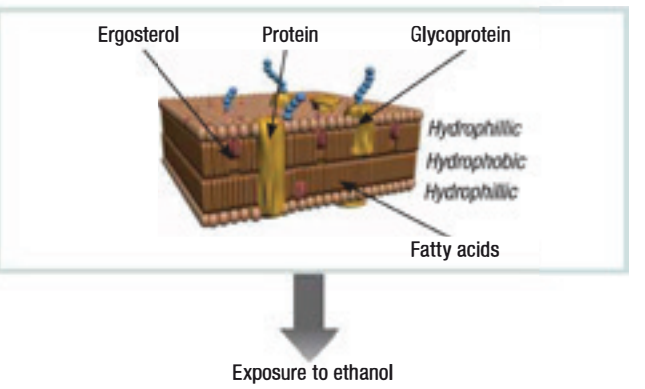
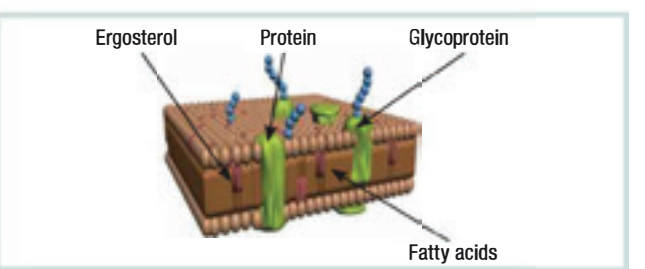
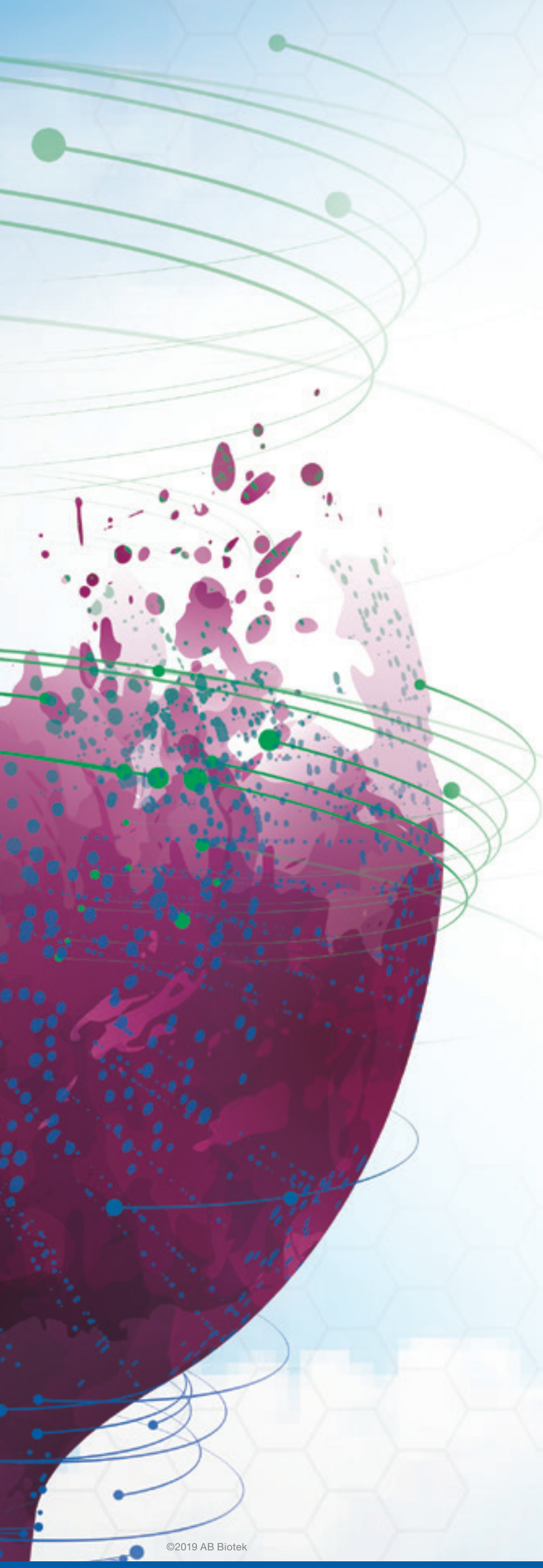


Figure C. Interdigitation of a phospholipid bilayer in response to ethanol-stress.



Figures. (A) Representation of a yeast cell highlighting key areas of the cell that are affected by ethanol. (B) Diagrammatic representation of a magnified cell membrane illustrating the bilayer organisation of phospholipids and the integration of proteins, some of which acts as gateways for transport of nutrients. Ethanol is soluble in cell membranes, and has dramatic impacts on the integrity of its structure. In fact, the membrane is thought to be one of the principal 'targets' for ethanol. (C) This figure illustrates the impact of ethanol on biological membranes. Fatty acids from opposite sides of the phospholipid bilayer become interdigitated and proteins are thought to be affected (illustrated as a colour change, yellow to green, between Figures A and B) however, the precise affects of ethanol on membrane proteins is not well understood. *Illustrations by Dung Quoc Tran.*



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actually *Saccharomyces bayanus* but instead *Saccharomyces cerevisiae* and are mainly from the "Prise de Mousse" family.[7,8,10] Some yeast manufacturers and resellers still label these yeasts as *Saccharomyces bayanus*, which is incorrect. Reinforcing this was the apparent discovery of some true *Saccharomyces bayanus* strains isolated from Patagonia (from non-inoculated fermentation processes).[5] However, after sequencing, these have been reclassified as *Saccharomyces eubayanus*. The defining characteristics of these strains are that they are generally cold-tolerant and not fructophilic. In actuality there are very few *Saccharomyces eubayanus* strains have been isolated so far, and even fewer are commercially available.

During fermentations, glucose is, more often than not, consumed at a higher rate than fructose (the other predominant sugar in wine fermentations). As a consequence, the proportion of fructose increases as the fermentation progresses. When fructose becomes the predominant sugar at the end of fermentation this often leads to sluggish or stuck fermentations. It is important to recognize, however, that *Saccharomyces cerevisiae* yeast strains (the majority used in winemaking) consume certain types of sugar to varying degrees. Some are glucophilic and others fructophilic, and in between exists a continuum. In order to understand why this is important it is necessary to understand the genesis of this problem, the consequences and how this issue may be addressed.

Why is This Occurring?

In part, this may be attributable to an increase in alcohol levels and the desire to produce more fruit-forward wines. As many critics and consumers have noted, table wines used to have significantly lower alcohol levels than they currently do. Wines with 14% to 14.5% ABV are commonly produced today. It is also not uncommon to see wines with more than 15% ABV. But why is this? Leaving aside any debates concerning global warming and the implications of this, two related reasons stand out: the first being related to commercial imperatives and the second is viticultural.

In the last 30 years, key wine critics/reviewers have "pushed" red wines, in particular, towards a certain style where wines have higher levels of ripe fruit and softer tannins (ignoring the influence of oak). This wine style has often received higher scores and higher critical acclaim from influential reviewers, which has subsequently increased sales. Partly as a consequence of this, the distinction between sugar and physiological ripeness has become increasingly important.

In warmer climates, physiological ripeness commonly trails sugar ripeness. Generally speaking, physiological ripeness is regarded as being more detrimental to wine quality than sugar ripeness. To this end, the notion of "hang time" has become more important—leading to physiological ripeness and, by implication, the wine style likely to garner critical acclaim. To fully understand the implications of this it is important to take a step back to Viticulture 101—in particular, the growth phases of the grapevine.

Three Growth Phases of the Grapevine

In phase one, berry size is set, the berries are green and the respiration rate is fast. Photosynthesis is sufficient to support the berry's nutritional demands. Acid concentration is high, and sugar concentration is low and constant. In this phase, the glucose to fructose ratio is greater than 1.0. In phase two, the berry growth tempo declines, and acids reach their highest levels. Sugars, especially glucose, begin to accumulate. This phase ends with the onset of *veraison*. Phase three sees an increase in the berry mass and volume. The glucose:fructose ratio is now in equilibrium.[7]

Importantly, however, the longer the grapes remain on the grapevine the more fructose accumulates proportionately. While there is actually little data related to the change in sugar composition during these growth phases (and the available data is relatively dated), some evidence to support the above can be seen in two graphs, FIGURES 1 and 2.

FIGURE 1: Growth Phases of the Berry

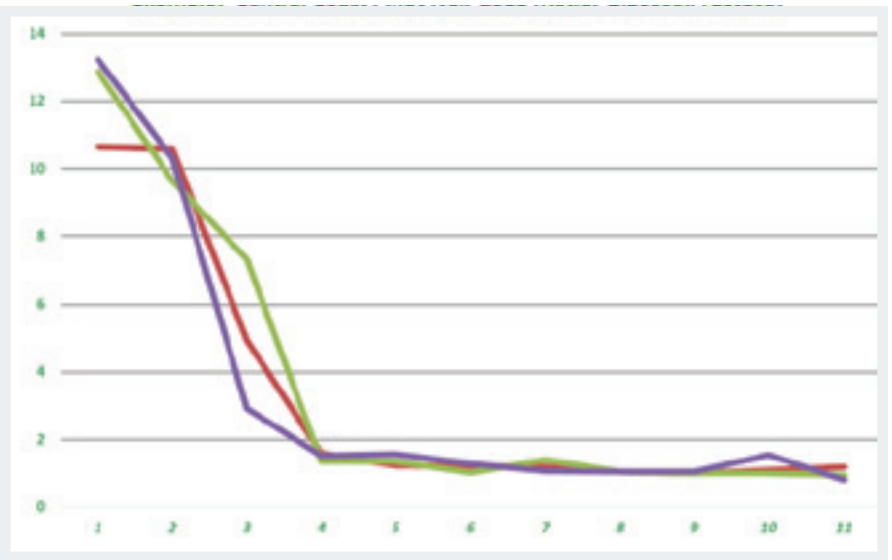

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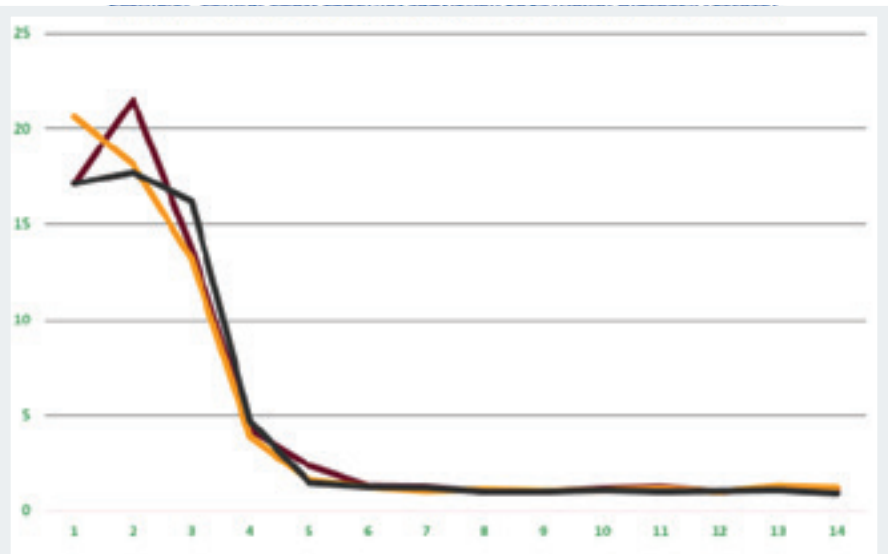
FIGURE 1: Change in the ratio of glucose to fructose in Pinot Noir in the Central Coast (2013) prior to harvest

FIGURE 2: Growth Phases of the Berry



AB BIOTEK

FIGURE 2: Change in the ratio of glucose to fructose in Cabernet Sauvignon in the Central Coast (2013) prior to harvest

The consequences of this process and extended "hang time" are pronounced, not only from a wine quality standpoint but also the possible implications: stuck and sluggish fermentations. Bearing in mind that fructose is approximately twice as sweet as glucose, any fructose that is unconsumed can detrimentally affect wine quality due to the fact that wines may be perceived sweeter than they actually are. Additionally, the residual fructose also means a lower ethanol yield and a higher risk of microbial spoilage.[1] In part, these consequences can be mitigated somewhat by using fructophilic yeast strains that have a higher capacity to consume fructose.

The capacity of certain yeast strains to preferentially consume a certain type of sugar is something that is by no means new. In 1932 **Edward Romer Dawson** published a paper: "The Selective Fermentation of Glucose and Fructose by Yeast." However, two important conclusions he arrived at were that the selectivity exhibited by any particular yeast is not constant and this is dependent on cultural conditions to which the yeast has been subjected to during growth. It is not hard to see, therefore, how researchers such as **Linda Bisson** (**University of California, Davis**) have pointed out that the high residual concentration of fructose may be a symptom rather than a cause of a stuck or sluggish fermentation.[2] But why is this?

Yeast performance is determined partly by genotype, or genetic makeup, which is species- and strain-dependent. Wine yeast strains differ in terms of fermentation kinetics, nitrogen requirements, ethanol tolerance, temperature tolerance and also glucose:fructose consumption (to name but a few defining characteristics). These strain differences are more pronounced in stressful conditions, suggesting differences in adaption to the environment.[6] To this end, researchers have found that with respect to the consumption of glucose and fructose, nitrogen supplementation helps strongly stimulate fructose utilization and that, under high ethanol conditions, fructose utilization is inhibited more than glucose utilization.[1] Thus the use of a fructophilic yeast strain will not necessarily ensure a problem-free fermentation in and of itself. It will certainly reduce the likelihood, but it is by no means a "silver bullet."

To further reduce the likelihood of a stuck or sluggish ferment that is a consequence of the imbalance in the glucose: fructose ratio, the differences between grape varieties have to be taken into account (you are more likely to have problems with Chardonnay than Chenin Blanc, for example).[3,7] Vintage also has to be taken into account. In warm, dry vintages there is, generally, a lower glucose:fructose ratio. Yeast strain selection should, in part, be based on composition of the sugars in the must. The use of a fructophilic yeast strain is recommended where there is a higher amount of fructose than glucose when the glucose:fructose ratio is less than 1.0. Probably most important, where there is more fructose than glucose, significant attention should be paid to other additional risk factors, such as insufficient YAN and high potential final alcohol.

Fermentation problems usually arise due to the presence and impact of more than one stress factor. Some research has shown that a high starting YAN might stimulate fructose consumption preferentially, thus suggesting that analysis of the initial YAN level is necessary. When the must was supplemented with nitrogen, strains consumed between circa 6 percent and 9 percent more glucose and between circa 13 percent and 17 percent more fructose. Moreover, supplementation of diammonium phosphate at a late stage of fermentation also enhanced fructose consumption.[1]

Furthermore, researchers have noted that multiple factors (some of which are unavoidable— for example, increasing levels of ethanol) generally have a synergistic effect on each other.[6] This suggests that while the ability to preferentially consume fructose is important, other attributes of fructophilic yeast strains may be just as important: low nitrogen demands and alcohol tolerance for example. Ultimately the one thing a winemaker can most easily control is the selection of the yeast strain to be utilized in the fermentation, taking into account not only whether it is fructophilic but also other attributes of the strain.

In the interim, yeast manufacturers and researchers will continue to assist by attaining a better understanding of the wine microorganism physiology and the impact on its environment. Additionally, through selective breeding, hybridization, adaptive evolution and investigation of other yeast species that might be better suited to the fermentation of fructose, we may be able to arrest issues related to stuck and sluggish fermentations.

Take Away

- Where the ratio of glucose:fructose is less than 1.0, winemakers should consider the use of fructophilic yeast strains to ensure less likelihood of a stuck or sluggish ferment. All yeast manufacturers and resellers have fructophilic strains, and their technical sales representatives will be able to point winemakers in the right direction.
- However, when the glucose:fructose ratio is less than 1.0, the use of a fructophilic yeast strain will not necessarily ensure a successful fermentation all the time. Fermentation management is fundamental.
- Attention has to be paid to other risk factors, such as proper yeast rehydration, YAN level, fermentation temperature and high potential final alcohol, in order to ensure a successful fermentation. **WBM**

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Yeast and Nutrition

A Q&A WITH JASON MABBETT

There are many different types of yeast. How do you know which one to select?

Yeast should be selected based on the grape variety and wine style you would like to create. However, there are other key factors to consider: The ethanol tolerance of the yeast strain should exceed the projected final ethanol titer of the fermentation. Nitrogen requirements should match the nutritional conditions of the juice. The temperature tolerance should be considered if uniform temperature control is a concern. Compatibility of the yeast strain with malolactic fermentation (MLF) is an important consideration if MLF is desired.

Production of specific aroma compounds is a consideration, but the ability to produce a spectrum of volatile characters is partially dependent upon composition of the juice. The aromas produced will vary, depending upon the levels of precursors present. The production and quantity of esters and thiols can also be favored through fermentation temperature profiling; this is most obvious and decisive in grapes such as Sauvignon Blanc.

There is no single "right" choice of yeast strain. In fact, for each grape variety there are many possible choices that will all make lovely wine. It is, however, important to understand the attributes of each yeast strain to ensure that you choose the one that will give the optimal fermentation profile and desired sensory characteristics you want.

How important is it to rehydrate yeast?

Extensive research shows that the yeast cell wall is very fragile during the first few minutes of rehydration. When a dessicated yeast cell rehydrates, its cell wall is swelling and the membrane is gaining back its elasticity. If rehydration is not properly carried out, the cell can leak important cellular compounds through the membrane, which is extremely permeable at the time of rehydration. As a consequence, the yeast will lose viability, and the subsequent populations will have reduced capability to undertake grape juice fermentation. Arguably the most important information yeast manufacturers provide is instructions for the correct preparation of active dry wine yeast, which is essential for optimum performance.

Can you add too much or too little yeast? Will it ruin the flavor/taste?

The amount of the inoculum influences the lag phase (the initial growth rate before rapid, exponential growth) and general fermentation speed, as well as, potentially, the flavor of the finished wine.

A small inoculum will result in a longer lag phase and more risk of contamination as the inoculated strain seeks to dominate other yeast that may be present (even after SO_2 additions). While these strains can add aroma and complexity to a wine, they can also negatively influence a wine's aroma. For example, some strains of *Kloeckera apiculata* can potentially produce up to 25 times the amount of acetic acid typically produced by *S. cerevisiae*. In addition, these native strains can also lead to longer fermentation times or, in some cases, to stuck fermentations possibly due to the production of acetic acid, octanoic and decanoic acids, or "killer" factors.

Conversely, too much yeast can speed up fermentation and can lead to early yeast autolysis (yeast death) and hence a yeasty/bread-like flavor added to the wine.

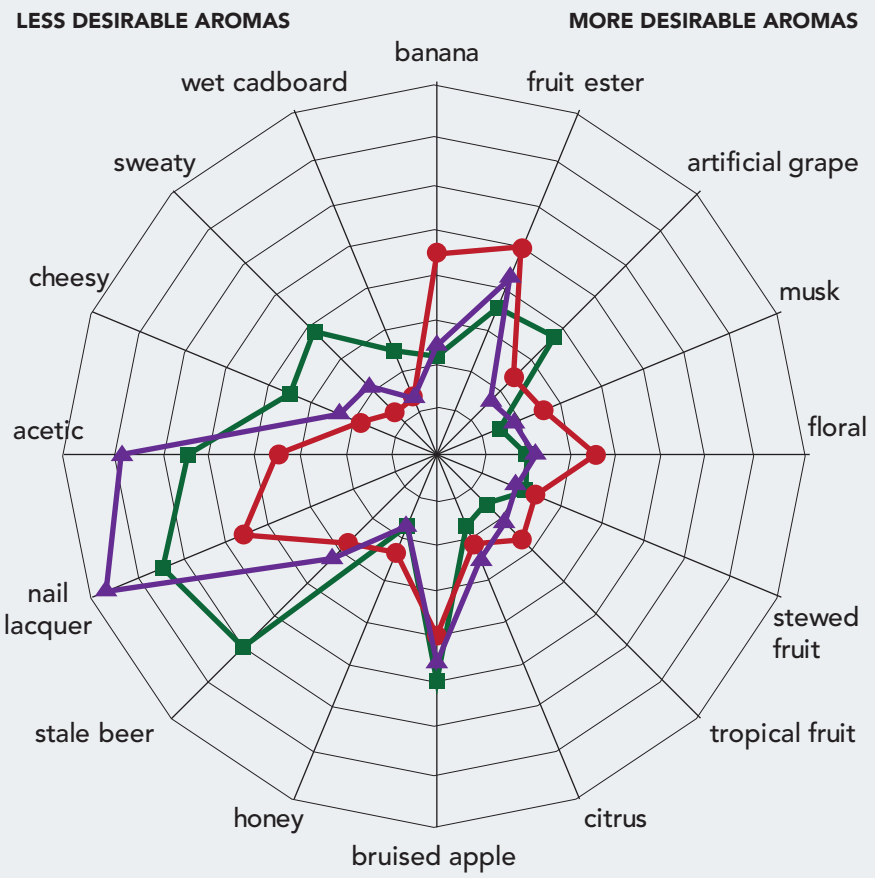
How do different nitrogen sources influence yeast fermentation performance and/or sensory characteristics?

Nitrogen comes in two forms: inorganic nitrogen, such as ammonium salts (DAP) that are added during alcoholic fermentation, and organic nitrogen such as small peptides and free amino acids—all derived from added yeast (inactive or autolysate) and from the grape juice itself. When yeast cells are inactivated, part of the cell protein are hydrolyzed and become available as small peptides and amino acids that live yeast can assimilate during fermentation. Yeast autolysates contain more YAN than inactive yeast. Yeast benefit from a mix of different nitrogen sources; the use of both organic and inorganic nitrogen is important for optimal growth and performance.

The inorganic form of nitrogen is more readily consumed by yeast, and it can be easily absorbed by yeast cells during the growth phase and even as the alcohol concentration rises during primary fermentation. Amino acids, on the other hand, require energy expenditure in order to be brought into the cell through transport proteins located on the cell membrane.

Nitrogen compounds are necessary for complete and clean-smelling ferments. Yeast assimilable nitrogen (YAN) can strongly influence production of some of the volatile metabolites, especially the acetate and ethyl esters, which are known to be positive to wine aroma when in balance. For example, in Chardonnay, the flavor and style of wine is dramatically modulated by the initial YAN concentration of the grape juice. Please see the work done by **Bell and Henscke**: *https://onlinelibrary.wiley.com/toc/17550238/11/3*.

FIGURE 3: Effect of nitrogen addition on wine aroma



Descriptive sensory analysis of Chardonnay wines made by fermentation, with *Saccharomyces cerevisiae* AWRI 796, of a grape juice containing 160 mg N/L (GREEN SQUARE) or 320 (RED DOT) or 480 mg N/L (BLUE TRIANGLE) made by supplementation with ammonium chloride (Torrea and Henschke 2004) in S-J. Bell and P.A. Henschke (2005) *Australian Journal of Grape and Wine Research* 11, 242-295; and reproduced here with permission from the *Australian Society of Viticulture and Oenology*.

Why do some fermentation nutrients have vitamins and trace elements included and how do they assist yeast performance?

ADDITIVE	PURPOSE
Biotin (Vitamin B7)	Increases viable yeast population and fermentation rate.
Magnesium	Magnesium prolongs exponential growth, resulting in increased yeast cell mass. The addition of magnesium also reduces the decline in fermentative activity as it is a critical cofactor in many stress-related transcription factors. Ultimately this results in stress-related proteins being produced, thus protecting the yeast cell and allowing it to ferment more easily.
Niacin (Vitamin B3)	Same as Biotin.
Nicotinamide (Vitamin B3)	Involved in the synthesis of nicotinamide adenine dinucleotide (NAD+), a co-enzyme that is important in maintaining the redox balance of the cell and the process of ethanol fermentation itself.
Pantothenic Acid (Vitamin B5)	Involved in the synthesis of sulfur-amino acids, such as cysteine and methionine, through the sulfate reduction sequence (SRS) pathway, which assists to reduce H_2S and volatile acidity production. Also used in the yeast production process to reduce cell wall adhesion and remove clumpiness.
Pyridoxine hydrochloride (Vitamin B6)	Involved in the synthesis of sulfur-amino acids, such as cysteine and methionine, through the SRS pathway.
Thiamine (Vitamin B1)	Increases yeast biomass and speed of fermentation.
Zinc	Zinc is a co-factor for numerous important biosynthetic and metabolic enzymes including, significantly, various glycolytic enzymes and alcohol dehydrogenase. In addition, it plays critical regulatory roles through the action of Zn finger DNA binding proteins and affects yeast-yeast flocculation. Zinc is also known to modulate yeast stress responses, mainly due to its role as a co-factor for the antioxidant enzyme superoxide dismutase.

When should the nutrient be added?

Yeast metabolize nutrients at different times throughout fermentation. Adding nutrients at the most optimal time can enhance yeast performance. As fermentation progresses and the ethanol level rises, yeast becomes less and less able to assimilate nutrients. Ethanol is inhibitory to key cell wall transporters; and if components are added after inhibition, the substrates will not be taken into the cell.

The most effective time to add key nutrients is once the *Saccharomyces* population has become dominant, generally 24 to 48 hours after the rehydrated yeast inoculum has been added. Generally, manufacturers recommend adding complex nutrients one-third of the way through fermentation in terms of sugar consumption. Inactivated yeast can be added throughout fermentation for various purposes: early additions can be beneficial for detoxification of the grape juice to make it easier for the rehydrated yeast to perform, and late additions can contribute to mouthfeel in the wine.

The goal is to keep yeast healthy and vital, so adding nutrients during the exponential phase before nutrition becomes limiting is preferred. Few nutrients are toxic; but if nutrients are added too early, nutrients could precipitate out or be adsorbed with other organic material in the must.

Can you add too much nutrient? What happens if excessive nutrients are added?

Overfeeding of fermentations can be as problematic as underfeeding as very rapid fermentation rates are likely to lead to overheating of the fermentation and loss of volatile aroma compounds. Adding excess nitrogen may lead to microbiological problems as it becomes fodder for spoilage organisms, such as *Brettanomyces*, *Acetobacter* and Lactic acid bacteria from the *Lactobacillus* and *Pediococcus* genera.

Can yeast nutrients be added for bacteria (MLF)? Why or why not?

Malolactic bacteria cannot utilize inorganic nitrogen sources. Bacteria cannot store nor synthesize all essential amino acids, so complex nutrients must be supplemented.

Newly fermented wine can often be deficient or void of nutrients due to yeast utilization. Nutritional depletion can cause sluggish or even stalled malolactic fermentations. Due to the complex nutritional requirements of malolactic bacteria and the relatively harsh medium for growth, minimizing nutritional stress is important. In addition to amino acids and peptides, which are the most influential nitrogen sources required for malolactic growth, B-complex vitamins and trace minerals are especially important. **WBM**

Just a Spoon Full of Sugar...

Sugar Measurement and Ethanol Conversion in Grape Must

Matthew Glynn

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CREATIVE WINEMAKERS ENGAGE WINE lovers by describing the charged, rotational forces that allow aroma molecules to liberate from the wine in their glass and provide sensory triggers to bring them back to a first date or a walk in a forest after a light rain. Few winemakers will speak so passionately about the most essential reaction in wine—the conversion of sugar to ethanol by the main character in the fermentation drama, *Saccharomyces cerevisiae*. The sugar concentration at the beginning of a wine fermentation has a profound impact on the balance of the final wine, and style, concentration and finesse are all related. I remain humbled by the fact that the seemingly basic topic of measuring sugar and predicting final alcohol continues to challenge very talented winemakers. This challenge is exacerbated by the increasingly high sugar levels in grapes we have seen following dynamic market trends. This article will discuss the critical aspects of sugar measurement, review the principles of sugar conversion to ethanol and discuss sources of variation affecting final alcohol in wines.

Methods of Sugar Measurement

Sugar content in grapes is determined by indirect or direct methods. Indirect methods to determine the total soluble solids (TSS) include refractometry and hydrometery. These methods measure juice density and correlate that density to an index (Brix, Baumé, Œchslé, etc.). Indirect measures are simple and cost-effective but not perfect indicators of sugar concentrations in many cases. Non-fermenting constituents in juice (i.e., pectins, tannins, etc.) refract light in a similar fashion to glucose and fructose, and can artifactually increase the refractive measurements. The correlation of juice density to degree Brix is also imperfect due to compounds that influence the juice density but are non-fermentable. Brix is most closely aligned with the concentration of sugar at 18° Brix, and Brix values below that level over-represent the sugar concentration. Brix values above 18° become increasingly inaccurate by under-representing the concentration of fermentable sugars. Direct methods measure the amount of glucose and fructose in the juice and report the concentration in grams sugar per liter (g/L). Direct methods can be more expensive and time-consuming and at the same time more accurate and precise. **FIGURE 1** displays a set of relationships between Brix and sugar concentration.

FIGURE 1

Brix	Sugar Concentration g/L	
14.0	136.0	Brix over-represents sugar concentration
18.0	180.5	Brix most closely represents sugar concentration
22.1	226.4	Brix under-represents sugar concentration
26.6	273.2	
29.9	308.8	

Sampling Considerations

A must sample that accurately reflects the concentration of sugar in the tank is critical to predicting the final ethanol concentration in the subsequent wine. A sample needs to represent all of the fruit in the tank, and the sugar from the berries must be in solution to be quantified in the analytical measurement. If the grapes in a fermentation tank are uniform in condition and maturity (with no signs of desiccation), a simple tank valve sample or crushed grape sample may be adequate. More often than not, the grapes are variable due to vine orientation, soil variability or vine health. Additionally, as grapes become dimpled or raisined, sugar crystalizes in the folds of the berry skin and needs to go into solution to be measured. For this reason, I have found a combination of techniques to be most effective to determine the actual sugar concentration. Collecting clusters from each of the harvest bins and using a blender to solubilize the sugar are effective. Keeping the tank cold and anaerobically mixing once a day for several days, a common practice during cold soak, have the additional benefits of dissolving sugar. In warm climates with dimpled and raisined fruit (by accident or intention), the measured sugar level of the juice in the tank can rise for four days before the onset of fermentation. After a representative sample is collected, the sugar level can be determined with a direct or indirect method.

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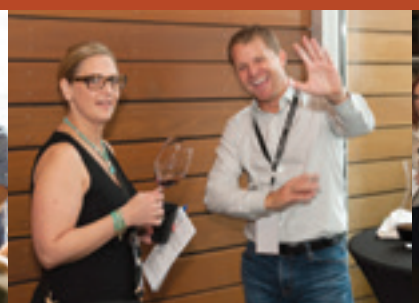


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"Saccharomyces cerevisiae…has a profound impact on the balance of the final wine, and style, concentration and finesse are all related."

Conversion of Sugar to Ethanol

Yeast metabolize glucose and fructose to produce ethanol and carbon dioxide. As displayed in **FIGURE 2**, one molecule of glucose will yield two molecules each of both ethanol and carbon dioxide. The theoretical yield (from 100 percent conversion—not what actually happens) is that 180 grams will produce 92 grams of ethanol and 88 grams of carbon dioxide.

FIGURE 2

Glucose >>	Ethanol +	Carbon Dioxide
$C_6H_{12}0_6$ >>	2 C_2H_5OH +	2 CO_2
180 g	92 g	88 g
100 g	51 g	49 g
100%	51%	49%

In reality, there is a small percentage of sugar that is converted to yeast cell material and miscellaneous end products—the balance is converted to alcohol and CO_2. Two ways to describe the rate of conversion are: 1) as a mass of sugar required to generate 1% alcohol v/v (i.e., 16.83 g/L sugar per 1% v/v); and 2) as a percent alcohol generated per unit of a density index (i.e., 0.59% alcohol per °Brix). A study by **Lallemand Inc.** measured the conversion rates of 56 wine yeast strains and found the range of conversion to be 17.2 to 16.5 grams per liter sugar per 1% v/v ethanol. These values correlate to approximately 0.581% to 0.606% alcohol per °Brix. The **European Economic Community** (EEC) has agreed on a conversion rate of 16.83 g/L sugar per 1% v/v, which correlates to ~0.594% alcohol per °Brix. Not coincidentally, the EEC value is very close to the midpoint of the range identified by the Lallemand study. The EEC conversion rate is useful to estimate final alcohol in a wine fermentation; however, there are several variables that influence the alcohol level in the wine when the fermentation is complete.

Variables Influencing the Final Alcohol in Wine

There are several factors that influence the alcohol level in a wine at the end of the fermentation—these include: yeast strain, fermentor geometry, fermentation temperature, mixing techniques and accuracy of the estimated sugar concentration in the must. Yeast strains have different conversion rates. I have found that the conversion rate for a particular strain is generally consistent from year to year. This has been true for native fermentations, which I have used extensively, and with commercial yeast strains. Beyond yeast, the volatility of ethanol results in evaporative loss from fermentations, and this evaporation can be influenced by several factors. The geometry of the tank can influence the ethanol evaporation rate due to exposed headspace to the air (open-top fermentation tanks allow the release of more alcohol during a fermentation than closed-top tanks) and because surface to volume ratio is positively correlated to ethanol evaporation (short, wide tanks have more exposed surface and allow a greater amount of alcohol to evaporate than fermentations in tall thin tanks.)

Temperature also will impact alcohol evaporation. Hot ferments will release more alcohol than cool ferments. Furthermore, mixing techniques during fermentation will influence how much alcohol evaporates. An internal circulation (rack to bottom or rack to under the cap) leaves less opportunity for alcohol evaporation compared to the splashing over the top of an open-top fermentor or an aerative pumpover using a sump and an aerating wine fountain. Finally, error in the initial sugar estimation will influence the final alcohol level. It is common for the initial sugar measurement to under-represent all of the sugar in the tank, resulting in a higher final alcohol than expected. It is easy to think that the yeast performed a remarkably high sugar to alcohol conversion, but it is more common that trapped sugars (not initially measured) are liberated from the berries and ferment, surprising the winemaker when the alcohol level rises beyond expectations. When all of these factors are combined, it is clear that final alcohol levels may vary significantly from the original estimated levels. Fortunately, there are approaches that winemakers can use to refine their estimates of final wine alcohol and help them create the wine of their preference.

A Summary of Effective Techniques

Despite all the variables, many winemakers are able to accurately measure the sugar concentation in their grape must and manage the parameters that can influence the final alcohol level in their wine. Ensure that the tank sample represents any variability of the fruit that filled the tank and use methods that accurately measure the sugar level in the must sample. Consider the fermentation yeast selection (native or commercial) when planning your fermentation. Finally, acknowledge that winemaker choices, including tank, fermentation temperature and mixing technique, all influence the alcohol level of the wine at the end of fermentation. Keep notes from each vintage to allow continued learning. **WBM**

Barrels for Pinot Noir: It's Complicated

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.

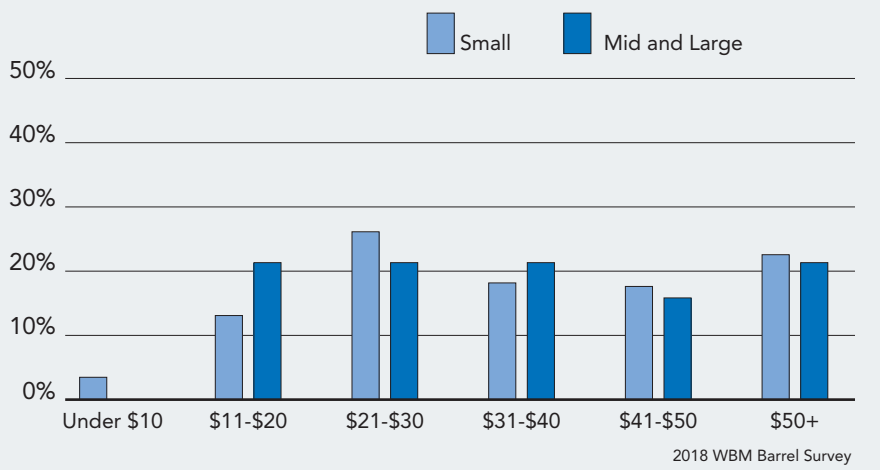
I'VE BEEN MAKING PINOT NOIR for a long time and I'm pretty comfortable with my winemaking style. I guess I should re-phrase: I'm pretty comfortable with my winemaking *styles* for Pinot Noir. It has been my experience that Pinot Noir is one of the most mercurial of winegrape varieties. I think that it is a mistake to treat Pinot Noir from Santa Maria, Philo, McMinnville or Otago as if it were from Lodi or Carneros. It is important to remember that the reverse is also true.

Wine Business Monthly asked several questions regarding barrel usage in the production of Pinot Noir in our recent Barrel Survey in order to establish something of a baseline for a discussion about the subject. I'll give a quick synopsis of the results below, but I did want to mention that for a few of the responses the survey answers can be a bit misleading. In particular, the question regarding the percentage of new barrels used each vintage for Pinot Noir, insofar as the survey, returned an average response of 30 percent. Thirty percent new barrels is just about the percentage I would probably use for Pinot Noir from Oregon or Anderson Valley, CA. When I went back into the data, however, I found that essentially none of the responses coincided with this and, as most other winemakers would probably suspect, merely represents the mean of a very wide spread.

It's merely a coincidence that the average (mean) response we received in the survey happened to align with my own winemaking preferences.

CHART 1

What is the price point for your most popular Pinot Noir barrel? by size



Pinot Noir Price Points

I asked about the price point of the most "popular" Pinot Noir made by each respondent. This wasn't intended to be any sort of pricing survey, but rather I was looking to get a feel for the pricing distribution for the main, or most popular, segment of the Pinot Noir market. The responses were spread out almost evenly from the $21 to $30 segment up to the more than $50 segment (CHART 1). The spread is a little wider if mid-sized and larger wineries are taken by themselves, as they are as likely to answer that their most popular Pinot Noir is priced somewhere between $11 and $20, as they are the high price segments.

The reason I'm noting this is to point out that, for most wineries, their most popular Pinot Noir is sold to a segment of the wine market that lies above the usual popular brand (AKA fighting varietals) and at the upper end of the "premium" wine segment. This means that, for the most part, the price point is high enough on these Pinot Noir SKUs that a traditional *élevage* should be possible.

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Micro-Oxygenation and Pinot Noir

We asked about micro-oxygenation (MOX) simply because I am curious about the adoption and use of the technology. In previous surveys, we have found that relatively few wineries use micro-oxygenation, and those that do are primarily, but not exclusively, mid-sized to large wineries. Among our respondents, only 5 percent of small wineries and 16 percent of mid-sized to large wineries noted that they use MOX on their Pinot Noir.

I have not used micro-oxygenation for Pinot Noir myself, but that is more a matter of lack of opportunity and infrastructure than lack of desire should the circumstances call for its use. I'm agnostic toward any winemaking technique. If it yields better results, then I want to use it no matter how old-fashioned or new-fangled a technique it is.

Élevage

I usually use the term *élevage* for linguistic efficiency's sake more than anything else, although I do like the sound of the word as well, even if it makes me seem a bit precious or pretentious for using it. For me, the English equivalents of *élevage* don't really convey the same ideas without becoming longwinded and cumbersome. I used to suppose the workaday phrase "barrel aging" did an adequate job of translating *élevage* until I was asked just how I aged my barrels before using them.

"Wine aging in barrels" is therefore our preferred alternative.

Despite being four times as many words, "wine aging in barrels" or "aging wine in barrels" fails to convey part of the meaning of *élevage.* Outside of winemaking, *élevage* means "breeding" with the connotation of raising, as in breeding or, more properly, raising livestock. One can see how, in an agrarian society, the notion of "breeding livestock" could be stretched to include "breeding or *raising* wine." Were we to cast about for a term to use today, we would probably choose something similar to "managing," rather than "breeding," as farm terms are less current.

In the Anglophone wine-world, *élevage* has been given a fairly specific meaning: the "aging wine in barrels" we see above. This is just one element of the winemaking that takes place in the French meaning of the word. I think that *élevage* should carry a broader connotation and refer to pretty much anything the winemaker does between pressing grapes and building the blend prior to bottling the wine, including, but not limited to, any aging of the wine in barrels that may occur. Of course, I don't think many people agree with me and prefer the more limited meaning.

We did ask the survey respondents if they aged their "most popular" Pinot Noir in barrels, to which 11 percent of the respondents from small wineries, and just one respondent from a winery producing more than 50,000 cases per year, replied that they did not. MOX plays into this less than one might suppose. Only a single respondent, who was from a mid-sized winery, replied that they do use MOX with their Pinot Noir but don't age in barrels.

New Wine in New Barrels

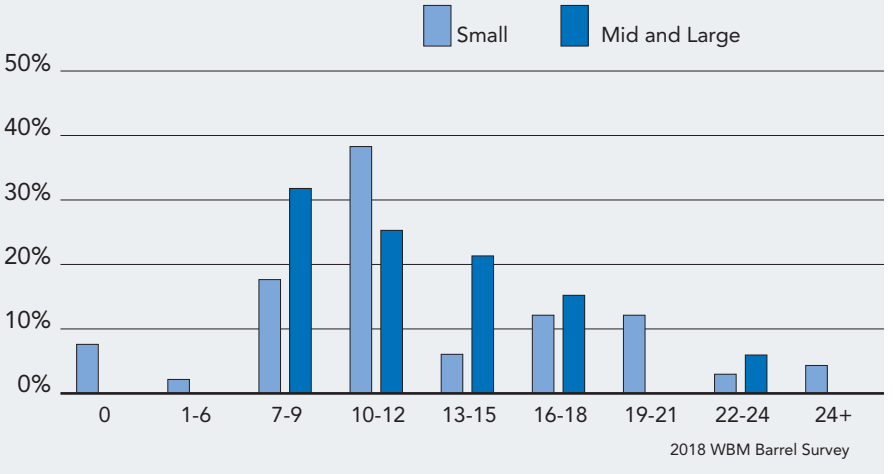
According to **Mark Twain,** there are "lies, damn lies and statistics." According to our survey, there are around 31 percent of new barrels used for each vintage. Of course, despite aligning well with my own Pinot Noir style, this is just the mean average of the responses, and few (if any) of the respondents actually use only 30 percent new oak. Instead, data behind the statistic shows that there is little or no consensus about a "correct" amount of new barrels to use with a Pinot Noir, unless origin and target price point are taken into account—and perhaps not even then.

Time in Barrels

The average time the largest percentage (36 percent, chart not shown) of Pinot Noirs spend in barrels is somewhere between 10 and 12 months. About one-third of mid-sized and large wineries, 32 percent, (CHART 2) start racking out of barrels as early as seven months after barreling-down. But as we can see from the same chart, there are almost as many large and mid-sized wineries that leave their Pinot Noir in barrel for 10 to 12 months or 13 to 15 months. A slightly higher percentage of small wineries (38 percent) keep their Pinot Noir in barrel for that length of time.

CHART 2

How many months does your Pinot Noir remain in barrel? by size



Each Pinot Noir is Unique

Part of the reason that there is such a wide spread in the responses regarding Pinot Noir is that there is not only no overarching single style that is appropriate for all Pinot Noirs, but many winemakers seem to end up treating each lot of Pinot Noir differently. **Florent-Pierre Merlier**, winemaker for **Van Duzer Vineyards** in Oregon, reminded me that every Pinot Noir needs to be taken on its own terms, and it is the winemaker's duty to remain attentive to any differences in the Pinot Noirs they receive and respond accordingly.

"Based on the personality of each single block/lot of Pinot Noir we are producing at Van Duzer Vineyards, we specifically and solely select French oak barrels based on the forest, the tightness of the grain and the toast. This allows us to frame the wine and guide it to an ultimate degree of precision. At the end of alcoholic fermentation, after 48 to 72 hours of settling time, the wine is then racked to barrels where it will age for nine to 18 months. Closer to bottling, we 'bulldog' [rack out of barrels using nitrogen] the wine and pay extreme attention during this racking to prevent any upkeep in dissolved Oxygen that may ruin all the previous efforts."

This takes experience. Not just generally, but also experience with the individual vineyards over multiple vintages. **Zach Long**, winemaker for **Kunde Family Winery,** provided an insight into how he approached instituting Pinot Noir as a new facet of his winemaking at Kunde.

"We barreled down the last week of October, racked off heavy lees in tank and put to 20 percent new **Damy** barrels and undergo malolactic fermentation (MLF) in the caves. We went a little lighter on the oak percent-wise, just so I could get a sense of the fruit that first year. We did inoculate ML just to be safe, although we rarely do that on our other reds. Aged and stirred once a month after MLF completed for 13 months on full lees, then first racking to come off the barrel lees and back to barrel for the final two months of aging very clean."

Pinot Noir Iconoclasm

I've been making Pinot Noir for all of my winemaking career, in multiple regions. All I've learned is that, despite my experience, I don't really know that much. I have several personal preferences that seem at odds to the way other winemakers treat Pinot Noir.

For most of my Pinot Noir, I tend to prefer larger cooperage, 70-gallon hogsheads and 120-gallon to 180-gallon puncheons. For Pinot Noirs from the Anderson Valley, Oregon and Otago, I like Eastern European, and especially Hungarian, oak. However, this may just be another way of saying that I prefer *Quercus petraea* over *Q. robur*. I like wood that has been aged longer than is the norm (24 months), for around 36 to 48 months in the staveyard prior to being raised into barrels. I like heavier toast levels and use a combination of MT+ and HT barrels, but will also use "ML" (Medium Long) or deep-toasted barrels if I can get them in the larger formats. This may just mean that I prefer lower levels of whisky-lactones, something that may also explain my apparent preference for *Q. petraea* as noted above.

I tend to use a fairly low number of new barrels, generally somewhere between 10 and 30 percent if the winery's stock of sound-used cooperage is sufficient to that need. If I don't have enough used or neutral barrels, I would rather buy new barrels and increase the toast levels to compensate for the higher percentage of new barrels.

For Oregon, I tend to keep my Pinot Noir in barrel longer. This may simply be a function of the specific vineyards with which I have worked.

For Pinot Noirs from Carneros, I tend to work at a faster tempo, with an *élevage* of just under a year so that I'm racking out of barrel just before the next crush. I use almost no new oak except for needed barrel replacements since I think Pinot Noir from these locations shows better if one emphasizes the fruit, and avoids anything but the slightest hint of oak, particularly since I seem to always end up working with fruit from vineyards in these regions that have a lot of upright clone (AKA GB clone PN).

For Pinot Noirs from Lodi, I end up working at an even faster tempo than for Carneros, but the reasons are a combination of warmer cellar temperatures and logistic requirements for larger wine companies. The wines ended up OK, but still seem a bit unfinished. I would have used MOX if the clients had been willing to install the equipment. I have a program that works for me, but it is likely that a combination of a cooler cellar and larger cooperage could mean that a Lodi Pinot Noir would be best when aged somewhere between 13 and 15 months instead of my breakneck seven months.

Coincidences aside, this year's *WBM* Barrel Survey demonstrates that there is really little or no consensus as to the "correct" way to make Pinot Noir. I find that few of the winemakers surveyed approach Pinot Noir the same way that I do. I'm comfortable with my iconoclasm, if only because I see my winemaking as a differentiator as much as the way that seems to work best for me. **WBM**

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Winemaker Trial

What are the Sensory Impacts to Sauvignon Blanc Following a Stimulated Thiol Release?

The winemaker at Scheid Family Wines and its associated brands was investigating ways to improve or add sensory styles to the Sauvignon Blanc blend customarily used, particularly to move to more tropical notes from the familiar grassy and herbaceous style.

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.

WINERY: Scheid Family Wines/ROC

WINEMAKER: Casey DiCesare

OBJECTIVE: To evaluate the effect of the nutritional product on the release of thiol aroma molecules in Sauvignon Blanc wine and to determine the overall sensory impacts.

SUMMARY: Fruit was brought in from the vineyard and pressed with rice hulls into a holding tank. A pectinase was added to the pressed juice, along with a dose of bentonite and SO_2 at 50 ppm.
The juice chemistry was as follows;

- Brix - 20.3°
- TA - 0.73
- pH - 3.32
- NH3 - 81
- NOPA - 168
- K - 930
- VA – 0.004
- Malate - 3.78

The juice was inoculated with *Saccharomyces cerevisiae* strain VL3 at 2 pounds per 1,000 gallons. The juice was then allocated into similar vessels for fermentation. The treated tank fermented significantly faster than the control and was dry in 15 days while the control took 34 days. The fermenting juice was racked to kegs at 7° and 9° Brix, respectively, to finish fermentation.

Lot 1: Control - No nutritional supplement
Lot 2: Treated with nutritional supplement

ANALYSIS	LOT 1	LOT 2	UNITS
free sulfur dioxide	9	8	mg/L
molecular sulfur dioxide	0.26	0.23	mg/L
total sulfur dioxide	70	46	mg/L
titratable acidity	6.8	6.9	g/L
pH	3.33	3.34	
volatile acidity(acetic)	0.35	0.31	g/L
glucose + fructose	1.5	0.3	g/L
ethanol at 20° C	12.12	12.41	% vol
ethanol at 60° F	12.08	12.37	% vol

CONCLUSION: Samples of the finished wines were sent to a commercial laboratory for quantitative analysis of the thiol aroma molecules 4-MMP, 3-MH and 3-MHA. 4-MMP is responsible for the grassy, boxwood, herbaceous character in Sauvignon Blanc wines. 3-MH and 3-MHA are responsible for the aromas of tropical fruits, such as passionfruit and grapefruit. 4-MMP was non-detectible in the samples for unknown reasons. 3-MH and 3-MHA were elevated by 68.5 percent and 64.4 percent respectively in the treated wine compared to the control wine. Fermentation esters, including isomyl acetate, hexyl-ethanoate, decyl-ethanoate and butyl-ethanoate, were insignificantly different, although isoamyl acetate was elevated. Sensory evaluation of the wines was carried out by the winemaking staff in blind tastings. There were sensory differences detected, with the control wine preferred by five of seven tasters. Sensory notes from the control wine included tropical, citrus, guava, floral, flint and green apple. Sensory notes from the supplement treated wine included thiol, gooseberry, grassy, passionfruit and tropical.

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What are the Sensory Impacts to Sauvignon Blanc Following a Stimulated Thiol Release?

CASEY DICESARE, WINEMAKER SCHEID FAMILY WINES

Casey DiCesare went to the University of California, Los Angeles where he competed in track and field. He placed in multiple conference championship meets in the decathlon and pole vault and was ranked in the top 25 among amateurs and professionals in the USA. He majored in political science but was looking for a path that inspired more passion in him. "Fortunately, the family of one of my teammates owned a winery in Paso Robles named Cinquain Cellars. I began helping around the winery on weekends and soon was hooked on wine," he said.

Later DiCesare went on to complete a master's in enology from Cornell University in the Finger Lakes AVA, under advisor Dr. Gavin Sacks. He returned to California in January 2017 and took a job at Scheid Family Wines as assistant winemaker/enologist. At SFW, his responsibilities include designing and executing all experimental wine trials (of which there are many), implementing and assessing new lab procedures, doing final checks on the wines before bottling and working with the bottling team to have the wines ready to bottle.

Winemaker's Postmortem

What led to the creation of this trial?

DiCesare: "We were just wanting to see how we could improve our Sauvignon Blanc. We were looking to see if we could include some tropical notes and add some different complexity to blending. We actually started a few different trials this harvest with Sauvignon Blanc; and when **Peter Salamone**, the CEO of the **Research Oenovation Collective**[1] (*www.rocwine.org*) approached us with this trial, it actually coincided really well with other things we were doing, both in farming and in the winery. There are a few companies that make different yeasts out of lysates to help yeasts steer themselves towards making more of those tropical aromas. This just fit along well with all the other trials we were conducting."

Was the control the way you have customarily been making Sauvignon Blanc?

DiCesare: "Yeah, exactly. We have a big receiving tank of Sauvignon Blanc juice, and we put that into five different 6,000-gallon tanks. We dedicated one of those as the control with which we performed our standard winemaking. The temperature was around 50° F, and we inoculated it with VL3 yeast then let it go to dryness. The only other difference would be the Stimula Sauvignon Blanc, which we used at on the onset of fermentation, so we knew we were feeding our yeasts. We added the 40 grams per liter of the Stimula Sauvignon Blanc."

How much fruit was ultimately involved?

DiCesare: "We ended up with two 6,000-gallon tanks per lot, which is a fairly decent amount of fruit."

Considering the size of these lots, isn't that a large investment to risk on an experimental trial?

DiCesare: "For us, we produce a large amount of wine overall, and we had a good idea that it wouldn't negatively impact the wine. It definitely was an investment, but one cool thing about Scheid is that we're willing to take little risks to be able to offer continued improvement and innovation."

During the trial, were there any problems that had to be addressed and how did you attend to them?

DiCesare: "The initial inoculation went well. Fermentation took a couple of weeks, and fermentation curves were very similar within both. We really didn't run any real issues. Partway through the fermentation, however, due to the limitations of available tank space, we racked off into kegs to finish fermentation. That was just tank logistics at the time. But even with that, both fermentations went well."

The Scheid staff preferred the control lot. At the 2019 WiVi trial demo the attendees preferred the Stimula-added lot. What does that tell you about the blend that will go to the public?

DiCesare: "Even though there was a preference, there was a difference. We found a difference in terms of style, so it is a tool that we can use if we want to stylistically shift a wine to be a little bit more tropical. I think, in general, our winery makes awesome Sauvignon Blanc, and we enjoy our control the way we make it. I think that might have some influence in terms of our initial sensory. For our staff, the control is what they were used to.

"With the attendees, I think there's a bit of a bias when a wine has something 'added to it,' like the nutrition supplement lot. It makes it feel like maybe that's more special. It wasn't the best in terms of hard-core sensory data, but I think there was a slight preference. I think people liked that slightly more tropical aroma that they got out of the Stimula Sauvignon Blanc." **WBM**

Reference

[1] The ROC (*www.rocwine.org*) coordinates industry resources on a platform for applied research to drive wine aesthetic, production efficiency and resource sustainability through a winemaker-driven agenda. ROC fills a gap in wine industry research by providing an unbiased applied research function that bridges discovery and application while integrating oenovation in both tools and processes.

Cork Quality Council Reveals Results of Annual Natural Cork Audit

The CQC releases its latest data in cork-taint screening

Stacy Briscoe

Stacy Briscoe joined *Wine Business Monthly* in 2018. She has been writing about wine professionally since 2015, freelancing for multiple publications including The *San Francisco Chronicle*, *Edible Communities* and *Napa Sonoma Magazine*, among others. She also maintains her own website, *BriscoeBites.com*, dedicated to wine reviews and tasting notes. Outside of wine writing, she also contributes as a freelance editor for the independent publisher She Writes Press. Stacy has a Bachelor of Arts degree in English-Language Literature from the University of California, Santa Cruz.

THE CALIFORNIA-BASED CORK QUALITY Council (CQC) conducts annual audits on thousands of corks, ensuring all quality control protocols in cork production are observed. One of the most important: screening for 2,4,6-trichloroanisole, or TCA. The screening process utilizes an analytical method developed by **ETS Laboratories** in St. Helena, CA.

According to the CQC guidelines, the process requires members to send a minimum of 250 corks taken from at least five separate bales. Corks are placed in 50-cork wine soaks for 24 hours to extract releasable TCA. ETS then analyzes these soaks and reports TCA at concentration as low as 1 part per trillion (ppt). If results of any one of the five soaks includes TCA as high as 1.5 ppt, the entire lot is flagged and removed from inventory.

In 2018, the CQC conducted more than 30,000 analyses. Results show that instances of cork taint continue to decline and that, overall, measurable TCA levels are now 97 percent lower than when the organization began this process back in 2001.

In the last reporting period, for the three months ending Dec. 31, 2018, 95 percent of all samples tested below 1 ppt. An additional 3 percent had results between 1 and 2 ppt, which meant those natural cork lots were rejected by the CQC.

"We developed this technology 20 years ago," said **Peter Weber**, executive director of the CQC. "But we update our data every quarter so wineries know we're continuing to find improvement." Weber said that when the CQC,

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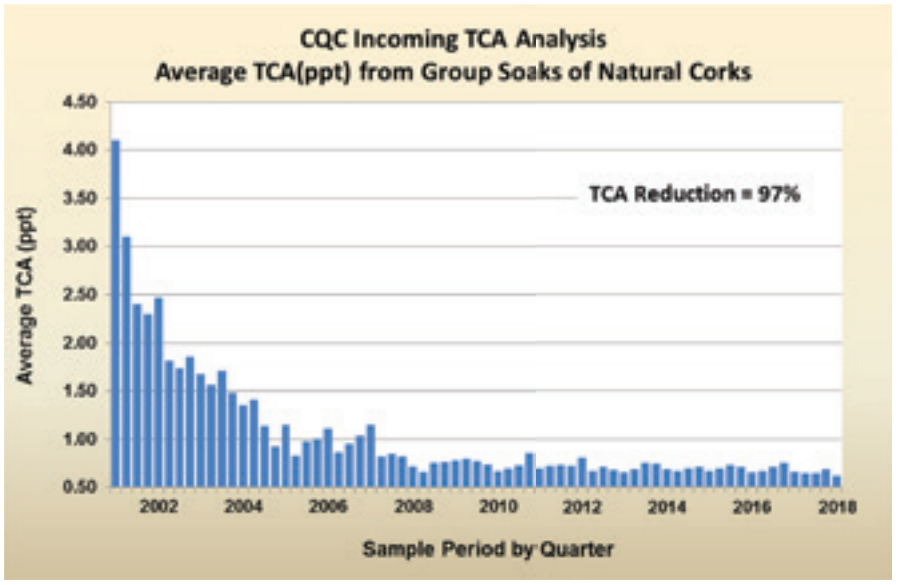
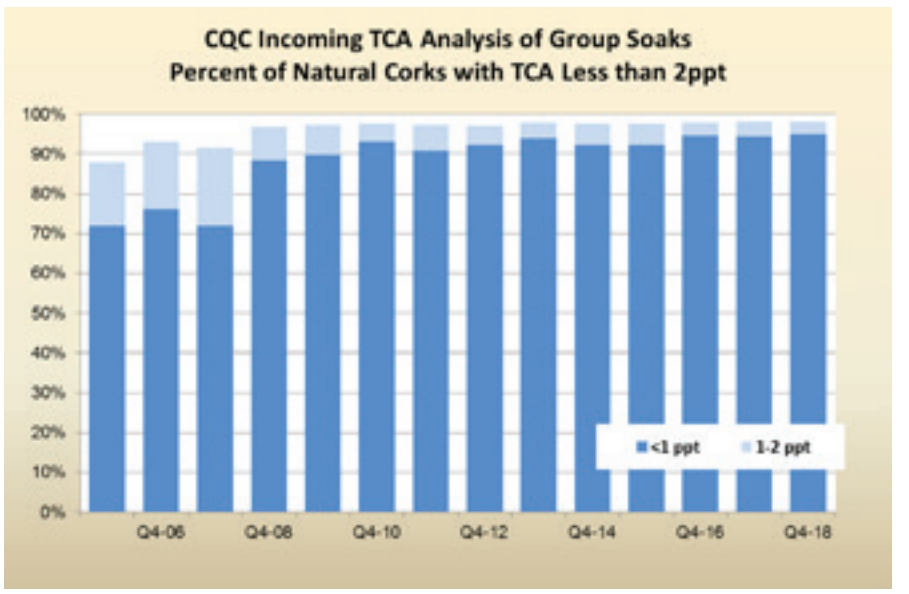
Cork Quality Council Reveals Results of Annual Natural Cork Audit





SOURCE: CORK QUALITY COUNCIL

in partnership with ETS, began the rigorous TCA testing back in 2001, a significant amount of TCA was found. Today, Weber said, nearly 90 percent of the corks tested come back with TCA levels that are "functionally zero."

"We routinely run extended testing of a sample of our screening tests to get a picture of what is the nature of scores less than 1 ppt," explained Weber. "In those extended tests, we get reports as low as 0.5 ppt. Currently, our testing shows that 90 percent of scores of less than 1.0 ppt were also less than 0.5 ppt."

The CQC treats results below 0.5 ppt (results labeled as "undetectable") as 0.5ppt for statistical purposes. With this assumption, the records cannot improve below 0.5ppt. "We can only report down to, but not less than, half a nanogram," explained Weber. "When we slow the machine way down, we can see these numbers are technically below 0.5ppt, but it's hard to put an exact number on it." Though these results "could" be marked as zero, Weber said that would be presumptuous and, technically, inaccurate. "I don't think it's a concern because we don't believe that TCA scores at that level are associated with any problems in wine," Weber added.

Weber calls these audits an important step in the improvement in cork production over the past 20 years and said "the issue" seems to be "well taken care of." "But we remain vigilant," he said. "The cornerstone of the CQC is to make sure that cork taint will never be a problem again." **WBM**

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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To Till or Not to Till?

The trend in modern viticulture is towards less tillage. But could it be detrimental to vineyards?

Mark Greenspan

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

I RECENTLY ATTENDED A tour of some vineyards in central Spain, hosted by **Lallemand,** to introduce some international viticulturists and winemakers to their LalVigne product, which acts to stimulate ripening processes in the grape. I will talk about their product, as well as some others, in another column. I had been to Spain a few times before this recent visit but was struck by the vineyards in the La Mancha region, which were rather extensive plantings of very low, head-trained (AKA bush) vines, widely-spaced and whose vineyard floor had been completely denuded of any other vegetation besides the vines themselves. This practice has been traditional in the region, which receives about 20 inches of rainfall annually and whose soils are very shallow and rocky. Because the soil overlies limestone, roots go down to only about 30 inches in depth or less.

Nevertheless, they do have irrigation available in the La Mancha region, and some vineyards there are experimenting with cover crops in order to build their soils, which otherwise tend to look like barren wastelands. Here in California, it is becoming more and more uncommon to witness vineyard floors with such a "scorched earth" appearance. Growers have been employing cover crops, either by sowing a blend of grasses, legumes or insectary flowers, or by allowing the "native" vegetation to grow during the winter and managing it during the growing season. The current trend has been to reduce or eliminate tillage from the row middles (i.e., tractor row). But is leaving the cover crop in the tractor row a source of competition for the vines and could it be more detrimental than it is beneficial? The answer is, of course, "it depends."

If Spanish traditionalists are trying cover crops in regions they never have before, perhaps there is a reason. As you can see from the photo, the soil in that bush vine vineyard looks more like a pile of dead rocks than it does actual soil, but fine winegrape vineyards don't really want fertile soil, do they? Again, it depends.

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What Do Cover Crops Do for Us?

Soil is an ecosystem with a mineral phase, a water phase, a gas phase and a biological phase. The biological phase includes soil-borne macrobiota: worms, insects, nematodes, mollusks, plant roots, etc.; and microbiota: bacteria and fungi of countless different genera and species. While some of the biota are potentially harmful to grapevine roots (e.g., some nematode species, grape phylloxera, some pathogenic bacteria and fungi), most, if not all, are part of an interwoven subterranean ecosystem. The soil biota help to cycle nutrients, thereby improving the efficiency of cropped systems by cycling biomass into useful minerals for our crops. Dead plant parts function as a source of energy for much of the soil organisms, large and small. So, when we prevent vegetation, a component of our biological system, from growing, usually through cultivation or herbicide applications, we eliminate the primary food source for the biological organisms in the soil. This not only increases our dependence on chemical fertilizers, it potentially creates waste as the soil nutrient-holding capacity of the soil is benefited by the ability of soil microbes to convert fertilizers into usable forms for plants, as well as to lock some up for temporary storage into organic forms.

In other words, a lack of plants (other than grapevines) is potentially very dangerous for a vineyard and is generally undesirable for a sustainable vineyard system.

An extensive research study was published in 2003[1], where a vineyard was analyzed after 17 years of treatments that included a permanent fescue cover crop in tractor rows, herbicide-treated tractor rows and alternate-row herbicide treatments (none was tilled). There was a distinct and significant elevation in soil organic matter in soil under permanent sod, but the difference was only seen in the upper 8 inches. Nitrogen content was also higher in the upper 8 inches of soil while potassium content was higher, down to 18 inches under the cover-cropped treatment. Soil under permanent cover crop also had higher water-holding capacity and greater friability down to 18 inches and a lower bulk density (hence less compaction) down to 8 inches. While no soil microbiological assessments were made (this study was done before PCR laboratory methodologies were as widespread as they are now), the higher soil organic matter and generally better soil conditions would most likely promote a more active and potentially diverse soil microbiota.

MARK GREENSPAN

Roots of a bell bean plant showing the nitrogen-fixing nodules.

Mind you, the benefits were mostly seen in the upper levels of soil, which are where most of the microbial activity and nutrient cycling occur. Though not explicitly stated, cover crops will aid in water infiltration and reduce runoff and erosion. Grass cover crops, such as the one studied in the 2003 paper, are high biomass producers, with dense but shallow root systems. Some native perennial grasses have deeper root systems,

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and we've seen them as deep as 4 feet in some places. But those grasses are intensely competitive and are not generally good companions for grapes, except possibly under the soggiest, most vigor-inducing soil conditions.

While grasses have a benefit as a cover crop, broadleaf plants also have their place. Legumes (e.g., beans, peas, vetch, clover) form a symbiosis with certain bacteria, and can capture nitrogen from the atmosphere and "fix" it in a mineral form that can serve as a nutrient for the crop. There is a place for legumes in all but very vigorous vineyards. The nitrogen fixed by legumes is not immediately available but is slowly released as the vegetation decomposes, which creates a slow and steady available nitrogen source for the vines. Besides legumes, many growers like to plant mustards and other brassicas, which have showy flowers in the spring and some tendency, though not a very strong one, to repel nematodes. Yet another use for cover crops is for insectaries, and they are usually planted only in a small percentage of rows for that purpose.

What is the Downside to Cover Crops?

The 2003 study I've referred to demonstrated a strong competitiveness of the grass cover crop for the grape roots. Grape roots were found to be far less abundant wherever the grape roots proliferated. That means, in the case of the cover crop, there were much fewer grape roots in the tractor row down to about 2 feet in depth. Below that depth, a reduction in grape roots was not observed. On the other hand, there were more grape roots found under the vines in the cover-cropped treatment than in the sprayed treatment, though again the differences were not evident below about 2 feet in depth. So, clearly, the grass cover crop roots presented a source of competition against the grape roots and caused the vine roots to grow differently based on the grass competition.

Grasses will compete against other species for nutrients and water, but much of their competitiveness comes through allelopathy, wherein the grass roots exude chemicals that are toxic to other plants. This is why it is generally quite undesirable to grow grass cover crops under vine rows. But can this effect be undesirable for cover crops grown only in tractor rows and not under vines? Again, I fall back on "it depends."

I've been involved with a study in Sonoma County that compares cover-cropped to tilled treatments, similar to the 2003 study, but with tillage instead of herbicides and with a much shorter time of study. One of the measurements includes soil moisture profiles measured in the vine rows in the treatment plots. Because I am serving as an advisor and analyst on the project and am not the principal investigator on it, I will refrain from presenting any data from the study (and also because the study is ongoing). However, early indications are that the cover-cropped versus tilled treatments did not show any differences in the rate of moisture draw-down by the vines, at least when measured under the vine rows.

Anecdotally, others who have conducted similar trials have seen little, if any, differences in water consumption under tilled versus non-tilled treatments. This is somewhat perplexing since we would expect a transpiring cover crop to extract more moisture from the soil than a tilled soil, as a tilled

soil may dry out in the upper few inches, but the disturbed soil will tend to inhibit evaporation otherwise. I suspect that we and others may have seen a difference in moisture draw-down in the tractor rows under cover crop versus tillage, but it is not practical to maintain soil moisture devices in the tractor rows.

That said, I most certainly believe that a cover crop will compete with vines, both for water and through an allelopathic interaction (for grasses). While cover crops will tie up nutrients, the long-lasting effect is not a nutrient competition because nutrients are eventually released as the vegetation decomposes, which is what cover crops eventually do. As for water competition, keeping cover crops mowed will reduce the transpirational surface area and, hence, reduce their water competitiveness. And on the contrary, leaving them high will help to extract moisture from the soil, which can be a good tool for wet spring conditions (and wet summer conditions in regions that receive summer rainfall). But as we've seen in our limited trial work, the competition is not great under well-managed conditions (i.e., a mowed cover crop with weeds controlled in the vine rows).

Where might cover crops be undesirable? Truthfully, they will probably be beneficial in almost any situation, and the types of cover crops can be chosen to complement any soil and climate combination. Grasses are great at water consumption if water is in over-supply and are also great for biomass production to improve soil organic matter content. Legumes are great for stimulating weaker vineyards by their ability to fix nitrogen and lack of competition based on their growth cycle. But planting grasses in a weak vineyard could be counterproductive, especially if not mowed when water is scarce. Planting legumes in a vigorous vineyard is similarly unwise.

Thinking about the relatively "awful" soils in La Mancha, wine growers have long eschewed any form of weeds and cover crops in order to reduce competition. But, in so doing, they have also (likely) reduced soil organic matter, water-holding capacity and nutrient retention. It's good to see that they are now experimenting with allowing other vegetation into their vineyards. The move to cover crops and reduction in tillage is a good one, but like everything, it must be managed to suit the specific conditions of the vines, soils and climate. **WBM**

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Disease-resistant Varieties are on the Way

Can we ensure they last?

Michelle M. Moyer, Timothy Martinson and Lance Cadle-Davidson

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AN ERA OF LOW-INPUT, disease-resistant grape varieties is coming. Marker-assisted selection (see "Grape Breeders No Longer Flying Blind," *Wines & Vines*, March 2018) is allowing breeders to confidently incorporate several resistance genes into new varieties that will express a high level of resistance and offer the prospect of very significant reductions in fungicide applications. While today's vinifera grape growers rely heavily on fungicide use (up to 10 to 15 sprays per season, depending on location and management), these new varieties may require only two or three sprays per season.

The first efforts in breeding the next generation of grape varieties have focused on natural resistance to powdery mildew, Pierce's disease and downy mildew, both because of their economic importance internationally and because genetic solutions are readily available. For example, within the past 20 years, over a dozen powdery mildew resistance loci (i.e., gene regions) have been identified in different grape species, along with DNA markers to track the resistance (see "The Phenotyping Bottleneck: How grape breeders link desired traits to DNA markers," *Wines & Vines*, January 2019). These have been used to create varieties that carry both quality attributes and disease resistance. The economic and environmental benefits of disease-resistant varieties are potentially huge and cumulative.

PHOTO 1: Vines in row 7 of Bruce Reisch's "no spray" block at Cornell Agri-Tech, previously selected for disease resistance, most of which have the *Run1* gene for powdery mildew resistance. Vines were photographed after temperatures had dropped to -2° C the previous night, hence some foliar frost damage is evident.

PHOTO 2: Vines growing in row 6 of the "no spray" block, a population not previously selected for disease resistance, were photographed the same day as the vines in **PHOTO 1**.

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Will Resistance Last?

The challenge is this: Once we deploy these varieties on a large scale, will their disease resistance last for the entire production lifespan of the vineyard? Disease-resistant varieties are management tools much like fungicides, and we do not have a good track record for fungicide stewardship. With a generation time of seven to 10 days on average, and thousands of spores released daily from each infected leaf, the fungus that causes grapevine powdery mildew (*Erysiphe necator*), is designed to evolve rapidly in response to selection pressure. Under fungicide selection pressure, resistance of powdery mildew to successive groups of new fungicides has typically been reported within a few years of their introduction. Resistance to benzamidazoles (introduced in 1973) was first reported within four years, demethylation inhibitors (introduced in the 1980s) within three and one years (triadimefon and myclobutanil, respectively), and azoxystrobin (introduced in the 1990s) was first reported within six years.

Disease-resistant varieties, like fungicides, will select for pathogen strains that can overcome the resistance, and the selection pressure may be more intense with disease-resistant varieties. Fungicide residues are relatively short-lived, so selection for resistant strains comes and goes as residues decay. Resistant plants are "always there, always on," and therefore exert constant selection pressure on the powdery mildew fungus.

HOW CAN BREEDERS AND GROWERS HELP RESISTANT VARIETIES STAY RESISTANT?

Like the development of new fungicides, breeding new disease-resistant varieties through traditional methods takes time and money, even with new tools to speed up the breeding process. Disease resistance is a limited resource, so we want the attributes of these new varieties to last. Two key factors will influence how long disease-resistant varieties will maintain their effectiveness with mildew management in commercial vineyards; that is, how durable the disease resistance will be. First, it's important to consider how resistance genes are incorporated into new varieties. The second, and equally important, factor will be how these new varieties are deployed and managed in commercial vineyards.

Incorporating Resistance Genes in New Varieties

With more than a dozen resistance loci trackable with markers, grape breeders can choose which, and how many, resistance genes to put into new varieties. The consensus is that it is important to "stack" multiple genes into each variety to improve the odds that the resistance will last. The challenge is deciding which genes and how many to incorporate into a variety.

Each marker-associated gene has a different mode of action and a different effect on the powdery mildew fungus. For example, the *Run1*, *Ren4* and *Ren6* loci can provide complete (major) suppression of powdery mildew in greenhouse and field tests while most others provide partial (minor) protection. By combining "major" and "minor" genes, some tests have shown that the effects are additive—that a grapevine with two resistance genes expresses stronger resistance than a grapevine with one.

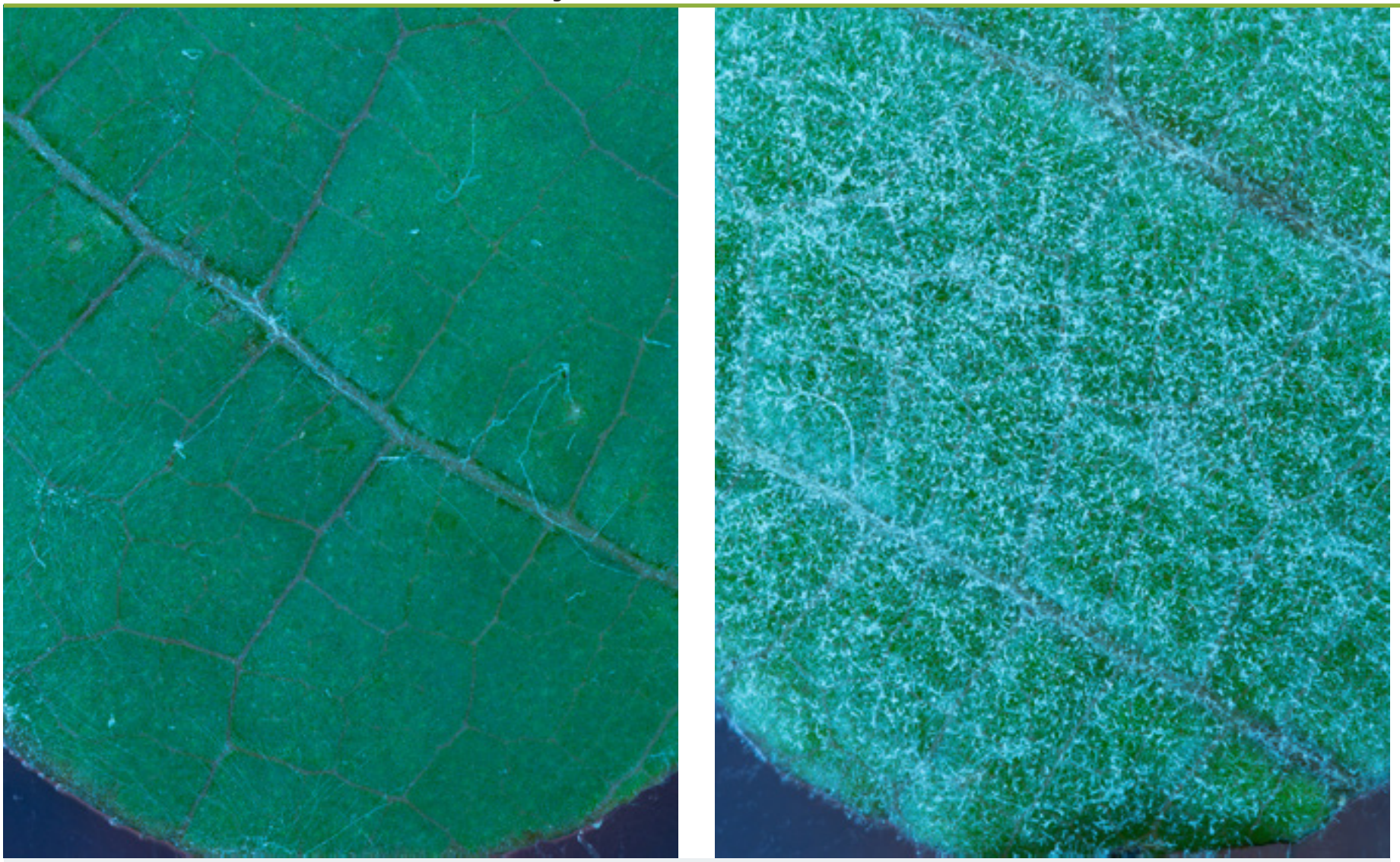
Figure 1: Grape breeding lines with 16 different combinations of 0 to 4 resistance genes have been created to test efficacy of gene "stacking" against varying strains of powdery mildew.

R gene #	*RUN1*	*REN1*	*REN6*	*REN7*
0				
1	■			
1		■		
1			■	
1				■
2	■	■		
2		■	■	
2			■	■
2	■		■	
2	■			■
2		■		■
3	■	■	■	
3	■		■	■
3	■	■		■
3		■	■	■
4	■	■	■	■

Another consideration is that *E. necator* strains also are genetically variable and react differently to resistance genes. When tested against different fungal strains from different geographical areas, all the known gene loci, except for *Ren4*, were at least somewhat susceptible to specific strains of the fungus. For example, the *Run1* gene shows strong resistance to most powdery mildew strains, except for strains from the Southeast United States, where the fungus co-evolved with this resistance gene. Pathologists refer to this as race-specific resistance.

The consensus of grape breeders worldwide is that stacking multiple genes into a variety will provide greater durability than single genes. But given the strong evolutionary adaptability of the powdery mildew fungus, it is also assumed that disease resistance genes will eventually select for resistant powdery mildew strains, regardless of how many loci are stacked. There is still scientific debate as to how many, and which, genes should be stacked, and how that will translate into long-lasting disease protection.

To guide these decisions with data, breeding programs in New York, California and Minnesota, as a part of *VitisGen2*, have produced crosses with all possible combinations of four powdery mildew resistance loci (*Run1*, *Ren1*, *Ren6* and *Ren7*), and will be testing these 16 combinations against diverse strains of the powdery mildew fungus (FIGURE 1). Additional tests are being done that will evaluate 32 different combinations of five loci: *Run1*, *Ren1*, *Ren3*, *Ren4* and *Ren10*.



Photos 3A and 3B: These microscope images show sibling grapevines A) with and B) without the *REN4* powdery mildew resistance gene, that were infected by powdery mildew at the same time. A few small strands of hyphae can be seen on A), the *REN4*+ leaf. The white stuff on B), the *REN4*- leaf, is hyphae and tens of thousands of spores.

Deploying Disease-Resistant Varieties in the Vineyard

The durability of these resistant varieties will be tied to a simple concept: Disease-resistant varieties will still require growers to use chemical and cultural practices to manage powdery mildew. Because these varieties provide constant selection pressure against the powdery mildew fungus, the fungus would likely overcome that plant-based resistance in the absence of additional management intervention.

The use of resistant varieties should be considered as a part of a larger, holistic approach to grape disease management. When coupled with existing chemical and cultural approaches, their adoption could result in significant time and chemical savings relative to approaches that only rely on traditional canopy and chemical management.

FUNGICIDE PROGRAMS WILL STILL BE IMPORTANT

Less-intensive spray programs will likely be required, even with disease-resistant vines, and one or two fungicide applications could be effective in eliminating rare, virulent types as they develop. While work is still needed to verify the timing and intensity of intervention necessary for disease management, these varieties would allow growers to significantly reduce fungicide inputs while providing more freedom to focus management primarily around the critical window for powdery mildew: immediate pre-bloom to pea-size berries.

For example, developers of the new French varieties with two stacked powdery mildew and two stacked downy mildew genes recommend two fungicide sprays, which is at least an 80 percent reduction in spray applications, especially when compared to a variety like Chardonnay, which would have received 10 to 15 sprays to manage diseases (see Resistant Grape Varieties, 2018 in the references).

CULTURAL PRACTICES WILL ALSO BE NEEDED

Cultural practices, such as canopy management, shoot-thinning and fruit-zone leaf removal, would still be recommended due to their ability to positively influence fruit quality and promote good spray coverage for chemical disease management. But growers would now have more time to do these practices because they are not spending that time spraying and would have fewer restricted-entry days in the vineyard post-spray application.

Using disease-resistant varieties would also assist in fungicide resistance management. Fewer sprays in a season make it easier to limit the overall use of a single fungicide chemical class to once or twice a season and facilitate the ability to more effectively rotate between fungicide classes.

Where and How Disease-Resistant Varieties Fit Within Existing Commercial Operations

MARKETING

Given the perceived market advantage of internationally-grown vinifera cultivars, where could these newer, high-quality, powdery mildew-resistant grape varieties fit?

"GREEN" MARKETING

Disease-resistant varieties could provide a significant marketing advantage in an age of transparency and consumer food awareness. Given that these varieties require fewer fungicide sprays, there is no better foundation for an accurately-labeled sustainability marketing campaign. Resistant varieties could also make the production of organic wine economically attainable for more producers by reducing pesticide and labor inputs.

WHEN A VARIETAL NAME IS NOT THE SELLING POINT

While it might be a few years before people are comfortable with growing a new variety and marketing in the ultra-premium category, there is immediate value in the use of these next-generation powdery mildew-resistant varieties to produce blends, dessert and sparkling wines, wines where profit margins may be slim or where recognized varietal typicity is not a major selling point.

DISEASE-RESISTANT VARIETIES COULD HELP MANAGE "PROBLEM" VINEYARD BLOCKS OR AREAS

Finding a place in a product portfolio is one requirement for adoption of these new varieties—another is figuring out how and where to grow them. A few potential tips and approaches are described below:

1. Admittedly or not, everyone has their "problem" vineyard areas that make consistent management of powdery mildew (PM) challenging. Even with these challenges, though, these problem areas are not removed from production; the fruit has a market of some form. But what if, when the natural production span of these problem areas is reached, they are replanted to powdery mildew-resistant varieties? Could this tool help reduce the inputs needed to reach cost-to-produce goals or, perhaps, allow a higher fruit quality that can increase the tier-status (and value) of the fruit? Planting disease-resistant varieties into problem areas could reduce the amount of time spent and fungicides used in those blocks, freeing up those resources to be spent in other vineyard locations or time spent on other cultural strategies that enhance fruit quality.

2. A grower would not have to plant the entire farm to disease-resistant varieties to gain an economic benefit. The durability of disease resistance in plants is not only based on some level of management intervention (described above) but also on mitigating the risk of potential selection events of the PM pathogen. There is no greater risk of selection events than that posed by planting a monoculture of the same plant genetics, which reflects our current situation with *Vitis vinifera*. **FIGURE 2** depicts several different potential planting schemes for incorporating resistant varieties into blocks or whole-farm. The pros and cons of these different planting schemes are described below.

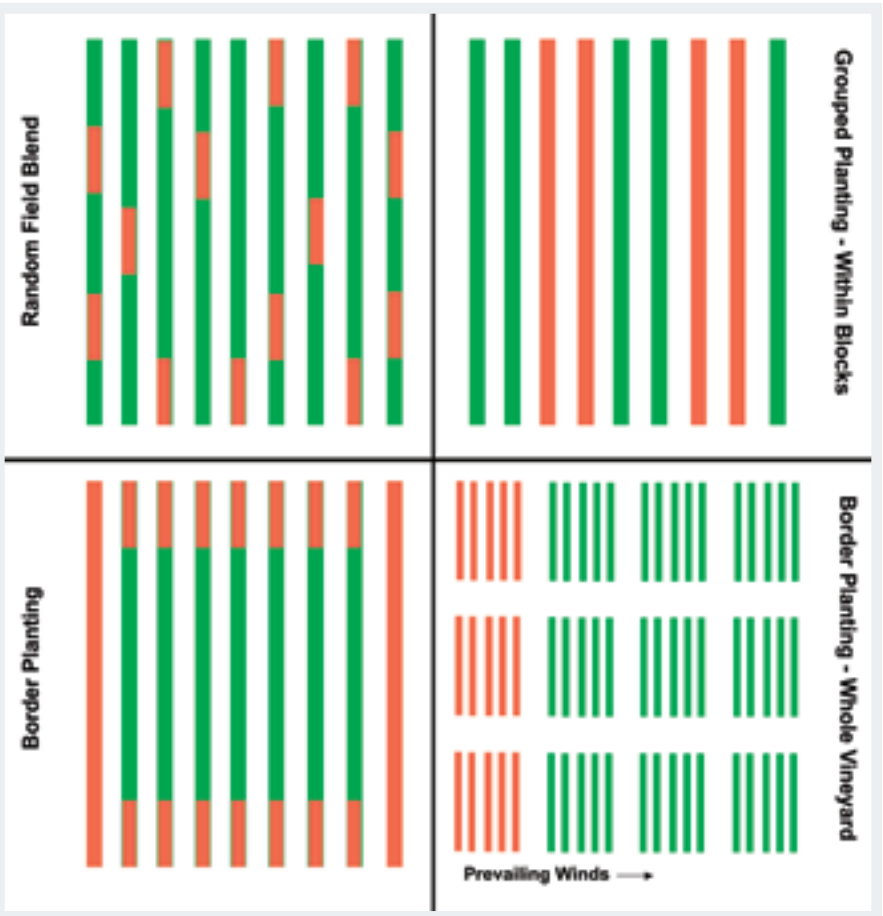


FIGURE 2: Potential planting patterns that incorporate disease-resistant varieties into vineyard blocks, or across whole-farm plantings. Green lines represent either sections or whole rows that were planted to vines that are not disease resistant. Orange lines indicate rows or sections of rows planted to disease-resistant vines.

Random field blends and grouped plantings within blocks: In wheat, for example, random field blends of different varieties (with different attributes, such as disease resistance) have been planted, breaking up the monoculture and preventing widespread loss to disease. Unfortunately, this strategy may not be as feasible in modern grape production. Unlike annual crops where the disease pressure is often reset each year, disease can build up over time in a perennial system. In vineyard field blends the entire block would ultimately have to be treated on a schedule that manages for disease in the most susceptible variety. This could also be true even if resistant varieties are restricted to entire rows; the risk of human error when spraying a complicated planting design might outweigh the product cost savings of not having to spray a few random rows.

The potential benefit to a random field blend, or whole-row blend, is the level of disease control that would be needed during the establishment years of the vineyard. Disease would likely build slowly, so reduced spray programs could potentially be used for more than one or two years after planting. Field blends might also pose additional challenges if preferred cultural practices differ between the varieties.

Border planting, or border planting across a whole vineyard: In vineyards, if border rows, or entire blocks within a large production area, are planted to resistant varieties, the ability to coordinate management practices, such as reduced or altered spray schedules and cultural practices, is easier. If a grower has as little as 10 percent of the total acreage planted to resistant varieties, at an 80 percent reduction in product application, there would be a whole-farm reduction in pesticide use of 8 percent. In addition, there would be cost-savings (or potential increase in revenue) related to the ability to reallocate the labor saved from reduced spraying to other tasks or blocks on the farm.

New Disease-Resistant Grape Varieties Will Be a Part of a Sustainable Future

The new grape varieties of today and tomorrow are not the same as the hybrids of the early 20th century. Marker-assisted selection allows breeders to pursue a more directed focus on both desired traits, such as disease resistance, and required traits like fruit quality (see "Grape Breeders no Longer Flying Blind," *Wines & Vines*, March 2018). Our centuries of viticulture knowledge in managing our classic *Vitis vinifera* varieties make it hard to embrace change. Wine and grape production is steeped in culture and tradition, but one cannot see what is ahead if you only look back.

The future will be defined by our ability to embrace all facets of sustainability, which will include some level of adoption of disease-resistant varieties. A proactive approach suggests now is an opportune time to start experimenting with how powdery mildew-resistant varieties can be incorporated into replanting (or planting) schemes, not just for new or niche markets but for all major segments and regions of the winegrape industry. **WBM**

ACKNOWLEDGEMENT

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Insight & Opinion

Scientific Holism, Alternative Agricultures and Climate Change

Ted Lemon

THE MONOCULTURE OF TENS, hundreds, even thousands of hectares of vineyards, without trees, without hedges and without wild lands is no longer tenable. Whether the viticultural community will face this reality is one of the two great challenges of the 21st century, equally as important and closely related to climate change. We have codified and sanctified a form of viticulture that can no longer succeed. Like a person on life support, the system survives only on allopathic inputs and chemical fertilizers. We have come to believe that this is "normal." This model has survived for many generations by stealing the environmental inheritance of future generations.

Can we, as winegrowing farmers, bequeath living, vibrant, healthy landscapes to our children? The current model will not allow this. In the fine wine community, we so honor traditions (including technical and scientific ones) and past practices, that we are unable to see that we work in a system built for a time long ago and for plant materials, soils and conditions that no longer exist. We are not farming the earth beneath our feet but, with apologies to **Marcel Proust**, remembrances of things past, which now exist solely in our minds.

We treat each new disease and pest in isolation, seeking separate "cures" for each. Viticulture faces an ever-growing laundry list of diseases, exotic pests, bacteria and viruses: Red Blotch, trunk diseases, mealy bugs, etc. This litany of woe tells a great deal about how we propagate and husband vines. A healthy ecosystem is a resilient one, and our vineyards are not. While we claim victory over an individual exotic, our vineyards' general health continues to decline. Consider the vexing problems of powdery and downy mildew. How can so many bright scientific minds have spent so much time and so much money, and yet both mildew pressures continue to increase at alarming rates around the world? Advanced plant breeding techniques may offer solutions to specific issues, but that simply confirms my point: we are no longer able to successfully farm the plants we have loved for hundreds, if not thousands, of years. How can this be? How did we come to see this as "normal?"

Winegrowers in regions such as Marlboro, the Russian River or the Barossa should not be self-congratulatory if they experience less disease and pest pressure than the classic regions of Europe. They suffer less partly because they experience more benign summer conditions but, more importantly, simply because they are younger. They have not been robbing from the ecological bank of the future for as long. To understand our crisis, this concept is key. We pretend that the notions of place, of viticultural excellence and individuality reside only in the vine's relationship to the dirt in which it is planted and the climate in which it grows. For many generations, we have believed that farming the great vineyard sites of the world is equivalent to farming vines in a magic pot, a magic pot which, isolated from all notions of ecology and the interdependence of living creatures, can continue to produce the world's great wines, unchanged forever.

To escape from this dead-end, we must change the model that we have constructed. We must tear down a part of our house. Alternative agricultural paradigms are models for rebuilding our house.

Good work is being done in sustainability research, useful work that can contribute to a different model for viticulture. Some of these efforts are driven by honest concern for climate change and environmental degradation. Unfortunately, much of the sustainability movement is driven by marketing. Furthermore, sustainability, by its very name, implies maintaining a system that has become untenable, as outlined above. The argument for sustainability systems remains built upon the idea of the magic pot. Sustainability is a tired term from the late 20th century of which we should be ashamed. Sustain what? The path we are on? If climate change tells us anything, it should certainly put to death the idea that there is a global or local stasis worth sustaining. A newer buzz word is re-generative agriculture. This, too, is an illusion. We have wrought such change on our planet that there is not a person alive, nor will there be for many generations to come, who will witness the "regeneration" of the natural world as it existed a few hundred years ago.

Can we imagine a different way of farming? A different viticulture? If the Anthropocene is the age in which we are fully responsible for the future of our planet, then solutions to our problems will come from human action in concert with nature. The challenge before us is as simple as it is complex: can we create an ecologically generative agriculture? Are humans capable of creating a beneficial synergy with nature, leading to results nature alone cannot achieve? Can farms generate ecological health? This is not simply a question of carbon sequestration. How do we begin this pursuit and how do we encourage our owners, their consultants and the scientific community to embrace this transformation?

PHOTOS SCOTT SUMMERS

Every person reading these words was raised in the post-Enlightenment world. Most of us were raised with the belief, indeed the faith, that the Enlightment approach to science, what has become scientific reductionism, is the only true material science, the only real path to understanding our world. Yet this approach is riddled with problems.

It is beyond the scope of these few words to discuss the shortcomings of the modern materialist/reductionist view of science or how it has strayed from science to "scientism," a veiled form of religion. Such topics have been covered in detail by many others[1]. What is essential to our discussion of alternative agricultural paradigms and environmental health is to understand that the path of modern science was only one of the possible outcomes in the evolution of science. To gain insight, to find an alternative path, and to understand that the scientific pursuit will evolve in entirely new ways, we must go back further in time to understand the concept of vitalism.

Aristotle came up with the term to define "a vital force peculiar to living organisms and different from all other forces found outside living things. This force is held to control form and development and to directo the activities of the organism. Vitalism has lost the prestige as the chemical and physical nature of more and more vital phenomena have been shown. [2]

Biologist **Rupert Sheldrake** states, "Vitalism was, and still is, the ultimate heresy within mechanistic biology." [3]

Even during its birth, many of the great scientific minds of the Enlightenment believed that a living spark, animus, underlies our world, and this living spark is fundamentally different in nature and composition from the material building blocks that we have studied so thoroughly. Other scientists have worked with fervor to discredit vitalism, including such prominent figures as **Richard Dawkins**[4] and **Francis Crick**[5]. Dawkins and Crick, among many others, are representative of the stream of scientists who crossed from science to scientism in their efforts to destroy the notion of vitalism and other forms of science.

Have I strayed too far from farming? Some of the greatest wineries in the world, whether they understand it or not, are engaged in practicing vitalism. They call it Biodynamics.

The rise of the Cartesian world view banished vitalism to a wilderness where few modern intellectuals have dared to tread. There are few more

Insight & Opinion: Scientific Holism, Alternative Agricultures and Climate Change

potent inhibitors than fear of ridicule by your peers. Yet vitalism won't die simply because scientific reductionism is unable to answer the fundamental questions about our universe.

The philosopher **Thomas Nagel** subtitled his important book, *Mind and Cosmos*, "Why the materialist neo-Darwinian conception of nature is almost certainly false."[6] "…If physical science, whatever it may have to say about the origin of life, leaves us necessarily in the dark about consciousness, that shows that it cannot provide the basic form of intelligibility for this world."[7] As **Frederick Amrine**, professor of intellectual history at the **University of Michigan** summarizes in his review of Nagel's book, material reductionism can explain everything "except life, consciousness, human reason, the lawfulness of the universe, and moral values." He adds, "Because it has no adequate explanation of consciousness and reason, the prevailing paradigm cannot even begin to explain how science of any kind is possible."[8]

Vitalism is related to holism. Vitalism gave birth to scientific holism. Tragically, during the environmental movement of the 1970s, the word holistic became a catch-all term, meaning nothing and everything. Let's correct that. This is crucial because scientific holism provides the rational bridge that many of us require to understand alternative agricultures.

Holism is the "idea that all the properties of a given system (physical, biological, chemical, social, economic, mental, linguistic) cannot be determined or explained by its component parts alone. Instead, the system as a whole determines in an important way how the parts behave."[9]

Authors such as **E.S. Russell**[10], **Kirt Goldstein**[11] and **D'Arcy Thompson**[12] were all proponents of biological holism, the idea that cells and genes do not make organisms, but rather the other way around. Scientific holism was famously promoted by the American theoretical physicist **David Bohm**.[13]

E.S. Russell states: "The initial step which leads to abstractness of treatment is of course the isolation and definition of parts and part-processes as such. To define is to separate and to separate is to ignore or to disregard in some measure the relations with other parts and with the whole. In the living thing there are, in actuality, no separate parts, no separate processes, for no part can be adequately characterized save in terms of its relations to the whole."[14]

Stephen Talbott, of **The Nature Institute**, writes: "So while it may be necessary to analyze and abstract as one step along our way toward understanding, this leads to severe distortion unless we simultaneously insist on recalling the indissoluble unity from which we are abstracting. Only this continual reckoning with unity can enable us to counter the falsification entering our science through abstraction."[15]

Holism in science, or holistic science, is an approach to research that emphasizes the study of complex systems.[16] Scientific inquiry, led by the results from its own work, has begun to return to this alternate form of inquiry. Fields such as ecology, agro-ecology, quantum theory and epigenetics point to the resurgence of scientific holism. Concepts that derive from scientific holistic thought have entered and are now accepted in common scientific language, think of the notion of the "soil-food web."

In his 2015 book, *Plant Sensing and Communication*,[17] **Richard Karban** provides a review of current scientific knowledge of the plant world and offers some fascinating observations that (perhaps unintentionally) make the case for scientific holism.

"Plants sense many aspects of their abiotic and biotic environments and respond with a variety of plastic morphologies and behaviors that are often adaptive. In addition, plants communicate, signaling to remote organs with an individual, eavesdropping on neighboring individuals and exchanging information with other organisms ranging from other plants to microbes to animals. They even demonstrate the ability to make decisions about which cue to respond to when a trade-off is necessary. Plants defend themselves

by communicating with and manipulating other organisms that provide protection from herbivores. Plants attract these bodyguards by providing either resources (food and shelter) or information about prey that allows these carnivores to forage more effectively. Plants may regulate their interactions with already established mycorrhizal associates by sensing the contributions of each partner and adjusting the quantity of resources that they provide to each in turn.…plants…reward generous partners and…punish less cooperative associates…In conclusion, there is abundant evidence that plants learn and have memory.

"Morphological responses of plants are possible in many instances because plants are made up of repeated semiautonomous modules. These modules are produced by reiterated meristems that can give rise to multiple organs of undetermined characteristics that can vary in type, size, shape, number and function. As a result, plants are sometimes able to quickly and radically transform in response to different cues."[18]

I want to be scrupulously fair to the author and state that I have cut and pasted from various parts of his work to create the paragraphs above. Yet the words are his and his intent is clear. If you have read **JW Goethe**'s *The Evolution of Plants*, you might think that Goethe was speaking to us across the centuries. Instead the author is an eminent professor of entomology and a member of the **Center for Population Biology** at the decidedly mainstream, traditionally scientific, **University of California, Davis**.

The surging interest in the biology of terroir not only begs for an integrated, holistic, systemic approach, but is probably impossible to demonstrate without using the principles of scientific holism as the main tool.

Only the alternative agricultural paradigms, agro-ecology, biodynamics, permaculture and deep organics[19] address the farm and vineyard as a system, an ecosystem and thus engage scientific holism. Only these paradigms seek to improve the health of both the farmed and adjacent lands and thereby our planet. Industrial organics is simply western agronomy with a bow tie.

The first step in the transition to the farms of the future is the embrace and promotion of scientific holism by winegrowers and farmers. We can push the research community and our investors towards the agriculture and the viticulture of the future. We can use the techniques of scientific holism to evaluate the benefits of our trials.

The second step is redefining economics. The economic rewards we currently assign to farming are both perverse and untenable. If the land in Rutherford and Vosne Romanée is so valuable, how can we not afford to ensure its health for future generations? Today, we simply rob from the ecological bank of the future by claiming that we have no choice because the land is so expensive. Every day we see the same mistake repeated all over the world, encouraged by famous winemaking and viticulture consultants: a new vineyard is established and planted property line to property line, with no ecological reserves, no companion plantings, no thought for the interconnectedness and interdependence of all living beings. We suffer from an ethic of short-sightedness.

The third step is for farmers to build a generative agriculture through farming experience. We cannot wait for "proof" that such a system is possible from the research community. At the same time, we must also put pressure on our research universities and our politicians to change the way agricultural research is funded. The international research community currently

has limited resources to provide even basic "sustainability" research. There is no research funding in the U.S. for what I am describing. The biochemical companies that currently drive funding will not willingly participate in this research.

What would the new vineyards look like? They are not monocultures. Diversified wine farms are the vineyards of the future. I hear you laughing. We are going to turn the Russian River back into pasture? And who will pay for that? The wine farm of the future will not come from the heart of the famous vineyard monocultures. They will be the last to make the radical change that I am proposing. There is too much of the old economic logic invested in the status quo. The change will come from the periphery. If you want to see the viticulture of the future, visit alternative vineyards in "lesser" wine regions.

The fourth step, and by no means the least important, is recognition of the moral imperative. We have an important role to play as winegrowers. Currently, we are viewed as a noble form of agriculture, and we benefit from significant good will. If we do not move quickly to be at the forefront of the change in agricultural practices occurring around us, we will forfeit that good will and become backward and out of touch. Is that how your owners and marketing team would like Millennials and Generation Z to perceive us?

We are the only form of agriculture that is consistently prosperous. There are winegrowers around the world who struggle to make ends meet; this is important. However, in aggregate, we are the rich uncle in the family of farmers. Therefore, we have a moral duty to be at the forefront of the re-invention of agriculture. We can afford to make these investments and bring their benefits to the attention of researchers, the public, other farmers and, of course, to our consumers. We have access to the wealthy. Our consumers are educated individuals, influential in their communities.

According to **Forum of the Future**'s co-founder, **Jonathan Porritt**, "The world revolves around often frighteningly small cohorts of frighteningly wealthy and influential people. It is hard to say this, but if you are really talking about the 1 percent of the 1 percent who have massive disproportionate influence over the way the world works, you might say, if you did your detailed analysis about where you can get the maximum impact, you

might say there. Because every one of the 1 percent of the 1 percent that could be brought into a zone of ethical and sustainable sanity, the better the world might be. If we did this on a strictly impact-related analysis, where do you get the biggest bang for whatever amount of money you have available to you? You might say those luxury brands might change the minds of a large number of luxury consumers, who will then become hugely proactive advocates for a more sustainable world."[20]

While we might quibble with the hyper-restrictive terms "1 percent of the 1 percent," the 1 percent, my friends, are your consumers.

The new viticulture will be a viticulture of the environment of the fields and streams, the forests, the vines in communication with the cover crops and the companion plantings. Systemic resilience, immunological response capacity, dynamic equilibrium, carbon sequestration, water table recharge, species diversity, all these will become part of our everyday viticultural language. There is hope for Serralunga and Pomerol. The key is for individual farmers and for their farming communities to begin the small steps. Become a subversive. Remove your end vines and rows. Don't plant roses, plant beneficial insect hosts. Sow the flanks of your vineyard roads with wildflowers.

Great changes begin with the smallest steps. As Schelling said, "Nature, too, mourns for a lost good." You, farmer, will find that she sings with joy when you begin to take down your house. **WBM**

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19 I will use this vague and uncomfortable term as a catch-all phrase for organic farms striving to go far beyond industrial organic agriculture. Some in this community use the terms regenerative organic farming to describe their work.

20 Jonathan Porritt, co-founder of the Forum for the Future in a speech to the Sustainable Business Council of New Zealand, March 2017.

High-end Magnums: Popular and Relatively Rare

Though harder to find, glass suppliers report increasing interest in magnum bottles

Kerana Todorov

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MAGNUM BOTTLES, A FAMILIAR sight at wine shops and charity auctions, remain a mainstay at celebrations. Now, a few glass companies are reporting an uptick in demand from wineries for magnum-sized bottles. But how popular is the large format bottle, really?

From a Wholesale Perspective

According to **Annette Alvarez-Peters**, vice president and general merchandising manager for beverage alcohol at **Costco**, fine wines and Champagne magnums are popular with Costco members, as is the 3-liter format. "Due to our limited items on hand, we tend to select these items for the holiday," Alvarez-Peters said.

Elsie Wolfe, liquor sales manager at **Safeway**, said magnums originally gained popularity during the holiday season, but she's seen a change in this trend over the past few years: increasingly, customers want magnums all year-round—either to celebrate milestones (weddings, anniversaries, birthdays, graduations), serve and entertain larger groups, or use them as a decorative centerpiece at events.

Kelsey Aanerud, director of communications at **Precept Wine** in Seattle, WA, said large bottles signify an experience in the minds of restaurant patrons and consumers.

On-premise accounts drive the majority of Precept Wine's magnum-related business—and it is expanding. Precept Wine sells magnums of **Browne Family Vineyards**' Cabernet Sauvignon, as well as **Gruet**'s Brut NV and Blanc de Noirs year-round, with the demand peaking during the holidays, according to Aanerud. Precept Wine's off-premise retail accounts at Costco, **Total Wine & More** and other major grocery stores sell magnums primarily during the holidays.

"Our magnums are priced at an accessible price point, and we find that people purchase them to drink," Aanerud said, adding that Browne Family Vineyards magnums, in particular, are designed with the thought that customers would keep the empty bottles as mementos.

Sommeliers and others say wine ages better in larger formats. Wolfe said wine in a magnum tastes and ages better and slower than in a traditional bottle 750ml bottle of wine. "Aging a wine at a slower pace will result in a more graceful, better tasting wine," she said.

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Winery Production

Tablas Creek Vineyard produces 30,000 cases a year, which includes 250 cases of magnums. "Wine ages beautifully in them, and opening one is guaranteed to make any occasion feel special," said **Jason Haas**, Tablas Creek partner and general manager, adding that he, personally, loves magnums.

"We've bottled our two flagship wines in magnum for more than a decade now; and while demand isn't huge, it's been steady," Haas noted. "It definitely picks up around the holidays, both because a lot of them are given as gifts and because it's a time where there are lots of large meals and family gatherings."

Winery Sixteen 600 in Sonoma, CA, produces 1,500 cases a year, which includes about 30 cases of magnums. "People want magnums," said **Sam Coturri**, who co-founded the family business with his father, **Phil Coturri**. "Magnums are fun and collectible," Sam Coturri said. "Especially with red wine… The magnum is the perfect vessel for aging."

Debonné Vineyards, a 30,000-case winery in the Grand River Valley wine region 45 miles east of Cleveland, Ohio, produces about

ROBERT HOLMES

Ashley Bell of Domaine Drouhin pours from a magnum for Ron Penner-Ash, at ¡Salud! the world premiere of Oregon's finest Pinot Noir. Winemakers from the state's foremost wineries will debut the 2013 vintage at this benefit for Oregon's seasonal vineyard workers and their families, many of which will be bottled in magnums. This event is the only opportunity to acquire unique cuvées made exclusively for ¡Salud!

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12,000 cases of magnum bottles. Its bestseller, River Rouge, retails for $12.99 and is sold to grocery stores statewide. Magnum bottle sales are a major part of the winery's wholesale business, especially in the off-premise accounts, according to Debonné owner **Tony Debevc**. "Our sales are fairly consistent year-round," said Debevc.

Treasury Wine Estates' sweeter varietals drive growth for magnums, primarily Moscato, sweet reds and red blends, according to a company representative, who also said there's been a significant growth at a number of price points in the sparkling wine category. The representative said that Treasury Wine Estates will produce magnums as demand and forecasts necessitate.

"Magnums are popular with wine lovers because they are an easy way to make any occasion feel special," said **John Seethoff**, vice president of marketing—luxury brands, direct sales and hospitality at **Constellation Brands**.

"Anyone who brings a magnum of Champagne to a birthday party or a magnum of Cabernet Sauvignon to a dinner party is instantly a hero," Seethoff said. "Magnums are also a great format in which to age wine; the smaller ratio of air to wine in the bottle helps the wine to age better longer, which wine collectors love. We see high demand for magnums of our fine wines, like **The Prisoner** and Mount Veeder Napa Valley Cabernet Sauvignon, in restaurants and fine wine retailers across the country," Seethoff said.

Restaurant Trends

Tyler Field III, divisional vice president of wine and spirits at **Morton's The Steakhouse** said that at his restaurants, magnum bottles are the most popular in the private dining rooms where large parties take place. "The demand is year-round," he said. "Larger format bottles speak to celebration and rarity, two things hosts want for their guests," Field added.

The challenge for restaurants, however, is finding magnums and keeping them in stock, as wineries only produce a finite number of large-format bottles. Field said his sommeliers purchase what they can within proximity to their restaurant's location.

"I can use more magnums," observed **Albert Letizia**, sommelier at **Booth One** in the **Ambassador Hotel** on Chicago's Gold Coast. "They're cool," Letizia added.

In addition, high-end magnum wine bottles are more expensive than a 750 ml bottle of wine on a per-ounce basis, he said. "Therefore, there is no price break in buying a larger format, which is sometimes confusing to the guest who buys 1.5s of lower-end wines in their local market," said Field, who attributes the price increase to higher glass costs and the shorter supply of high-end magnums.

Micah Clark, wine director at **The Restaurant at Meadowood**, said the restaurant does not typically see a large number of inquiries for large format bottles as parties are typically no larger than four guests to a table. That is, until the winter holiday season. "Then we tend to see guests with larger party sizes that are interested in splurging on bigger bottles," Clark said.

He said his guests are mostly interested in domestic Chardonnay, Pinot and Napa Valley Cabernet Sauvignon. "The Restaurant also uses a decent amount of Champagne and sparkling wine magnums," Clark said.

Like Fields, Clark noted that magnums are typically produced in small quantities and can be difficult to source. The team, he said, is always searching for special or unique large format bottles that have an "interesting" story.

Monica Zanotti, estate sommelier at **The Grill at Meadowood**, the hotel's more casual dining experience, said she often suggests magnums for larger groups, but guests tend to decline the offer. "One reason might be 'sticker shock' when looking at the price, even though they might not realize they would pay the same amount for two 750s," Zanotti said.

Expert palates at Napa-based **Cadet**, a wine and beer bar that draws winemakers, restaurant employees and other professionals in the beverage and hospitality industries, do order magnums of Champagne and sparkling wines. "We find that people really enjoy large formats," Cadet owner **Aubrey Bailey** said.

A few blocks from Cadet, **Carpe Diem** owner **Scott Kendall** said the cellar is 10 percent magnums. He started ordering more magnums about a year ago because larger parties were asking for the large-format bottle. That was not too surprising, he said. "If I go in a group, I like to order one too."

Collector's Items

Large format bottles are also a familiar sight at events such as **Auction Napa Valley**. **Cate Conniff**, communications manager at **Napa Valley Vintners**, said many magnums submitted for the live auction are hand-etched and not otherwise commercially available, making them rare.

Data from the United Kingdom-based **Christie's Auction House** indicated that the number of magnums sold at auction has been even each year for the past five years.

"I think magnums and other large format bottles are extremely popular among collectors, since there are not that many out there," said **Peter Rusinak**, associate specialist for Wine and Spirits at Christie's. "Moreover, wine tends to age slower in the larger bottles," he said. "Large format bottlings, like magnums, have less exposure to the effects of oxygen, which means that wine will keep longer."

In some cases, collectors use magnums for celebrations. "There is nothing like hosting a party with magnum bottles of wine," Rusinak said. "Large format bottles are very appealing to the eye."

Magnum Manufacturing

From a glass manufacturing standpoint, the demand for magnum bottles has increased over the last couple of years, according **Jean-Pierre Giovanni**, vice president for sales, marketing and customer service at **Glopak USA**.

Traditionally, magnums were required for wine clubs and wine auctions and at upscale restaurants or clubs, Giovanni said. However, the demand for magnum bottles has grown because consumers buy them as gifts and for special social events. Giovanni also noted a trend in businesses that are increasing demand for large format bottles to use as business gifts.

Magnum production is more challenging, Giovanni said. Due to their size and weight, magnums cannot be produced on a production line at the same time as 750 ml bottles. The practice is to make special runs for magnums. "This makes it difficult to anticipate and service sudden surges in demand, so it requires anticipation and planning from the winery(ies) in order for the glass industry to be able to supply," Giovanni said.

Ardagh Group, the largest manufacturer of wine bottles in the U.S., also has seen an uptick in sales. "Ardagh Group has seen an increase in the demand for magnum bottles for sparkling wine, however, the market for those bottles is still a small portion of the overall wine market," said **John T. Shaddox**, chief commercial officer for Ardagh Group, Glass, North America.

Conclusion

Magnums are popular among wine collectors and other wine lovers. However, high-end magnums remain relatively difficult to stock, sommeliers said. The magnum format is also particularly popular in the Rosé category. "We believe Rosé drinkers love large formats because it adds an element of excitement to their drinking experience as well as a fun photo opportunity," said Corinne Labitzke, lineage portfolio marketing manager at Shaw-Ross International Importers, Château d'Esclans. **WBM**

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

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Total Wine Sales Value Up Slightly

U.S. off-premise wine sales tracked by **Nielsen** increased by 1.6 percent to $14.4 billion in the 52 weeks ended March 23. In just the four weeks ended March 23, total sales value came to $1.1 billion, which was 0.9 percent less than during the same period a year ago.

Sales Volume Drops by 3 Percent in March

In past four weeks ended March 23, total off-premise sales volume fell by 3.3 percent to 11.9 million 9L cases. Over the past 52 weeks, sales volume declined by 1 percent to 162 million cases.

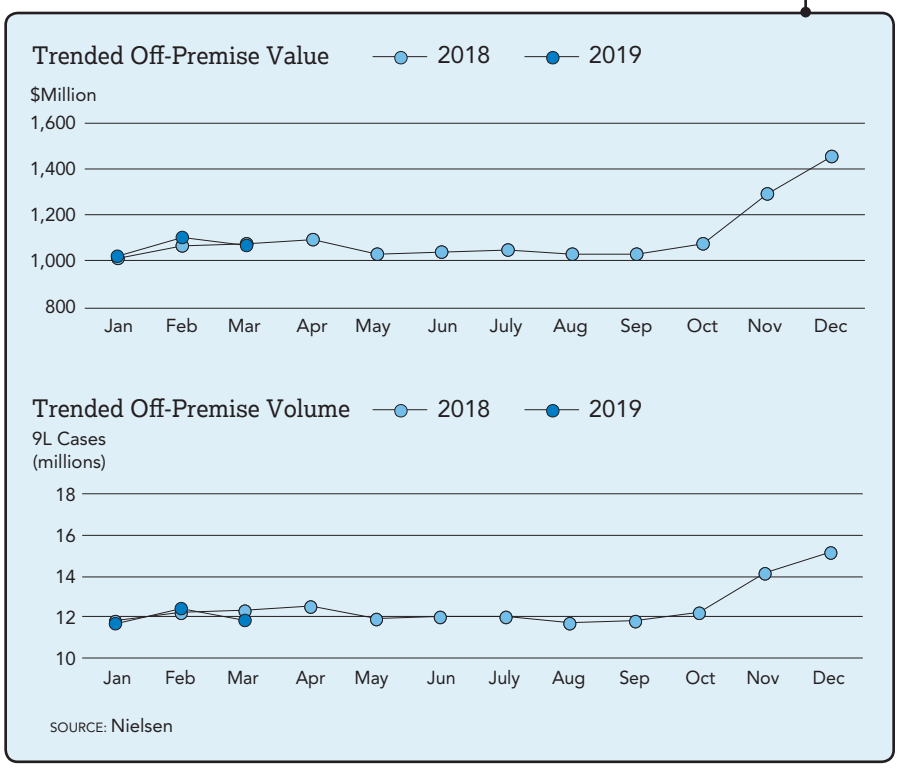
Cabernet Sales Post Solid Growth on Large Base

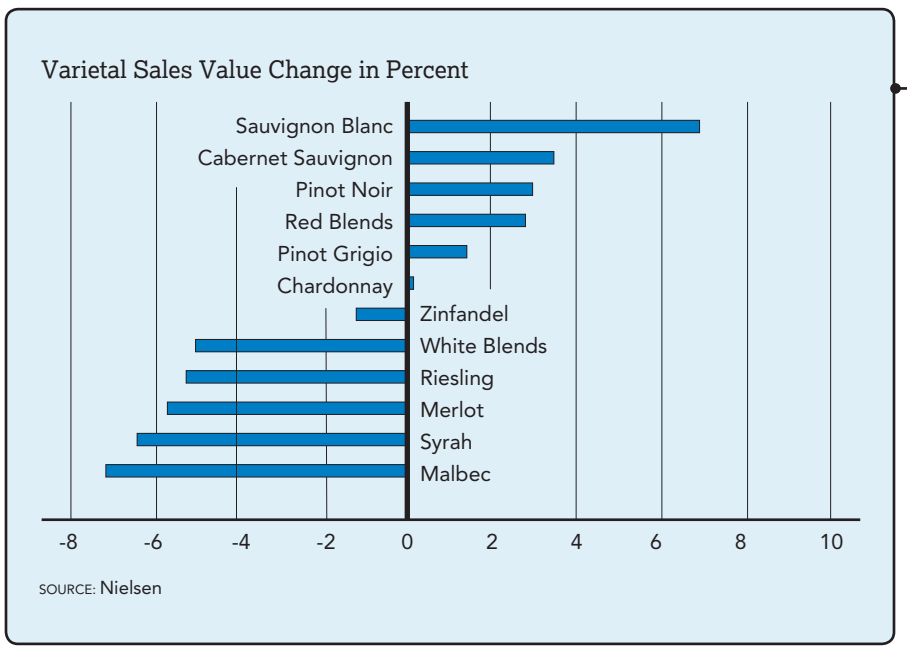
Sales of Cabernet Sauvignon wines increased 3.7 percent in value to $2.6 billion and 0.7 percent in volume to 24.7 million 9L cases in the past 52 weeks ended March 23. The varietal's sales in the past year outperformed most of the other major varietals, including Chardonnay, which saw sales value grow by just 0.1 percent to $2.5 billion and a sales volume increase of 1.8 percent to 30 million cases in the same period.

Sales of red blends were up 2.8 percent to $1.9 billion in value in the past 52 weeks but dropped 1.6 percent to $140 million for the month. Sauvignon Blanc sales were also brisk, totaling $951 million, an increase of 6.4 percent, in the past 52 weeks and increasing 5.5 percent to $69.9 million in the four weeks ended March 23.

Total Sauvignon Blanc sales surpassed Merlot by more than $200 million, and sales of the red Bordeaux varietal continue to slump. By value, Merlot sales fell 5.9 percent to $740 million and declined 7 percent in volume to 10.3 million cases in the past 52 weeks. In the four weeks ended March 23, Merlot sales were down 9.8 percent in value to $55.2 million and 8.2 percent in volume to 769,264 cases.

Rosé wines continue to perform well. The rosé category saw total sales value increase by 39 percent to $518 million and sales volume jump 42.7 percent to 4.5 million cases. **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 **March 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 03/23/19	Latest 4 Wks - W/E 03/23/19	Latest 52 Wks - W/E 03/23/19	Latest 4 Wks - W/E 03/23/19	Latest 52 Wks - W/E 03/23/19	Latest 4 Wks - W/E 03/23/19	Latest 52 Wks - W/E 03/23/19	Latest 4 Wks - W/E 03/23/19	Latest 52 Wks - W/E 03/23/19	Latest 4 Wks - W/E 03/23/19
	TOTAL TABLE WINE	**14,358,094,944**	**1,061,779,051**	**1.6**	**-0.9**	**161,649,718**	**11,945,620**	**-1.0**	**-3.3**	**7.40**	**7.41**
PRICE TIERS BY CONTAINERS	BOX	1,365,547,590	107,077,804	4.8	4.6	33,499,867	2,572,286	2.1	1.3	3.40	3.47
	$0-$3.99	570,691,105	43,479,812	-2.2	-2.7	20,103,706	1,512,547	-2.6	-3.6	2.37	2.40
	$4+	794,815,481	63,576,277	10.4	10.2	13,394,560	1,058,875	10.0	9.3	4.95	5.00
	Total Table Wine Glass	12,741,435,351	935,662,613	1.0	-1.7	124,924,966	9,139,819	-2.1	-4.7	8.50	8.53
	Value Glass $0-$3.99	683,187,941	50,668,575	-4.5	-8.0	17,149,704	1,255,918	-6.0	-9.6	3.32	3.36
	Popular Glass $4-$7.99	3,229,868,168	236,060,988	-5.1	-6.9	49,192,305	3,581,558	-5.5	-7.4	5.47	5.49
	Premium Glass $8-$10.99	3,371,810,280	246,779,844	-0.9	-4.1	29,808,291	2,174,383	-1.5	-4.4	9.42	9.45
	Super Premium Glass $11-$14.99	2,765,703,849	205,812,912	7.8	3.9	18,305,469	1,360,377	7.2	3.3	12.59	12.60
	Ultra Premium Glass $15-$19.99	1,370,901,876	102,165,014	7.5	4.8	6,684,406	496,243	6.4	4.2	17.08	17.15
	Luxury Glass $20-$24.99	563,680,143	39,921,653	7.2	3.1	2,160,317	151,629	5.5	1.8	21.74	21.93
	Super Luxury Glass $25+	749,925,172	53,061,920	4.5	3.1	1,578,262	111,958	1.4	0.2	39.58	39.48
IMPORTED	IMPORTED	3,794,436,531	275,235,786	1.7	-1.7	40,228,908	2,955,327	-0.5	-2.9	7.86	7.76
	ITALY	1,190,954,058	88,152,914	1.6	0.0	10,506,456	783,511	-0.8	-1.9	9.44	9.37
	AUSTRALIA	729,475,364	55,417,909	1.8	-3.1	11,990,842	909,259	-0.5	-3.3	5.07	5.08
	FRANCE	461,306,313	27,924,513	9.4	-1.5	2,980,006	176,410	8.8	-4.2	12.90	13.19
	CHILE	256,515,469	19,096,456	-4.0	-4.5	3,840,092	288,802	-2.9	-2.8	5.57	5.51
	SPAIN	164,523,314	11,843,330	-2.4	-9.5	2,079,669	154,900	-1.4	-5.7	6.59	6.37
	GERMANY	83,232,138	5,469,877	-4.4	-6.5	823,878	54,731	-1.2	-2.1	8.42	8.33
	NEW ZEALAND	475,039,878	35,339,257	8.9	7.1	3,425,460	253,732	8.3	7.3	11.55	11.60
	ARGENTINA	341,010,234	25,494,733	-7.5	-7.7	3,739,879	277,525	-9.4	-9.5	7.60	7.65
	SOUTH AFRICA	24,327,904	1,707,058	-8.2	-6.8	210,495	15,049	-9.0	-8.1	9.63	9.45
	PORTUGAL	41,663,311	2,640,376	10.8	-1.2	454,355	27,800	5.4	-6.7	7.64	7.91
DOMESTIC	DOMESTIC	10,563,658,413	786,543,266	1.5	-0.6	121,420,811	8,990,293	-1.2	-3.4	7.25	7.29
	CALIFORNIA	9,515,949,149	709,733,573	1.4	-0.8	112,733,031	8,355,042	-1.3	-3.5	7.03	7.08
	WASHINGTON	619,163,015	45,932,110	2.3	-0.1	5,171,471	384,659	1.7	-0.6	9.97	9.95
	OREGON	198,091,228	14,962,260	13.4	12.7	1,010,604	75,246	12.4	11.4	16.33	16.56
	TEXAS	32,340,721	2,499,092	-1.0	5.0	395,211	30,288	-3.4	2.7	6.82	6.88
	NEW YORK	35,431,111	2,302,302	-4.8	-23.1	488,487	34,574	-7.6	-23.6	6.04	5.55
	NORTH CAROLINA	40,756,937	2,890,769	2.0	0.2	424,387	30,150	0.9	-2.3	8.00	7.99
	INDIANA	23,706,172	1,719,204	-0.1	-2.3	262,627	18,804	-1.0	-3.9	7.52	7.62
	MICHIGAN	22,226,611	1,295,120	-2.0	-5.8	242,714	14,066	-1.4	-4.6	7.63	7.67
TYPES	RED	7,419,841,024	563,625,092	1.0	-2.0	74,508,309	5,648,554	-1.7	-4.6	8.30	8.31
	WHITE	5,846,854,039	427,281,821	0.6	-0.3	70,710,533	5,170,518	-1.2	-2.1	6.89	6.89
	PINK	1,090,082,430	70,856,309	12.0	3.7	16,416,794	1,126,379	3.5	-2.1	5.53	5.24
VARIETALS	CHARDONNAY	2,547,208,952	188,525,208	0.1	-0.8	30,134,874	2,225,055	-1.8	-3.0	7.04	7.06
	CABERNET SAUVIGNON	2,644,733,365	203,567,914	3.7	0.8	24,736,854	1,914,480	0.7	-2.0	8.91	8.86
	PINOT GRIGIO/PINOT GRIS	1,313,095,528	96,804,369	1.7	1.8	17,132,836	1,273,538	1.0	1.4	6.39	6.33
	PINOT NOIR	1,086,544,565	82,837,393	2.9	0.1	8,473,109	641,887	0.4	-2.7	10.68	10.75
	MERLOT	740,251,705	55,191,628	-5.9	-8.2	10,321,164	769,264	-7.0	-9.8	5.98	5.98
	SAUV BLANC/FUME	951,108,280	69,863,211	6.4	5.5	8,376,611	614,664	4.6	4.4	9.46	9.47
	MUSCAT/MOSCATO	648,941,519	46,969,353	-1.9	-3.1	9,915,256	709,852	-3.1	-4.4	5.45	5.51
	WHITE ZINFANDEL	283,825,728	20,297,768	-8.0	-9.8	5,755,648	409,019	-8.8	-11.0	4.11	4.14
	MALBEC	263,609,262	19,770,977	-7.2	-8.3	2,476,162	184,768	-8.6	-10.1	8.87	8.92
	RIESLING	244,348,771	16,458,728	-5.6	-8.7	2,713,598	180,941	-5.7	-10.1	7.50	7.58
	ZINFANDEL	228,708,561	17,416,094	-1.4	-2.9	1,633,305	123,284	-4.9	-6.7	11.67	11.77
	SHIRAZ/SYRAH	151,987,523	11,534,968	-6.2	-12.5	1,744,188	132,194	-9.8	-14.9	7.26	7.27
	WHITE BLENDS (ex. 4/5L)	225,840,796	15,457,783	-5.0	-8.8	2,754,150	194,605	-4.3	-8.4	6.83	6.62
	RED BLENDS (ex. 4/5L + CHIANTI)	1,863,018,268	140,402,591	2.8	-1.6	17,217,966	1,300,625	1.2	-2.8	9.01	8.99
	ROSE BLEND	517,768,670	29,421,259	39.3	23.6	4,477,890	266,496	42.7	25.2	9.63	9.20
GLASS SIZES	750ML	10,359,795,642	759,963,052	2.4	-0.6	82,920,868	6,054,364	0.0	-3.0	10.41	10.46
	1.5L	2,101,743,617	154,852,150	-4.5	-6.2	36,332,897	2,674,145	-5.4	-7.1	4.82	4.83
	3L	62,903,814	4,731,696	-8.6	-11.7	1,653,181	122,582	-9.9	-13.8	3.17	3.22
	4L	79,898,108	5,773,507	-8.5	-10.7	2,553,661	182,090	-11.5	-13.1	2.61	2.64
	187ML	106,923,227	7,956,350	-1.6	-5.5	1,314,868	96,293	-3.3	-8.2	6.78	6.89
	375ML	17,906,289	1,440,945	8.1	10.6	69,150	5,246	8.6	1.8	21.60	22.91
BOX SIZES	ex. 4/5L	876,652,766	70,185,371	9.0	8.7	15,650,788	1,243,297	8.0	7.5	4.67	4.70
	1L	29,735,812	2,365,667	10.8	17.4	449,956	35,438	8.3	14.9	5.51	5.56
	1.5L	14,776,970	1,133,118	4.4	2.7	240,922	18,625	5.3	5.0	5.11	5.07
	3L	640,398,289	51,382,683	8.0	8.4	12,381,745	990,015	7.4	7.8	4.31	4.33
	5L	488,891,898	36,891,732	-2.0	-2.4	17,849,001	1,328,973	-2.6	-3.8	2.28	2.31
	TETRA	221,859,723	17,700,337	12.8	10.1	3,031,796	234,955	11.1	6.5	6.10	6.28

Source: Nielsen

2019 Vineyard Economics Report

Flush with Cash, Banks See Some Plateauing of High Vineyard Prices

Every banker interviewed confirmed the continuance of a plateau in prices and sales of vineyards and also noted the pervasive wait-and-see market conditions.

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.

Vineyard Sales Take a Time Out

For regular readers of ***Wine Business Monthly*** the headline above may seem familiar. That's because it appeared in the September 2018 issue. To place emphasis for this year's report on the current lending environment for vineyard sales, we repeated the headline. There's a current lull in vineyard real estate transactions, but this, if anything, illustrates the common economic underpinnings that ultimately determine the ever-changing vagaries of the vineyard marketplace and today's sales climate. Simply put, it's one part of a trio of symbiotic vineyard market behaviors noted by the banking, real estate and M&A executives *WBM* spoke with:

1: "As consumer wine sales go, so goes demand for vineyard property." (**Rob McMillan**, **Silicon Valley Bank**)

2: "As grape prices go, so go vineyard prices." (**Tony Correia**, **The Correia Company**)

3: "As vineyard prices rise in one region, vineyard sales climb in neighboring regions." (**Eric McLaughlin**, **Metis Mergers & Acquisitions**)

The years-long crescendo of vineyard sales has peaked this year as buyers have settled into a contemplative, wait-and-see period. "There's a theory that bottle price leads to gallon price, which leads to grape price and leads to vineyard price. That all makes sense, in general, but vineyards also hold a collector's status besides an economic status, so it's not quite perfect," Rob McMillan, the EVP and founder of Silicon Valley Bank's Wine Division (SVB), explained. "But all that said, in an era where we are clearly long on supply for the moment, that should make the sales of property plateau.

"Last year there were some notable sales that still were fetching high prices, but I think the difference that we're running into this year is there's a general realization that we have more grapes than we need right now, so at some point that changes the way buyers might think about the market," said McMillan.

Amplifying this assessment, **Charles Day**, regional manager at **Rabobank**, explained, "You know, when I predict that we're going more into a buyer's market, I would have thought it probably would've happened already, but more of the transactions that I've seen so far don't reflect that. You have a combination of a fairly large harvest and high volume in the premium areas. So that's dampened the drive to lock in fruit sourcing and created more flexibility for the larger wine companies. They're less concerned about locking in fruit sources, either through long-term contracts or leases or outright purchases; and because of that, there's bound to be a ripple effect. I expect that it's going to put the frost in vineyard pricing."

The bankers and M&A consultants *WBM* spoke with are divided on who the predominant vineyard buyers are. Correia, a leading authority on the valuation of agricultural and rural properties, with a special emphasis on vineyards and wineries, says wineries are still the primary buyers in the pursuit of firming up their grape sources. McMillan finds there are a variety of buyers, but he added that the speculative buying by different investment sources has dwindled for now.

Santa Rosa I Napa I Santa Maria I Salinas I Paso Robles I Fresno I Modesto I Yuba City

High Vineyard Prices and Abundant Harvests Slow Vineyard Sales

Jason Hinde, vice president at **Exchange Bank**, agreed. "I think everyone senses that vineyard prices are very high right now, so that's why there's a little bit of a hesitation and softening in the market. But it doesn't mean that there aren't transactions going on. Rather, there's a collective and momentary 'holding-of-our-breath' even though there is still plenty of capital available for loans."

"Let's face it: It's been very difficult to pass along the vineyard and grape price increases to the consumer. We have a lot of pressure from not just other wineries but other beverage categories," said **Jeff Clark**, domain specialist at **Live Oak Bank**. "Another reason for the slowdown in vineyard sales, especially compared to the past few years, is most vineyards are financed, and the bank wants to do projections for their return on loans. If you're projecting lower income, then that's going to reduce your ability to service loans. The domino effect of that means the bank will have to adjust the payments up to match the loan."

Clark noted, and most other bankers concurred, that the higher interest rates over the past 18 months factor in a little bit on all lending, not just vineyard lending. That, too, adds to a plateauing of loans. "Putting it all together when you have reduced demand and higher interest rates, and now we've got abundant supply at lower prices, that's going to put downward pressure on vineyard values," said Clark.

Hinde said that there are also some unrealistic expectations on the part of vineyard sellers, who saw some acres sell for incredible sums and want to realize that for themselves. Unfortunately, the numbers just don't work, he said, and there is no influx of institutional or foreign buyers.

Clark noticed that savvy buyers looking for property are being patient. They're willing to wait to see if prices will come down in conjunction with the supply of bulk grapes and wine out there. "I think you're going to see more négociants and private label business this year because we have this abundance of juice, and it seems like when we have surplus, the entrepreneurs come out and sop up all that excess juice," he said.

Beyond the grape abundance issue, there still remains a demand for premium vineyards to produce more consumer-coveted varieties. If not stratospheric prices for Cabernet Sauvignon vineyards in Napa or Pinot Noir from Sonoma, vineyard buyers are alternatively seeking grape sources on California's Central Coast and even more so in Oregon and Washington. Some AVAs in the Pacific Northwest are experiencing a land rush; vineyard values are beginning to match Napa-like pricing, though in other areas an oversupply has muted sales.

California Vineyard Buyers Flock to Compelling Northwest Alternatives

"The growth and interest in Oregon and Washington are largely driven by Napa and Sonoma becoming less and less affordable," said Eric McLaughlin, CEO and managing partner at the Northwest's leading mergers and acquisitions firm, Metis.

"We're definitely seeing more interest in properties in Oregon and Washington from operators that are either currently investing in California, or previously would've looked to invest in California, for various reasons. Part of the influx to Oregon and Washington is getting priced out of the ultra-premium areas [in California]. Part of the movement north is environmental or regulatory," McLaughlin said.

The increase in vineyard transactions has led some of the preferred AVAs in the two states to be price-prohibitive. For instance, noted McLaughlin, "The Dundee Hills AVA is experiencing a price premium and a price insulation that is unparalleled by the other regions' nested AVAs within Oregon. It's not that Dundee Hills is inherently superior from a viticultural standpoint. Rather, it's people want to be in close proximity to established players at the high end of the market."

Ironically, added McLaughlin, the oversupply in both Oregon and Washington is causing a softening of price, which is slowing demand for vineyard acquisition. "The vineyard acquisitions we see happening are those driven by the prime vineyards, which have either a proven or a high-end theoretical ability to produce very high-end wine. Those will continue to go for a premium," he said. "The other activities that we'll see are purchases of properties in distress, where the buyers are going to be opportunistic about buying C- and B-quality vineyards at a bargain."

While the rush to premium property in Oregon has been generated by the growing consumer demand for Pinot Noir, it's Cabernet that drives the pursuit for vineyards in Washington, the latter centered around the life-style-rich, Walla Walla and the rich-soil Red Mountain. McLaughlin noted that "consumer sales of Oregon wines continue to outpace the industry in general, and Washington is slightly outpacing the median in the industry." This phenomenon is occurring despite an overall wine industry sales growth rate that has flattened.

The Road Ahead: No Peaks Expected as Wait-and-See Sales Plateau Continues

"We're at that point in the market cycle which has to be digested, so I don't expect to see any major changes from today until we get closer to harvest, and then we'll see, because at some point if the trends continue the way they're headed, you're going to see buyers wanting to negotiate grape contracts and renegotiate gallon contracts. You'll see changes in that component of the business," said McMillan.

Flush with Cash, Banks See Some Plateauing of High Vineyard Prices

"We still have growth in the higher-priced bottles, but it's slowing and a definite slowing for lower-priced bottles. This is reflected likewise in vineyard sales and the type of buyers that predominates now. The larger wineries are still buying. I don't see as many people who are buying speculatively," McMillan reported.

Day is still confident that there will be long-term growth in the wine market but doesn't expect it to be as rapid as before "Wineries are going to have to be much smarter about how they get their products to the consumers. I expect to see some increased competition from négociants, which is probably going

How Does the Growing Labor Shortage Affect Vineyard Sales?

The implications of an omnipresent labor shortage in large and small agricultural areas are certainly seen as a threat to vineyards, especially ones that are still hand-picked. As vineyard real estate expert Tony Correia said, "Buyers are paying much more attention to what their operating costs are going to be going forward. That's driving a lot of their decisions about purchasing a property."

Live Oak Bank's Jeff Clark pointed out, "We've been spoiled! We've had this abundance of low-cost labor until recently. I wouldn't make a loan on a vineyard unless it was set up for mechanical harvesting in the future. The exception would be vineyards on steep hillsides, which have to be hand-picked.

"Labor is only going to get more expensive because the shortages will become more severe. Add to that the state of California just keeps implementing more taxes and regulations that drive up the expense of labor."

Charles Day at Rabobank sees vineyard deals becoming less desirable, thanks to a combination of high prices for the vineyard and ever-increasing farming costs. It makes buying fruit and contracting more economically feasible.

Potential vineyard buyers are much more aware when considering a site if it will be able to get automated equipment in, according to Jason Hinde at Exchange Bank. "They also look at the margins. If you're handling a very premium-quality vineyard transaction, and it's very labor-intensive, if the cash flow is too thin, they may not do the deal because they know that labor is not going to go down. Nobody thinks labor costs are going to go down. It's just like everything else. I think labor considerations are a risk that was not very prevalent 10 years ago, so buyers are factoring that in much more often," he said.

Of course, labor is not just an issue in California. In the Pacific Northwest states, Metis' Eric McLaughlin reported the same. "We're seeing clients that are quite mindful to whether or not a vineyard is currently mechanized or has the ability to be mechanized. But investors from outside of the Northwest, mainly from California, are very cognizant of the need for mechanization in the future, and whether or not a vineyard is suitable for mechanization.

"If a vineyard's not suitable for mechanization, it might because of the topography, but maybe it's a super steep vineyard making high-end wines that you can leverage to pay what it takes to get the labor into it. If it's not suitable for mechanization because it's not trellised and trained properly, well, that will be reflected in price because it would be expensive to convert those vineyards to trellising systems to handle mechanization," McLaughlin said.

to put the estate-model wineries' margins under pressure. I'm waiting to see if some of the sellers out there are motivated enough to sell into a market that might start declining."

Hinde thinks that vineyards and wineries will need to look to the changing consumer to keep their business current. "I think that the wine industry as a whole is going to have to change—and I'm talking on a very macro and long-term basis, and not what's happening next year or the year after. Most people have recognized that your core consumer is changing. People always drink alcohol. What changes is what alcohol they spend money on and how much. Legalization of cannabis will be another product that takes away money that has been spent on wine.

"I don't think it's going to be the same old business or work using the same old business plan, which gave the wine industry the level of success that we have seen in the previous 20 years. I think there'll still be tasting rooms. I think there'll still be plenty of DTC-focused small wineries and ways to make money, but we have a different demographic that spends money differently, and you have competitors that we didn't have 10 years ago," Hinde said. This, of course, will trickle down into the ways buyers approach vineyard purchases. **WBM**

Select Vineyard Lenders

Company Name	State	Phone	Website
5th Street Financial	CA	707-591-0573	*www.5thstreetfinancial.net*

American AgCredit CA 800-800-4865 *www.agloan.com*

American AgCredit has provided financial services to the vineyard and wine industry for more than 100 years. We finance many all types of operations and understand the industry's credit needs. American AgCredit believes that making a success of your operation takes hard work, knowledge of the industry, and sound financing. You want a lender who understands the demands and unique aspects of your operation and has the experience to provide the financing you need.

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Bank of America Merrill Lynch	NY	707-293-2553	*www.baml.com*

Bank of Marin CA 707-265-2001 *www.bankofmarin.com*

If you're looking for custom financing to help grow your wine business, Bank of Marin's local team of industry specialists is there for all your financial needs. Energized by the great work of our customers and committed to doing our part to help them grow, we have just the right tools and expertise to deliver creative and flexible solutions that address your unique and often complex business challenges.

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Bank of Marin

Bank of Stockton	CA	209-929-1600	*www.bankofstockton.com*
Bank of the West Wine & Beverage Group	CA	707-501-5150	*www.bankofthewest.com*
California Private Money Lenders	CA	707-315-1119	*www.californiaprivatemoneylenders.com*
Capital Farm Credit	TX	512-892-4425	*www.capitalfarmcredit.com*
CoBank	CO	800-542-8072	*www.cobank.com*
Comerica Bank	CA	888-973-8665	*www.comerica.com/wine*
Exchange Bank	CA	707-524-3102	*www.exchangebank.com*
F&M Bank	CA	707-757-8501	*www.fmbonline.com*
Farm Credit West	CA	800-909-5050	*www.farmcreditwest.com*
Farm Plus Financial	CO	866-929-5585	*www.farmloans.com*
First Republic Bank	CA	415-392-1400	*www.firstrepublic.com*

The descriptions are provided by the banks.

Select Vineyard Lenders

Company Name	State	Phone	Website
GUD Capital, LLC	CA	866-526-0238	*www.gudcapital.com*
Janus Ag Finance	CO	888-249-0777	*www.janusagfinance.com*
Live Oak Bank	NC	707-921-1102	*www.liveoakbank.com/wcb*
Mechanics Bank	CA	707-256-4343	*www.mechanicsbank.com*
Working Capital lines of credit for inventory and accounts receivable; Equipment Term Loans; Vineyard Development and Replant Loans, Crop Loans and Long Term Loans; Winery Construction and Permanent Loans. Operating Accounts and Treasury Management.			
MetLife Agricultural Finance	CA	559-435-0206	*www.metlife.com/ag*
MetLife, one the nation's largest private lenders to agriculture, provides long-term mortgage financing to the wine industry. We have a local staff of knowledgeable wine industry professionals dedicated to helping you meet your financial goals and who can offer personalized service for large and small business alike.			
Northwest Farm Credit Services	WA	509-340-5300	*www.northwestfcs.com*
PGIM Real Estate Finance, Agricultural Finance	CA	916-789-4071	*www.pgimref.com/real-estate-finance/businesses-agricultural-lending.shtml*
Prudential has been providing long term debt to the vineyard and wine industry since the 1950's for acquisitions, expansion, and refinancing.			
Rabobank, NA	CA	707-545-6887	*www.rabobankamerica.com*
Rabobank, N.A. is a full-service community bank and a leading provider of agricultural financing and banking products to California's wine growers and businesses, offering depository and cash management services, flexible operating credit, real estate based revolving lines of credit, equipment loans and leasing, and fixed and variable rate real estate financing.			
Silicon Valley Bank, Wine Division	CA	707-967-1367	*www.svb.com*
Umpqua Bank	CA	707-259-2350	*www.umpquabank.com*
Union Bank	CA	707-968-9514	*www.unionbank.com*
Wells Fargo Wine, Food & Beverage Group	CA	707-584-3150	*www.wellsfargo.com*

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Mechanics Bank

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MetLife

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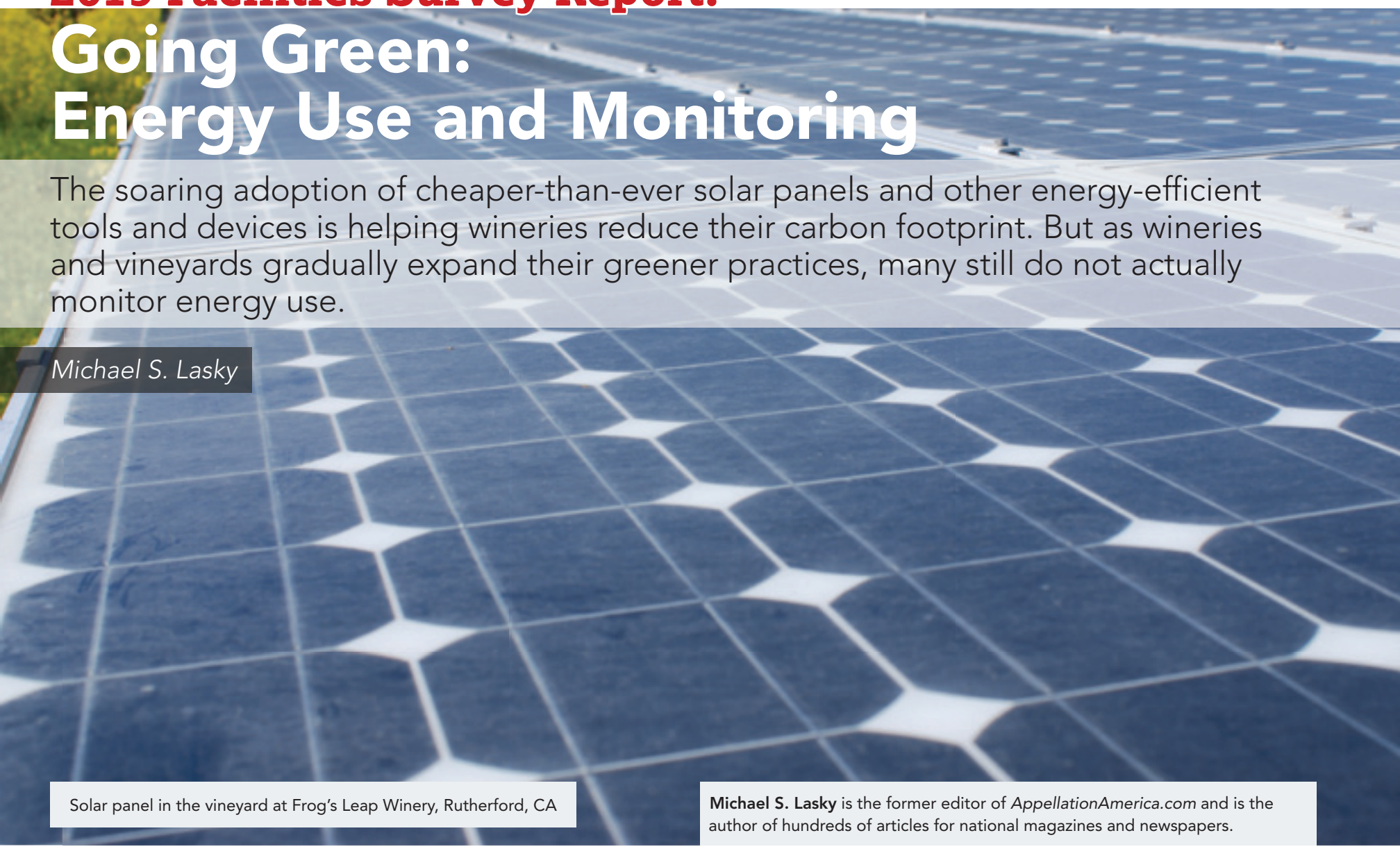
Rabobank

2019 Facilities Survey Report:

Going Green: Energy Use and Monitoring

The soaring adoption of cheaper-than-ever solar panels and other energy-efficient tools and devices is helping wineries reduce their carbon footprint. But as wineries and vineyards gradually expand their greener practices, many still do not actually monitor energy use.

Michael S. Lasky



Solar panel in the vineyard at Frog's Leap Winery, Rutherford, CA

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

EACH YEAR THE ***Wine Business Monthly*** Facilities Survey focuses on time-relevant issues facing the maintenance of winery and vineyard operations. It was no surprise that for the past few years, the Facilities Survey addressed the drought-centric water demands on the West Coast wine industry. Now that this year's exceptionally wet winter and spring have filled many reservoirs to the max, putting the water crisis behind us for now, this year's survey wanted to gauge the steps the industry is taking to manage, reduce and monitor its overall energy use in the production of wine.

Before a company can start to reduce its energy use, it must monitor how much it's using. Otherwise, how will it know what its comparative reduction levels are?

Do You Monitor Your Energy Use?

Overall, 45 percent of respondents confirmed they do monitor energy use. When divvied down by winery size between small (under 49,999 cases) and mid-to-large wineries (50,000 cases and higher), the data revealed a significant difference between the two. Larger wineries with more financial, logistical and human resources at their disposal likewise displayed a commanding lead, with 57 percent noting they monitor their energy use. Small wineries with more limited resources tended to measure energy 43 percent of the time.

How Many Kilowatts Per Hour Does Your Winery Use to Produce a Gallon of Wine?

As in past years, when this question was presented, the vast majority of responses from wineries of any size was basically, "We have no idea." This year is no different.

The overall average of all "we don't know" winery responses was 81 percent; 82 percent of small wineries and 75 percent of large wineries chose this option.

WBM has tracked the answers to this question since 2011, and there has been only a slight percentage difference year to year; in fact, on average the negative responses have trended in the same range between 76 percent and 81 percent. Admittedly, the question requires wineries to perform some mathematical calculations and, of course, it only works if a winery actually monitors its overall kilowatt consumption. We ask this question if only to bring awareness to energy conservation, but so far wineries still are figuring alternative methods to conserving their energy IQ.

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What Steps Have Been Taken or Are Being Taken by Your Company to Conserve Energy?

When it comes to implementing ways to conserve energy, the wine industry has proven to be a leader. Sure, there's room for improvement—and that goes for all industries—but as a unit, wineries are at the head of the energy-conscious class. With the multitude of methods to lower energy use—and the associated reduced expenses that come along with that—the Facilities Survey inquired about 10 potential ways most frequently utilized by wineries.

Out of the 10 ways we zeroed in on, by far the most frequently applied energy reducers by wineries of all sizes were

- adding installation in winery walls and roof—63 percent
- installation of low energy lighting—75 percent
- installation of tank temperature controllers—51 percent
- installation of solar panels—30 percent

CHART 1

What steps have been taken or are being taken by your company to conserve energy? (Check all that apply)

	SMALL	MEDIUM to LARGE
we have not taken any steps to reduce our energy usage	9%	0%
installed insulation in winery walls or roof	64%	62%
installed low energy lighting	73%	92%
installed motion detectors that automatically shut off lights	28%	38%
installed variable drive pumps for pumping water	16%	23%
installed variable drive pumps for glycol pumps, condensers or evaporator fans	12%	54%
installed insulation on indoor or outdoor tanks	25%	38%
installed tank temperature controllers	50%	62%
purchased new energy efficient portable chiller	10%	23%
purchased new energy efficient permanent installation refrigeration system	11%	15%
installed solar panels	27%	54%
Other (please specify)	18%	8%

2019 WBM Facilities Survey

SMALL 0-49,999 MEDIUM to LARGE 50,000 and over

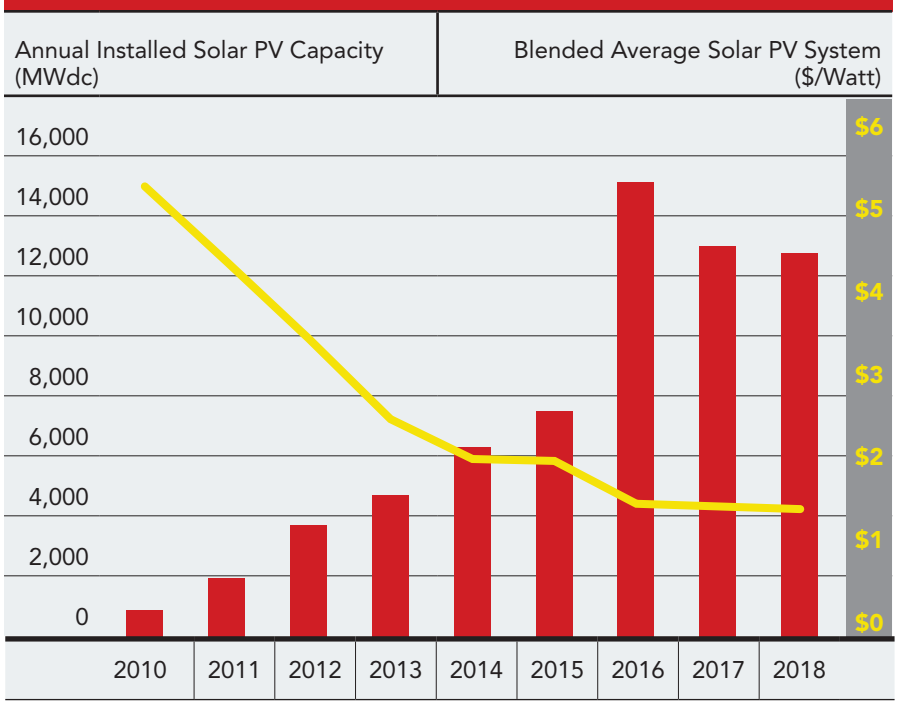
Compared to previous years, solar panel adoptions surged in 2018, as the ever-lowering installation, maintenance and use costs reached a tipping point and wineries are able to afford the use of this method.

When we compare the solar panel installation responses from prior surveys, a clear pattern emerges. Six years ago, in 2013, just 19 percent of all wineries said they installed the panels. In 2014, the percentage climbed just 2 percent. When we checked in again in 2016 solar panel installation fell to 17 percent, then popped back up in 2017. But in 2019, suddenly the number of solar panels at wineries dramatically climbed to 30 percent, with all signs pointing to even higher numbers in the years to come.

According to the **Solar Energy Industries Association** (*www.seia.org*), "The cost to install solar has dropped by more than 70 percent over the last decade, leading the industry to expand into new markets and deploy thousands of systems nationwide. Solar's increasing competitiveness against other technologies has allowed it to quickly increase its share of total U.S. electrical generation—from just 0.1 percent in 2010 to over 2 percent today. Prices as of Q4 2018 are at their lowest historical level across all market segments. Solar generation offsets more than 73 million metric tons of CO_2 emissions each year, equivalent to taking 15.6 million vehicles off the road or equivalent to planting nearly 1.2 billion trees."

Solar panels are not the only pieces of energy reduction equipment that have seen significant winery installations. Of course, mid-sized and large wineries provide a higher percentage of equipment purchases while small wineries have proven their desire to reduce energy consumption with an investment in low-energy additions. In fact, small wineries exceeded mid-to-large wineries 64 percent to 62 percent in the installation of insulation in winery walls or roofs. Although not a commanding difference, this statistic does manifest small wineries' greener intent.

U.S. Solar PV Price Declines & Deployment Growth



Source: 2019 SEIA/Wood Mackenzie Power & Renewables *U.S. Solar Market Insight;* Lawrence Berkeley National Laboratory, *Tracking the Sun*

On the other hand, small wineries reported far less investment in installing variable drive pumps for glycol pumps, condensers or evaporator fans, with only 12 percent of survey responders compared to a whopping 54 percent of mid-to-large wineries.

Infrastructure Additions: What Have You Added in the Last 12 to 24 Months?

No matter the size of the winery, adding barrel and tank storage space and tasting room and/or event space have been the consistent top add-ons. For this year's survey, more than 50 percent of respondents said these areas were where improvement dollars were spent.

Compare this to other energy-centric winery concerns that earned lower affirmative responses this year: renewable energy systems (22 percent), water efficiency measures (35 percent), crushpad capacity space (34 percent) and geothermal refrigeration/heating (6 percent).

When we compared this year's survey responses to the same questions asked in 2017, all add-on categories displayed conspicuous increases in 2019 from the 2017 results with one exception: Installations of water efficiency measures were stronger in 2017 when the West Coast drought still blistered. Back in 2017, 44 percent improved their water efficiency. This dropped to just 35 percent this year, when the water emergency ebbed.

CHART 2

Have you added any of the following in the last 12-24 months? (Check all that apply)

	SMALL	MEDIUM to LARGE
Renewable energy systems	22%	25%
Water efficiency measures	33%	50%
Crushpad capacity space	33%	38%
Barrel/tank storage space	52%	50%
Tasting room/event space	53%	38%
Geothermal refrigeration/heating	5%	13%
Heat pump	15%	0%
Other (please specify)	9%	13%

2019 WBM Facilities Survey

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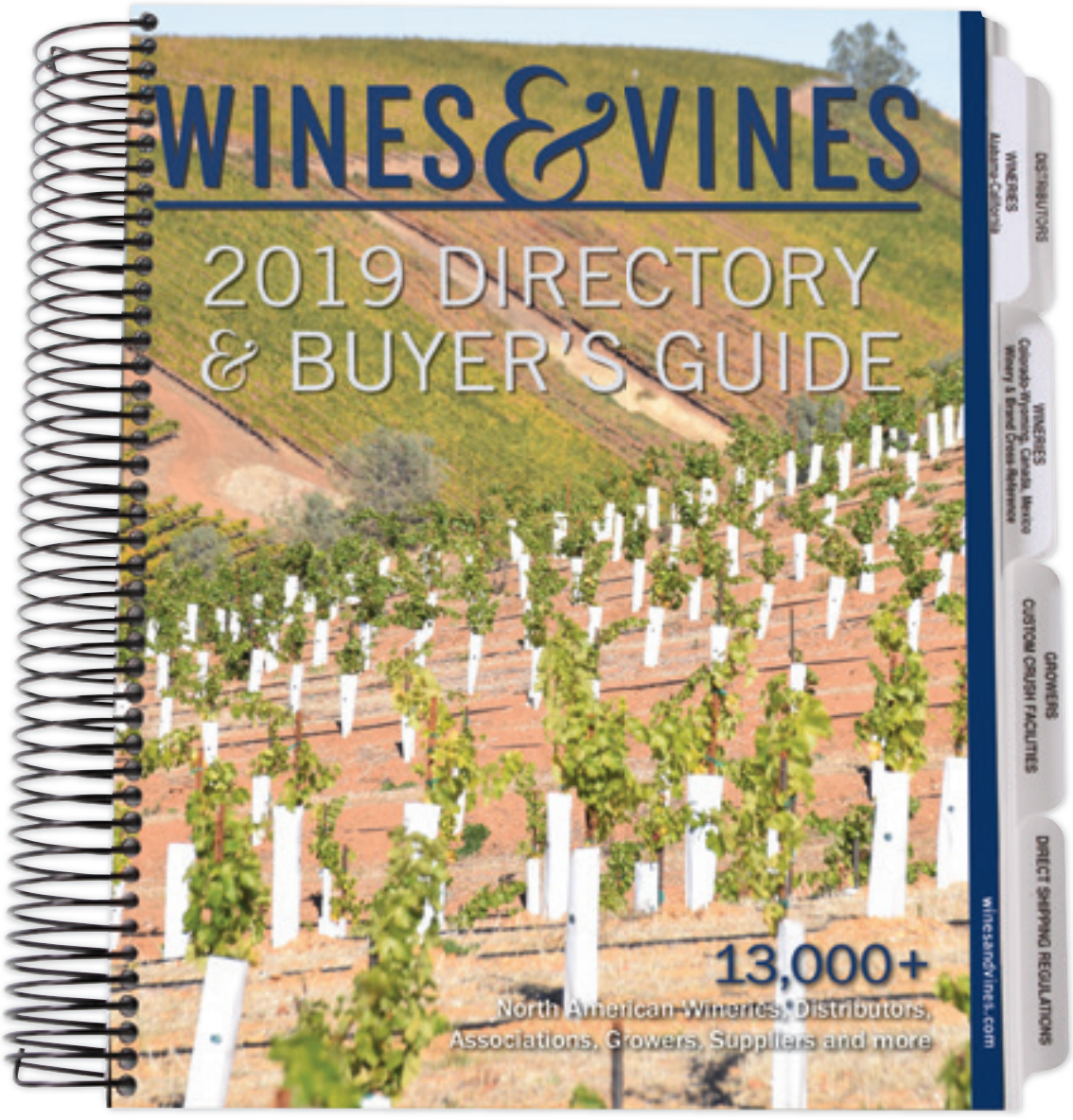

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How We Save Energy: Winery Case Studies

Each year dozens of wineries in California demonstrate their environmental practices as they pursue earning the **California Green Medal**. Now in its fifth year, the **California Green Medal Sustainable Winegrowing Leadership Awards** (*www.greenmedal.org*) provide recognition to vineyards and wineries that are leaders in implementing the three Es of sustainability (environment, economic and social equity). Here are the energy saving practices of a trio of wineries that serve as winning examples of the wine industry.

Silver Oak Winery, Oakville, California – The Oakville winery sports 1,464 solar panels, which are enough to power 35 percent of its annual energy needs. The winery's new AV facility produces about 80 percent of its energy demands with nearly 2,600 solar panels. According to the application: "We have installed 330 Kw batteries along with a micro-grid controller to optimize use of solar and grid energy. The Pxise (*www.pxise.com*) Advanced Controller Technology (ACT) will perform load shifting so that during times of high energy costs, the batteries will be discharged, resulting in tangible savings."

Domaine Carneros, Napa, California – The winery's solar array provides about 40 percent of the winery's power. Accordingly, the winery had virtually no increase in energy usage from 2017 to 2018 even with a large harvest and several construction projects. According to the application: "We also have a continuous program to replace the winery's lights with energy efficient LED bulbs. So far, 90 percent of the light bulbs at the winery have been replaced."

Stone Edge Farm Winery, Sonoma, California – According to the application: "Our MicroGrid is a mile-long line that connects a network of electrical services and integrates various forms of distributed energy generation (solar, micro turbine, hydrogen fuel cells) and storage (batteries and hydrogen) with real time monitoring and control. What makes our MicroGrid mode unique is its ability to operate islanded while intentionally export energy onto the utility grid. Our MicroGrid was awarded the **Governor's Environmental and Economic Leadership Award** (GEELA) for its advanced technology to generate, store, and distribute clean energy to its property and beyond."

CHART 3

Do you plan on adding any of the following in the next 12-24 months? (Check all that apply)	ALL WINERIES
Renewable energy systems	29%
Water efficiency measures	30%
Crushpad capacity space	25%
Barrel/tank storage space	32%
Tasting room/event space	38%
Geothermal refrigeration/heating	5%
Heat pump	5%
Other (please specify)	10%

2019 WBM Facilities Survey

Future Planning: What Do Wineries Say They Are Adding in 12 to 24 Months?

Coming up within the next two years, 38 percent of wineries indicated in the survey that they still intend to focus much of their infrastructure budgets on expanding their tasting room and event space; this was the top survey response. This is consistent with past years' survey results.

Thirty-two percent of survey respondents indicated they intend to add more barrel and tank storage space.

Renewable energy system additions and water efficiency measures are also high on winery investment plans, with 29 to 30 percent of survey respondents noting plans to include these methods of energy savings. **WBM**

Methodology

Wine Business Monthly received 145 responses from wineries and growers to this year's survey. Eighty-eight percent of all respondents were small producers with annual production of less than 49,999 cases per year. The next size category (mid-sized) of 50,000 to 499,999 cases per year comprised about 6 percent, and the remaining portion of respondents had production over 500,000 cases (large). This is less than a 100 percent response total due to rounding. The survey was conducted via **SurveyMonkey**. About 30 percent of respondents were from California, with the rest from other states.

Winemaking & Wineries


Joseph Fritz

Scheid Family Wines (SFW) hired **Joseph Fritz** as multi-state sales manager. Fritz will handle SFW's sales and distributor management in Virginia, Washington, D.C. and Maryland. Fritz has 15-plus years of wholesale wine experience. Previously he served as senior wine manager of **Hop and Wine Beverage** in Chantilly, VA. During Fritz's time there, the fine wine business grew from less than $100,000 in revenue in 2012 to over $2,000,000. Prior to Hop and Wine Beverage, Fritz was a sales representative for **Grassroots Wine Wholesalers** in Birmingham, AL. Before launching his career in the wine industry, Fritz graduated cum laude from the **University of the South**, Sewanee, TN with a B.A. in economics.

C. Mondavi & Family promoted a series of sales team members alongside a new hire. Effective immediately, the appointed **Riana Mondavi** as director of chains off-premise, West and **Spencer Tirschek** as director of national accounts on-premise. C. Mondavi & Family further welcomes new hire **Christopher Mouriski** as sales vice president—West. In her new role, Mondavi will continue to uphold the family legacy with her industry expertise. After joining the family business 2011, she worked her way up from Pacific Northwest regional sales manager to her latest role. She continues to serve as a family brand ambassador and is further utilized as a key spokesperson for the Mondavi's fourth generation.

Mondavi is joined by Tirschek with his promotion to director national accounts on-premise. Tirschek will continue driving on-premise sales with his leadership and wine acumen. With over 12 years of industry experience, Tirschek previously held sales and management roles at **Vintage Wine Distributor, Inc**. before joining C. Mondavi & Family. Additionally, Christopher Mouriski joins C. Mondavi & Family as the sales vice president—West. Mouriski comes with over a decade of sales and sales finance experience within management and leadership roles from notable companies such as **Beam Wine Estates** and **Delicato Family Vineyards**. Most recently, Mouriski acted as director sales operations for Treasury Wine Estates. During his time in the role, he elevated their national sales organization through a set of initiatives to grow his team's sales capabilities.

Bob and **Renée Stein**, the owners of **Notre Vue Estate** and **Balverne Wines**, based in Windsor, announced several new key management figures who have joined the winery. **Alex Holman** has been named winemaker; **Kirk Tomiser** has been named national sales and marketing manager; **Daniel Charles** is the new viticulturist.

Holman graduated from **CSU Fresno** with a B.S. in chemistry after spending five years in the **U.S. Army**. As a winemaker, his career has been entirely based at family-owned wineries. He received his start with **Golden State Vintners** making **Christian Brothers** brandy. Most recently at **Rack and Riddle**, Holman has also made wine for **Keller Estate**, **J. Rickards**, **Dry Creek Vineyard** and **Paul Hobbs**. Kirk Tomiser graduated from the **University of Missouri, Columbia**. He has more than twenty years of experience as a supplier with both multi-state and national responsibilities. He began his career at **Mueller Distributing Company** and went on to regional and national sales management positions at **Barefoot Cellars**, **Dry Creek Vineyard**, **Rutherford Wine Company**, **Stoller Imports** and most recently, **Provence Rose Group**. Daniel Charles graduated from **California Polytechnic State University, San Luis Obispo** with a degree in agricultural business. Charles has worked in the vineyards for **Bayview Vineyards** in Napa, **Balletto Vineyards** in Sonoma and **Gallo Vineyards** in Monterey and San Luis Obispo as well as in in the Marlborough region of New Zealand. He has broad experience across numerous areas of grape growing, from expertise in new vineyard development to the development of new vineyard technology including evapotranspiration sensors and remote frost alarms.

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people

BRION, the new standalone label established by **Brion Wise** of **B. Wise Vineyards**, announced its vineyard and winemaking team. The team consists of three top Napa Valley winemakers, a collection of accomplished local vineyardists and a dedicated master cooper who will collaborate to pursue Wise's goal of depicting distinctive terroirs through wine. BRION's winemaking team consists of **Julien Fayard**, **Mark Herold** and **Massimo Monticelli**, three of Napa Valley veteran winemakers. **Larry Bettinelli**, **Paul Goldberg**, **Garrett Buckland**, **Enrique Castillo** and **Jesus Espinoza** anchor the vineyard team. **Ramiro Herrera**, one of only a handful of master coopers in the world, will oversee barrelmaking and procurement for the BRION wines.

Miller Family Wine Company announced the creation of a new national sales team under his leadership. New team members include **Lanay Jacobs**, director of on-premise and commercial strategy, whose past experience has led to working with leading beverage companies such as **Bacardi**; **Jon Smalley**, midwest region sales manager, who brings strong distribution management skills and over two decades of experience in both beer and wine; **Kaila Debesse**, south central region sales, who has maintained key relationships throughout her time in both the distributor and supplier communities overseeing both on and off premise business; and **Janet Hammer**, region manager pacific northwest who brings strong control label capabilities with great experience in companies like **O'Neill Vintners**. They join existing industry professionals **Wes Hagen**, brand manager, and **Brandt Grandy**, plains region manager, to represent Miller Family Wine Company's national sales team.

Precept Wine chief executive officer **Andrew Browne** announced the promotion of **Courtney Bradbury** to the strategic accounts team, part of the team led by **Austin Gangel**, senior vice president of strategic accounts. Representing one of its fastest-growing business divisions, Bradbury brings her 12 years of supplier logistics and sales experience to develop high-opportunity business segments. She will split her time between airline, broker, as well as selected Northwest regional chain accounts.

Constellation Brands, Inc. appointed **Robert Hanson** as the company's new executive vice president and president, wine and spirits. Hanson previously served as a member of Constellation's board of directors from Feb. 27, 2013 to April 24, 2019. Constellation's Board accepted Hanson's resignation from the board prior to his acceptance of this new role with the company. Hanson will officially assume this new role on June 3, 2019.

Distributors, Importers & Retailers

Laffort USA appointed **Cayla Dee Porter** as Nobile business development manager, responsible for all aspects of the Laffort-owned oak alternative producer based in Bordeaux. Porter comes to Nobile and Laffort with experience in Napa, Sonoma and Mendocino county winemaking roles, as well as extensive experience in sales of wine direct to consumers.

Cannabiniers, a cannabis brand management company, announced **Marty Birkel** as the company's newest board member. Former president of **Ballast Point Brewer**y and 20 years of experience in global beer, wine, and spirits with **Constellation Brands**, Birkel brings decades of knowledge focused on building brands, managing aggressive market expansion, marketing, operations and hospitality in support of adult beverages. During his 20 years with Constellation Brands, Birkel served as chief global sales officer- wine and spirits, president of Ballast Point Brewing, president of **Constellation Spirits**, and executive vice president of **Barton Beers**. Over the past two years, Birkel was key in the Ballast Point acquisitions of Florida's second largest craft beer company, **Funky Buddha**, and **Four Corners**, a Dallas-based dynamic and bi-cultural Hispanic and Anglo craft brand.

Industry Services & Suppliers

Exit Strategies Group, Inc. announced **Joe Orlando**, ASA, as its new vice president of valuation services. Orlando will perform a broad range of business valuation services for our clients and provide technical leadership for our team of accredited valuation experts. Orlando is an accredited senior appraiser (ASA). He has served as president, vice president, treasurer and business valuation discipline director for the **American Society of Appraisers'** NorCal chapter, and he is a founding member of the **Fair Value Forum**. Orlando has an MBA in finance from **Georgetown University** and a B.A. in economics from **St. Lawrence University**.

Associations & Education

Leticia Chacon-Rodriguez began her new role as winemaker/winery manager the **UC Davis LEED** Platinum-certified teaching and research winery for the department of viticulture & enology. As winemaker, Chacon-Rodriguez will oversee crush operations and wine production from grapes sourced from UC Davis vineyards, teach enology students about winery operations and wine production, and assist faculty and researchers with winemaking research projects and trials. She most recently was director of operations at **Safe Harbor Wines** in Napa that provides wine blending, aging, micro-oxygenation and oak management, and storage services for wine production clients.She previously worked nearly seven years as a senior winemaker with **Treasury Wine Estates** (TWE) in Napa managing wine production to maintain quality control, ensure regulatory compliance, and meet company marketing requirements; and overseeing all operations from blending to bottling at the TWE bottling facility. Chacon-Rodriguez previously held positions as a winemaker with **E& J Gallo Winery** in Livingston, CA, and as an assistant winemaker at **Golden State Vintners** in Soledad.

Wine Institute appointed **Honore Comfort** as vice president of international marketing, effective April 8, 2019. Comfort brings extensive experience in international wine marketing, winery association management, brand strategy and wine export sales to the role. Comfort is principal and founder of **The Artemis Group**, a strategic planning and marketing consulting firm for the wine industry. Previously, she held the position of president of **Brack Mountain Wine Company**, executive director of **Sonoma County Vintners** and senior marketing positions with **Fosters Wine Estates**, **Southcorp Wines—The Americas** and **Rosemount Estate**. Earlier in her career, she held senior marketing positions with **Macy's West** and **The Art Institute of Chicago**. Comfort has also served as executive in residence with the Wine Business Institute at **Sonoma State University**, and is on the board of the **Wine Studies Program** and **Shone Farm Foundation**, both affiliated with **Santa Rosa Junior College**. She resides in Healdsburg, CA.

Longtime Napa Valley farmer **Pete Richmond** has been named as the 2019 recipient of the prestigious Napa Valley Grower of the Year award. Richmond will be honored for his contributions to the Napa Valley grape-grower and farmworker communities on May 10 at the 44th Napa Valley Grapegrowers Annual Dinner. In 2001, Pete Richmond founded **Silverado Farming Company**, which he currently owns and operates. Born and raised in Northern California, Richmond graduated from **Fresno State University** with a degree in agricultural business. His first job at **Bien Nacido Vineyards** on the central coast sparked his lifelong love of grape growing and farming. He later moved North to Napa Valley, where he worked in vineyard management for **Stag's Leap Winery**, **Atlas Peak Winery**, and **Kendall Jackson**, before striking out on his own. **WBM**

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Julia Iantosca, winemaker,
Saini Vineyards, Healdsburg, CA

Wine Business Monthly offers articles on all aspects of the wine industry, making it truly a great resource. The Varietal Focus articles give me new ideas and thought provoking insight into what other winemakers are doing both in the vineyard and the winery.

The new Product Reviews provide an easy way to stay up to date on equipment available—particularly useful when contemplating new equipment purchases.

The Annual Salary Survey is a great management tool. It is important to make certain staff is fairly compensated.

The ability to access past issues online is really useful, streamlining research on any topic."

NAME AND TITLE: Julia Iantosca, winemaker

WINERY NAME AND LOCATION: Saini Vineyards, 2507 Dry Creek Road, Healdsburg, CA

The Saini family represents four generations of Sonoma County grape growers, farming for over 90 years in Dry Creek Valley and Alexander Valley. The legacy began in 1908 when great grandfather Micele Saini arrived from Genova, Italy. He purchased the Dry Creek Valley farm in 1917. In 1934, second-generation grandfather Eugene (Si) Saini partnered with cousin Gene Cuneo and purchased a second ranch in Alexander Valley. Today John Saini and his son Mike Saini (third- and fourth-generations respectively) continue the family tradition of impeccable grape growing—made possible through their passion for quality and long history with their land. The next chapter began in 2008 when John and Mike partnered with family friend George Christie to launch a winery project. In spring of 2019 the new winery and tasting room will open at the home ranch in Dry Creek Valley.

ANNUAL CASE PRODUCTION: 1,500 cases

PLANTED ACRES: 225 acres Dry Creek Valley, 75 Acres Alexander Valley

CAREER BACKGROUND: I have been a winemaker for over 35 years. While a student at UC Davis I interned at Dry Creek Vineyards. I graduated from UC Davis with a B.S. in fermentation science. My first winemaking position was at Stevenot Winery in Calaveras County. I returned to Sonoma County in 1982 and worked for more than 20 years in Dry Creek Valley, first as winemaker for William Wheeler Winery and after as winemaker for Lambert Bridge Winery. In 2006 I began working as a consulting winemaker. Some of my clients have included Lasseter Family Winery, Hamel Family Wines, Leveroni Vineyards, West Wines and Starlite Vineyards. Joining Saini Vineyards feels like coming home because much of my career has been spent in Dry Creek Valley.

WHAT HAS BEEN YOUR BIGGEST PROFESSIONAL CHALLENGE? My biggest challenge was balancing my profession and my family. I have two daughters and they prove 'it takes a village' to raise children. I was fortunate to have lots of support from both friends and family. Our family had the added difficulty of having not one but two parents that were winemakers—long hours at harvest, bottling and travel for wine sales are not the most 'family friendly' schedule!

VARIETALS THAT YOUR WINERY IS KNOWN FOR: Old Vine Zinfandel, Sauvignon Blanc and Proprietary blends Angelo's Paint Brush (red) and Valentina Marie Rose (both blends of Grenache, Sangiovese and Carignane)

The Progression

ILLUSTRATION BY BOB JOHNSON

"COOKING IS A JOYFUL enterprise," asserted Chuy Palacios as he hand-ground spices in his stone molcajete. He took the powdered spices and dumped them into his blender to join the chili paste he had mixed with four different types of chili. "If you can't have fun cooking, the food won't taste right," he declared. Then he pushed the contents of the blender bowl through a sieve into a huge pot of soup that bubbled gently on his stove. Chuy used a finger to swipe some chile paste from the sieve, tasted it and then added a large pinch of salt to the pot. "That should do it, amigo," he said. "Now we just have to let it come together for an hour or two and we'll have something mighty tasty."

He reached into the cooler, pulling out two cervezas Victoria, lopped off the caps and passed one to me. Jake Lorenzo sat on his chair at the counter of Carne y Caldo, fully contented. I had just finished an extraordinary bowl of birria. The intense, complex flavors of chiles and spice clung to the goat meat with a richness that was inspirational. Lime juice, chopped serrano chiles, cilantro and red onion brightened the lush meat flavors and turned the broth ethereal. My second, ice-cold Victoria made for the perfect finish to the meal.

I sipped my beer with Chuy and thought about the joy he got from cooking. His Burrito Palace had been one of the greatest restaurants in all of Wine Country, but it had burned. Chuy wasn't joyful then. He was depressed. That depression lasted a long time. Bit by bit he got back into the kitchen. He started with Palacio en Fuego, his gourmet burrito wagon that still pops up wherever he decides to park it. Then he opened Carne y Caldo, a simple brick and mortar place that serves hearty soups, stews and salads, catering to local working families for breakfast and lunch. Chuy is happy again, and it is comforting to see.

This detective got a lot of joy out of making wine. Back in the late '70s and early '80s winemaking was back-breaking work, but it was fun. Not many people were doing it, and those of us making wine bonded in a strange society. Nobody paid us any attention. We were free to experiment. We shared information, tasted each other's wines and partied together. We had no experience and very little training, but we were making wine. It was good enough to drink, and it made you high. What more could you ask for?

As time went on, people started showing up at our wineries. They wanted to taste what we were making, and they were willing to buy what they liked. We set up tasting rooms to accommodate them, and we started looking for distributors to sell our wine as well. Pretty soon, those distributors brought their sales people to visit, so we would entertain them and teach them about wine. Tourists kept coming, and wine tasting became a big deal.

Restaurants opened for the tourists flooding into town. Hotels were built and opened. Pear and apple orchards were pulled out and replaced with vineyards. The town square still had plenty of restaurants and bars, but many of the small-town businesses, like the hardware store and the coffee shop diner, had been replaced by art galleries and knick-knack shops. Wineries grew, started wine clubs and began hosting weddings. Pretty soon wineries were making money.

That's when well-to-do business people started looking. They liked the wine business, saw it as a relaxed, rural way to simplify their lives, so they bought land, planted grapes and built stunning wineries with fancy reception areas. They saw business opportunities and started selling clothes and trivets and picnic fixings in their tasting rooms. They charged for tasting their wines. They made even more money, so corporations started snooping around.

Their accountants would study the books, see how to maximize profits, sell off unnecessary or duplicated entities, and then they would make an offer, a big-number offer. The businessmen who had come here for a different way of life were looking for the next new thing, so they sold their wineries. The old-time family wineries suffered divorces or had kids uninterested in continuing the wineries or just couldn't resist that big-number offer. They sold their wineries, too.

Winemaking became a business, much like any other business. People went to work and did their jobs. They got paid good salaries with health benefits, but there wasn't as much joy. That excitement of being on a rising wave, contributing to something new, had faded. Fewer and fewer wineries were family-owned. Corporations ran things and imposed restrictions, like having employees wear safety vests while pruning on a sunny day.

Things never stay the same. They progress and morph into different things. When it comes to the wine business, this detective has seen the same progression occur time after time.

Things never stay the same. They progress and morph into different things. When it comes to the wine business, this detective has seen the same progression occur time after time. It all starts with adventure and joy and learning as you go. Slowly, the wines get better, and the business becomes profitable. Business people and others with money are lured by the lifestyle and start fancy wineries, which bothers the people who have struggled for years to make wine viable. They look at the resources of these new competitors and assume they can't compete. The corporate offers seem reasonable, so they sell.

It is a cycle. It happened in Napa Valley and Sonoma County. It is happening in Oregon, Washington and Paso Robles. You can see it in Finger Lakes, New York and on the Leelanau Peninsula in Michigan. If they ever figure out their water dilemma, it will happen in Valle de Guadalupe, Mexico. It's just the way things work.

Wherever wine is taking a foothold, the progression is coming. The progression is inexorable and inevitable, but there is no reason to be depressed. Find out the place in the progression that you like the most and then visit areas at that stage. Jake Lorenzo prefers the joyous state right after the wine gets good and the restaurants flourish, but before the rich people and corporations come in. Right now, that puts me in Valle de Guadalupe, the Sierra Foothills and Idaho.

No matter where you are on the progression, look for the joy and go there. To paraphrase Chuy Palacios, "If you can't have fun making wine, then you shouldn't be drinking." Go where they enjoy making wine. What more can you ask for? **WBM**

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