

WINES & VINES

WINESANDVINES.COM

HARVEST IS COMING

Tools and Techniques to
Get Your Crush Pad Ready

Q&A with
Gallo's Nabedian
Prevent or Halt
the Spread of Brett
New Crush Pad Tech
at Ferrari-Carano



NOMACORC
TRENDSETTERS
#4 IN A SERIES

“YOU LEARN TO TRUST THE PLANT TO
CONNECT YOU TO THE LAND.
WE TRUST NOMACORC TO KEEP
THAT CONNECTION CLEAR.”

Ken Wright has used our closures for 15 years because they eliminate faults due to oxidation, reduction and TCA. They help him deliver wines that are true to the place where they were grown.



vinventions.nomacorc.com/trendsetters

by VINVENTIONS



8 Connect With Us

10 Editor's Letter

73 Advertiser Index

METRICS

12 Surge in DtC, rosé fuel stable wine sales

NEWS

14 Top Stories

Gallo Continues Buying Spree, Snatches up Santa Barbara vineyards

20 Canadian Wine Trade Caught in Pipe Feud

66 Eastern News

Partners Seek to Revive Texas Winery, Bolstering Wine and Vineyard Education

PRODUCTS

26 News

Light for Night Picking, Wound Sealant for Vines, Barrel Lifter

COLUMNS

28 Vineyard View

Successes in the Fight Against Pierce's Disease
By Clifford Ohmart

30 Viewpoint

Is China a Long-Term Play for U.S. Wine?
By Jim Boyce



ON THE COVER

It may only be June, but harvest is just around the corner and this is an ideal time of year to make sure everything is squared away and ready to go on your crush pad.

This issue of *Wines & Vines* features content on new crush pad equipment and design, enological tools to help during fermentation as well as a report on recent research into preventing the spread of *Brettanomyces* in the cellar. Pretty soon the interns will show up looking for work. Have you checked the press membranes, tested and lubricated the destemmer and do you know where all the picking bins are? Harvest is coming, are you ready?



PUBLISHING INFORMATION: Volume 99 Number 6 *Wines & Vines*, ISSN 043-583X, a member of Wine Communications Group, Sonoma, Calif., is published monthly. Periodicals postage paid at San Rafael and at additional mailing offices. Reproduction in whole or part without permission is prohibited. *Wines & Vines* does not assume responsibility for unsolicited manuscripts or materials. Contributors are responsible for the proper release of proprietary and/or classified information. *Wines & Vines* is distributed through an audited circulation. **SUBSCRIPTION RATES:** U.S., \$38; Canada/Mexico, \$48; All other countries, \$85 (for airmail add \$85). **POSTMASTER:** Send address changes to: *Wines & Vines*, PO Box 1649, Boulder, CO 80306-1649.





RIVERCAP

The Artisan Capsule Maker




PURE
TIN

DISTRIBUTED BY



CORK
SUPPLY

(707) 746 - 3630
CORKSUPPLY.COM

PRODUCED BY



RIVERCAP

5301 Industrial Way,
Benicia, CA 94510, USA
RIVERCAP.COM



WINEMAKING

34 Demystifying Tannin and Enzyme Applications

How to best use enological tannins and enzymes to achieve red wine quality goals.

By Peter Salamone and Shaun Richardson

40 Technical Spotlight: Ferrari-Carano Red Wine Facilities

Mountain top winery equipped for small-lot and high-volume production.

By Andrew Adams

48 Making Cab at Four Price Points

Four winemakers discuss how they produce the popular varietal.

By Andrew Adam

54 A Call for Cold Stability

New winemaking tools that warrant approval by regulators.

By Richard Carey

58 A Conversation with Roger Nabedian

Gallo executive discusses recent acquisitions and if wine can survive the next recession.

By Jim Gordon

60 Keep Brett Under Control

Study determines effective measures to control and prevent spread of spoilage yeast.

By Melissa Hansen



GRAPEGROWING

68 Mapping *Terroir* by UAV

Collecting and leveraging vineyard data for precision viticulture by drone.

By Andrew G. Reynolds

TASTING ROOM FOCUS

62 Case Studies in DtC Success

Two Central Coast wineries detail elevating direct-to-consumer experiences for guests.

By Jaime Lewis

64 How to Keep Tasting Staff Motivated

WISE Academy offers 10 tips to help tasting room staff stay focused on hospitality and sales.



Always close. Now closer.



With our new warehouse in Grandview, Washington, ATPGroup can now provide service for the wine, beer and juice industries of the Pacific Northwest.

Some of the products and services we provide:

- Tannins
- Fermentis Yeast
- Enzymes
- Yeast Nutrients
- Malolactic Bacteria
- Fining Agents
- Stabilizers and Antioxidants
- Filtration Products
- Beco Pads and Cartridges
- Cellar Supplies - Chemicals
- Cleaning and Sanitation Products
- Parts and Service Repair
- Mobile Filtration Services (Coming Summer 2018)



TO PLACE AN ORDER OR INQUIRE ABOUT A PRODUCT, PLEASE CONTACT US AT 707-836-6840 OR GO TO WWW.ATPGROUP.COM
OR COME SEE US AT OUR NEW GRANDVIEW WAREHOUSE AT 601 ELM STREET, SUITE B, GRANDVIEW, WASHINGTON, 509-203-2100

QUESTION FOR JUNE: Is there a pre-harvest job that can often get overlooked?



Jamie Benziger
Winemaker
Imagery Estate Winery
Glen Ellen, Calif.

One thing that gets overlooked is making sure all equipment and set up needed to receive and process grapes is running properly prior to the first grapes coming in. It's key to set up and operate all equipment for a trial run the week before your grapes arrive to ensure success on the first day of harvest. This entails making sure a forklift is switched over from forks to a bin dumper (if needed), hooking up all hoses and pumps and confirming control panels for your hopper, belts and presses are working. If you wait until the day your fruit arrives to do this and part of the setup isn't working, it can lead to delays in fruit processing.



Armando Padilla Sr.
Cellar Master
Frank Family Vineyards
Calistoga, Calif.

It's imperative that we don't just check our equipment but do a full trial run. This is often overlooked, as a careful visual inspection might seem to be "enough," but when equipment rests in storage between harvests, even the tiniest things can shift or settle. A trial run allows us to double-confirm the assessments we make in visual inspections and make any necessary adjustments. Once the grapes arrive, everything has to work like clockwork in order to preserve freshness and do the fruit justice; going beyond a physical inspection allows us to enter into harvest confidently and fully prepared.



Kathleen Inman
Winemaker & Owner
Inman Family Wines
Santa Rosa, Calif.

I spend a lot of thought on getting everything ready for harvest from servicing the equipment to ordering in supplies, but the item I often forget is the dry ice. Dry ice isn't something I can organize in advance, and then when I realize I need it the next day, it is a challenge to find a supplier with inventory! The other thing we never seem to have enough of is bungee straps for the t-bins. They seem to develop legs and wander off each year and I end up having to buy more.

CONTRIBUTORS

It doesn't appear as if it's going to get any easier to sell wine in China despite the nation's growing taste for fine wine and sizeable spending power as the world's second largest economy. In his Viewpoint column on page 30 **Jim Boyce**, explores why U.S. wine has been a tough sell in China and the various market forces at play that could continue to be barriers to U.S. wine exports even if there isn't a trade war. Boyce is a Canadian based in Beijing where he has covered the wine scene in China since 2005.

It's no secret that enzymes and tannin products are often winemakers' secret weapons to produce wines to a particular style quicker and under budget. Two experts in the world of enological products, **Peter Salamone**, Ph.D., and Shaun Richardson describe the use and effects of these products in an in-depth and detailed article on pg. 34. Salamone is an independent wine consultant

who has worked in winemaking for nearly 20 years, and Richardson is a 25-year veteran of the wine industry who earned an undergraduate degree in oenology from the University of Adelaide and is currently general manager of Laffort USA.

Richard Carey, Ph.D., has been making wine for more than 40 years and in that time, he's evaluated countless new compounds and additives, technology and equipment that have all been billed as the "next best way" to make better wine. The current owner of Tamanend Wine Consulting, Carey is particularly excited about two new winemaking tools that he describes in a column on page 54. According to Carey, these new products have the potential to help winemakers make better wines quicker and more efficiently and he is so fired up he's making a call to action to see them approved for use in the United States.

WINES&VINES

A member of Wine Communications Group Inc.

ADVERTISING

**Vice President
and Director of Sales**
Jacques Brix
jbrix@winesandvines.com
(707) 473-0244

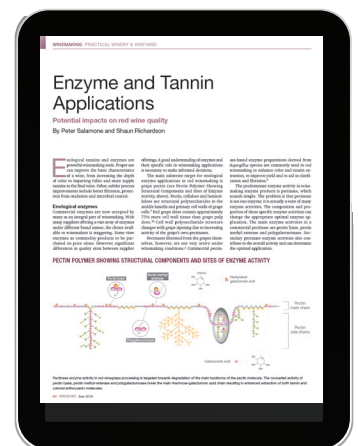
West
Lydia Hall
lydia@winesandvines.com
(415) 453-9700, ext. 103

Midwest
Hooper Jones
hooperhja@aol.com
(847) 486-1021

East (except New York)
Laura Lemos
laura@boja.com
(973) 822-9274

New York and International
Dave Bayard
dave@bayard.com
(973) 822-9275

Advertising Production Manager
April Kushner
ads@winesandvines.com
(415) 453-9700, ext. 114



DIGITAL EDITION

All print subscribers now get digital access to *Wines & Vines*. You can:

- **DOWNLOAD** pages or full issues
- **BROWSE** current and archived issues
- **WATCH** videos
- **ACCESS** via desktop, tablet or smartphone
- **SEARCH** by keyword or table of contents
- **NAVIGATE** by topic or page thumbnail
- **QUESTIONS?** Contact customer service at custserv@winesandvines.com or (866) 453-9701 Monday-Friday, 8:30 a.m.-5 p.m. PDT.

IDEAL SOLUTIONS FOR THE IDEAL WINERY.

Winery Equipment

When it comes to winery equipment, we are a one-stop shop. From destemmers to filtration, we can help set-up an entire operation or help you find individual pieces of equipment. Our dedication to quality products and service will guarantee you will get the best equipment at the best price to fit perfect with your winery.



CRUSH



FERMENT



FILTER



BOTTLE



LABEL



**CRIVELLER
GROUP**

THE BEST
IN WINERY EQUIPMENT &
STAINLESS STEEL TANKS

info@criveller.com | mail@criveller.com
East 905.357.2930 | West 707.431.2211
www.criveller.com

PROCESSING, BOTTLING, LABELING AND MORE FOR WINE, BEER & OLIVE OIL

A New Role, But the Same Commitment to Community

IT IS A GREAT HONOR and privilege to write my first Editor's Letter for *Wines & Vines* magazine, having been promoted to the editor post in April. I am following in the immensely qualified footsteps of Jim Gordon, who we are lucky to still have writing for us in the role of editor at large.

I've been with the magazine since 2011 and before that worked in the cellar and lab of Star-mont winery in Napa, Calif. Prior to my time in wine production, I was an ink-stained reporter and editor in the grinding world of daily newspapers. During my stint in the newspaper industry (which I left during its free fall in the 2009 recession) I was lucky to have only worked for small,

family owned publications. All of these papers had the same commitment to local, community journalism to serve their subscribers.

Some may perceive working for a trade publication as a departure from that type of journalism, but I see it differently.

Just a few months ago, I was in a Napa city park idly watching my toddler son scramble on the play structure and I happened to catch snippets of conversation among the parents around me. More than

half of them were talking about the wine business, from discussing varying barrel stacking methods for caves, bottling runs or the next sales trip. I imagine it's a common experience for anyone living in Napa, Santa Rosa or any other wine country town, where there are only a few degrees of separation from the wine business.

This business is something more than just a paycheck for the people living in those communities and working in wine. That was clear in how our communities have rallied in the months since the devastating fires of 2017. That sense of community is not unique to Northern California, as one of my greatest pleasures in traveling for this magazine has been discovering a similar close-knit sense of community in eastern Washington, Texas and the other fast-growing wine regions of North America.

The motivation for much of the reporting I've been most proud of in my newspaper career was a sense of service to the community. This included holding elected officials accountable while objectively reporting on local government, covering crime and courts and providing accurate and timely information during periods of crisis. I see that as my role now, as the editor of a publication serving a small but tight-knit community of winemakers and other wine industry professionals.

A key element of my responsibility will be helping you, our readers, navigate the changes of our industry whether that's through practical articles on winemaking or timely reports based on the most accurate and comprehensive wine industry market data. For all of the recent success of the American wine industry, there remain many challenges that include barriers to market; competition from beer, spirits and now cannabis and burdensome local, state and federal regulations.

No matter what may lie ahead for the wine industry, myself and the rest of my colleagues at *Wines & Vines* will remain steadfast in our service to the greater wine industry community to be a resource of quality information on how to grow the best grapes possible, make better wine and sell it at a sustainable profit.

—Andrew Adams



WINES&VINES

A member of Wine Communications Group Inc.

President & Publisher

Chet Klingensmith

Chairman Hugh Tietjen

Publishing Consultant Ken Koppel

Associate Publisher Tina Vierra

Publishing Assistant Ian Fadden

EDITORIAL

Editor Andrew Adams

Editor at Large Jim Gordon

Staff Writer Stacy Briscoe

Northwest Correspondent

Peter Mitham

Columnists

Andy Starr, Cliff Ohmart

and Glenn T. McGourty

Contributing Writers Laurie Daniel,

Richard Smart, Richard Carey, Jaime

Lewis, Chris Stamp, Andrew Reynolds,

Ray Pompilio and Fritz Westover

Practical Winery & Vineyard (PWV)

Editor Don Neel

Wine East Editor Linda Jones McKee

DESIGN & PRODUCTION

Graphic Designer Rebecca Arnn

DATABASE DEVELOPMENT – INFORMATION TECHNOLOGY

Vice President – Data Management

Lynne Skinner

Project Manager Liesl Stevenson

Database & Web Development

James Rust, Peter Scarborough

Research Assistant Sara Jennings

CONTACT US

SUBSCRIPTIONS

Email: subs@winesandvines.com

Online: winesandvines.com/subscribe

Phone: (866) 453-9701

EDITORIAL

Email: edit@winesandvines.com

MAIL

65 Mitchell Blvd., Suite A
San Rafael, CA 94903

CONNECT WITH US

facebook.com/WinesandVines

twitter.com/WinesandVines

youtube.com/WinesandVines1919

SAVERGLASS

PRESTIGE COLLECTION

A voluptuous silhouette

With its Bordelaise inspiration, CONSTANCE SUPERBIA seduces with its slender silhouette. Its slightly tapered shape coupled with a fleshy shoulder create a bottle of generous and statuesque elegance. It is the deep punt however that places it squarely in the category of unique flasks, conceived to enhance precious contents.



SAVERGLASS INC.

Napa (CA): (707) 259-2930

East Coast (NJ): (201) 825-7100

Pacific North West (OR): (707) 337-1479

Mid West (KY): (859) 308-7130

www.saverglass.com

HAUTE COUTURE
GLASS

Key Indicators

Complete data is available
at winesandvines.com/metrics.

U.S. Wine Sales

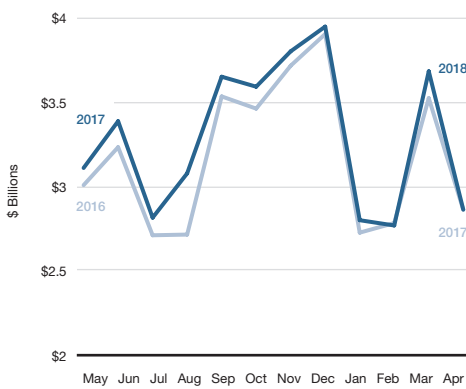
MONTH

April 2018 \$2,854M <1%
April 2017 \$2,853M

12 MONTHS

April 2018 \$41,957M 1%↑
April 2017 \$41,387M

MONTHLY SALES



Source: bw166.com, Wines Vines Analytics. Domestic table and sparkling wine sales on-premise and off-premise.

Off-Premise Sales IRI Channels

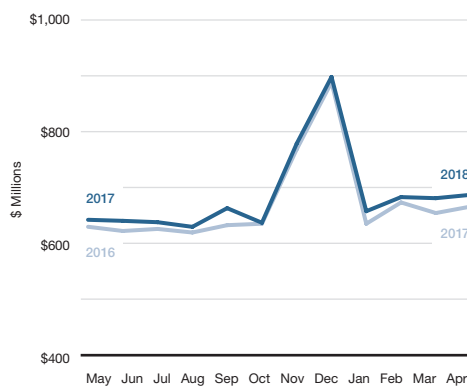
MONTH

April 2018 \$686M 3%↑
April 2017 \$664M

12 MONTHS

April 2018 \$8,919M 3%↑
April 2017 \$8,696M

MONTHLY SALES



Source: IRI, Wines Vines Analytics. Domestic table and sparkling wine sales in multiple-outlet and convenience stores, four weeks ended April 22, 2018.

Direct-to-Consumer Shipments

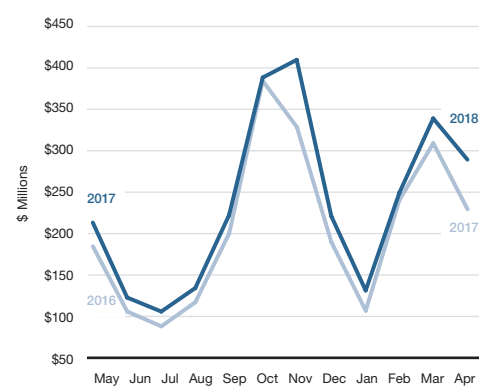
MONTH

April 2018 \$290M 28%↑
April 2017 \$227M

12 MONTHS

April 2018 \$2,821M 15%↑
April 2017 \$2,462M

MONTHLY SHIPMENTS



Source: Wines Vines Analytics/ShipCompliant

Winery Job Index

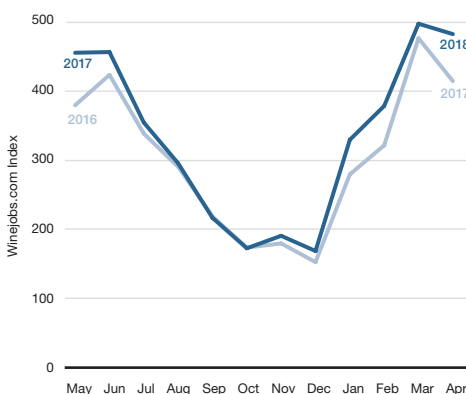
MONTH

April 2018 482 16%↑
April 2017 414

12 MONTHS

April 2018 333 10%↑
April 2017 303

MONTHLY INDEX



Source: winejobs.com

U.S. Wine Sales

U.S. Wine Sales Unchanged in April

U.S. wine sales were unchanged from a year earlier at \$2.9 billion in April, market research firm bw166 reported. Domestic table wine sales were \$8 million lower than a year earlier offsetting greater sales of sparkling wine (up \$3 million) and imported bulk wine (up \$5 million). A similar dynamic played out in the latest 12 months. While sales of domestic table increased by \$70 million and sparkling wines gained \$59 million in sales, bulk imports rose by \$440 million, leading domestic wine sales 1% higher to \$42 billion.

Yet the real story of the past 12 months was

packaged imports, which drove growth in total wine sales across the United States. While imported sparkling wine increased 10%, a gain of \$368 million, imported table wines increased by 6%, or \$866 million. All told, the category saw an additional \$1.2 billion in sales in the period, up 6% from a year ago. This was more than double the \$570 million in additional sales logged by domestic wines (including bulk imports). Italian sparkling and French rosé remain the key drivers of the growth. The activity drove total wine sales in the U.S. 3% higher in the latest 12 months to \$63 billion.

—Peter Mitham

TOTAL WINE SALES

	\$ Millions			
	2017	2018	Change	% Change
Domestic Table, Sparkling & Imported Bulk	\$41,387	\$41,957	\$570	1%
Packaged Imports & All Other Wines	\$20,130	\$21,423	\$1,292	6%
Total Wines	\$61,517	\$63,379	\$1,862	3%

Source: bw166.com, Wines Vines Analytics. Consumer expenditures for all wines on-premise and off-premise, 12 months through April 2018. Excludes cider.

Off Premise

Rosé Sales Rise 53% as Off-Premise Sales Increase 3%

Off-premise sales through multiple-outlet and convenience stores in the four weeks ended April 22, increased 3% versus a year earlier to \$686 million, market research firm IRI reported. Case volumes increased 2% to 8.6 million. The activity kept 52-week sales 3% above a year earlier, at \$8.9 billion.

Domestic table wine growth outstripped

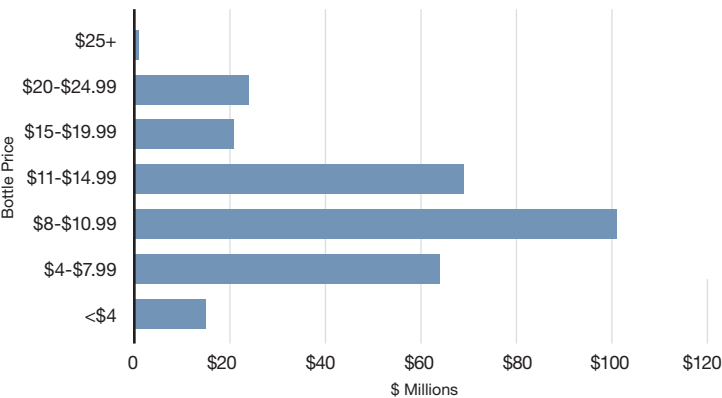
that of domestic sparkling wine, rising 3% in the month versus a 2% increase for sparkling. Both categories reported 3% growth for the year, consistent with domestic wine sales generally.

Rosé sales remain strong, with total sales in glass packaging in the latest 52 weeks rising 53% versus a year ago to \$295 million. Growth was particularly strong in the \$15-

\$19.99 segment, with sales rising 119%. Sales at \$11-\$14.99 a bottle were close behind, rising 97%. The price segment with the single largest volume of sales in the 52 weeks ended April 22, however, was the \$8-\$10.99 band at \$101 million. Rosé under \$4 was alone in seeing sales decline, falling 6% to \$15 million.

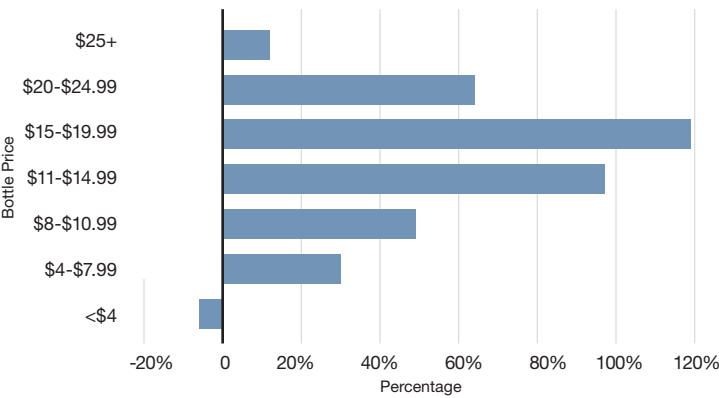
—Peter Mitham

OFF-PREMISE ROSÉ SALES BY PRICE SEGMENT



Source: IRI Wines Vines Analytics. All table wine sales in glass packaging in multiple-outlet and convenience stores; 52 weeks ended Apr. 22, 2018.

OFF-PREMISE ROSÉ SALES GROWTH (VALUE)



Source: IRI Wines Vines Analytics. All table wine sales in glass packaging in multiple-outlet and convenience stores; 52 weeks ended Apr. 22, 2018.

Direct to Consumer

DtC Surges 28% in April; Rosé Posts 48% Gain

Direct-to-consumer (DtC) shipments rose 28% in April versus a year earlier to \$290 million, Wines Vines Analytics/ShipCompliant by Sovos reported. Case volumes increased 23% to 603,232. Average bottle price in April rose 3% to \$40.05.

Rising volumes have meant changes in what's moving through the channel. Cabernet Sauvignon claims a dominant 28% share of the channel, but that's down from 30% last year. Pinot Noir moved up a point to 17%, while Zinfandel and all other varietals claimed 5% and

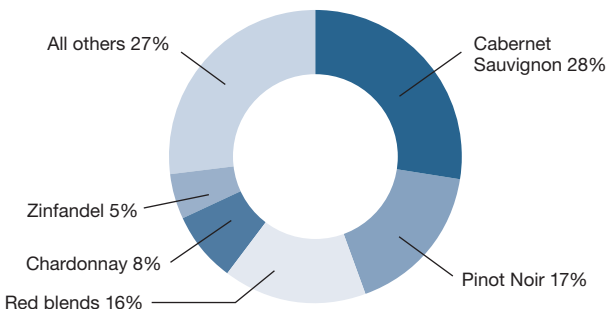
27% of the channel, respectively.

While all major varietals saw volumes increase in the latest 12 months, sparkling wine overtook Syrah and Sauvignon Blanc to become the seventh most-shipped

wine type at \$69 million. Rosé, meanwhile, edged out Cabernet Franc for 10th place with a whopping 48% increase in value to \$48 million.

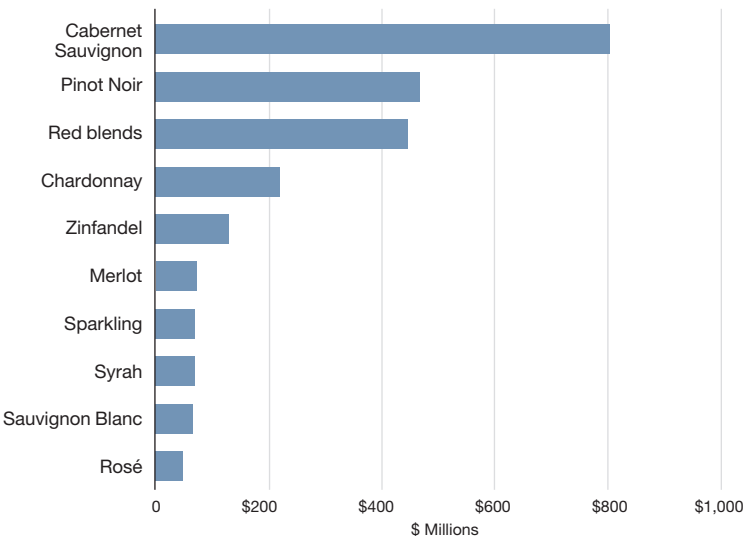
—Peter Mitham

DTC SHIPMENT VALUE SHARE BY VARIETAL



Source: Wines Vines Analytics/ShipCompliant by Sovos; 12 months ended April 2018.

DTC SHIPMENT VALUE BY VARIETAL/TYPE



Source: Wines Vines Analytics/ShipCompliant by Sovos; 12 months ended April 2018.

Top Stories

The month in perspective

Heitz Cellars Sold to Southern Billionaire

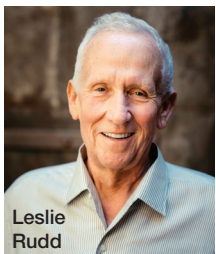
Napa Valley's venerable Heitz Cellars was sold to Gaylon M. Lawrence Jr., who is a reported billionaire and the principal investor in his family's vast agricultural company, which owns farmland in five states. The deal did not include the famous Martha's Vineyard property which is still owned by the May family. *See page 18.*

Canadian Wine Trade Caught in Pipe Feud

A long-simmering dispute between British Columbia and Alberta over plans to build an oil pipeline to the Pacific Coast appears to have been a major factor in a decision by the Supreme Court of Canada that put a chill on direct-to-consumer wine shipments. *See page 21.*

Winery owner, entrepreneur Leslie Rudd dies

Leslie Rudd, founding member of Vintage Wine Estates, died May 3 from esophageal cancer in New York City. He was 76. Rudd was the founder of The Rudd Group, which included Vintage Wine Estates, Covenant Wines and Distillery No. 209 as well as Rudd Oakville Estate, Edge Hill Estate, Oakville



Leslie Rudd

Grocery and PRESS restaurant. Rudd also owned Wichita, Kan.-based Standard Beverage

Corporation and launched the Rudd Foundation that focuses on education and health programs.

Sonoma auction raises nearly \$900,000

The Sonoma County Vintners fourth annual barrel auction on April 20 in Santa Rosa, Calif., raised \$840,700, which is 6% higher than the previous year. According to a press release by the vintners' group, more than 500 people attended the event at MacMurray Estate Vineyards to bid on one of 97 unique wine lots. Two lots to raise funds for the victims of the October 2017 wildfires raised \$99,000. Other top lots included: Pride Mountain Vineyards "Summit Cuvée," 2016 Sonoma County Cabernet Sauvignon: \$3,400 per case; Benovia Winery,



Auctioneer John Curley, left, and the Sonoma County Vintners interim executive director Michael Haney.

Aldenalli "A Perfect Pair," 2017 Sonoma Coast Pinot Noir, \$2,600 per case and Ramey Wine Cellars, "Single Vineyard, Single Clone Syrah," 2016 Petaluma Gap Syrah, \$2,200 per case.

Vineyard worker dies in accident

The Sonoma County Sheriff's Office identified Franklin Palacios Carrillo, 34, of Fairfield, Calif., as the worker who died May 1 in a tractor accident in a Sonoma Valley vineyard. According to reports by the sheriff's office, Carrillo was found crushed beneath a tiller attachment by another vineyard worker shortly before 8 a.m. Deputies who arrived on the vineyard in the 2300 block of Napa Road reported vineyard wires had become entangled in the tiller and Carrillo had been attempting to remove the wire when the attachment fell on him. The accident occurred in what is known as the Arrowhead Vineyard and is managed by Walsh Vineyard Management. The accident has been referred to Cal-OSHA, which is investigating.

Humbrecht joins Phantom Creek as consultant

Phantom Creek Estates in Oliver, B.C., hired Olivier Humbrecht as its new winemaking consultant. Humbrecht is a Master of Wine and the owner and winemaker of Domaine



Winemaker Ross Wise, left, and Olivier Humbrecht MW, right

Zind-Humbrecht in the Alsace region of France. Phantom Creek is expanding its portfolio to include Pinot Gris and Riesling, and Humbrecht is expected to be instrumental in helping to select and develop vineyard sites that have the potential for excellence. Humbrecht will also guide Phantom Creek's transition to organic and biodynamic farming practices. The winery's 67 acres of estate vineyards on the Black Sage Bench have been farmed according to organic practices since 2017.

Vineyard opponents file appeal

The opponents of the proposed Walt Ranch vineyard development in Napa County filed an appeal of a March court ruling that determined an environmental review of the project was sufficient. The appeal was filed by the Center for Biological Diversity and Sierra Club, which contend the project will compromise sensitive habitat for vulnerable wildfire, require an excessive number of trees to be removed and impair water quality. The Walt Ranch project would include the development of more than 300 acres of vineyards on the property that encompasses more than 2,300 acres of land between the city of Napa and Lake Berryessa.

Kentucky passes DtC law

In April, Kentucky Gov. Matt Brevin signed a bill allowing direct-to-consumer shipments of distilled spirits and wine in and out of the state. Kentucky wineries can ship up to

four cases of wine to a customer who makes the purchase "on site" at the winery or up to 12 cases per year to residents or tourists who join a wine club. The law had been sponsored by the Kentucky Distillers' Association that viewed it as a way to bolster tourist spending on Bourbon. Free the Grapes did not support the legislation because of the "on site" provision and backed a different bill that failed to win the support of lawmakers. Despite the limits of the new law, vintners in Kentucky said any move toward allowing more wine shipments is a positive development in a state that's still home to several dry counties. "For us to take this step forward is to take a bite out of the big white elephant in our state. And we're all very happy about that," said Cynthia Bohn, owner of Equus Run Vineyards, a Midway, Ky.-based winery producing 10,000 cases of *vinifera* and hybrid wines per year. "It's increased our shipping capability."

Rombauer Vineyards founder dies

Koerner Rombauer, the founder of Rombauer Vineyards, died on May 10. He was 83. Rombauer is survived by his wife, Sandy; children Sheana Rombauer and K.R. Rombauer III; grandchildren Reagan, Drew, Seth, Lane and Ransome and sister Kay Thornton. After serving in the California Air National Guard, Rombauer was a pilot for Braniff International Airways and moved his family to Napa Valley in 1972. In between his commitments with Braniff, Rombauer began spending time learning about winemaking at Conn Creek Winery. In 1980, the family founded Rombauer Vineyards, and harvested the first grapes — Cabernet Sauvignon from the Stags Leap District — in 1980 followed by the first vintage of Chardonnay in 1982.



Koerner Rombauer

LATEST NEWS

More detail on the news at winesandvines.com.

TOP STORY

Gallo Secures Premium Pinot Noir Sites

The purchase of two vineyards in California's Santa Barbara County announced within a week by E. & J. Gallo Winery underscored the popularity of Pinot Noir and Chardonnay wines and reflected a continuing trend among the state's large wine companies determined to secure ample supplies of those two varietals.

Gallo is buying 542 acres of the well-known Sierra Madre Vineyard in the Santa Maria Valley AVA of Santa Barbara County from owner Circle Vision. Announced May 9, the purchase by a Gallo affiliate includes the Sierra Madre trademark and 151 acres of vines within the Santa Maria Valley AVA.

The vineyard was an early mover in Santa Barbara premium grape production. It consists primarily of Pinot Noir and Chardonnay, and currently supplies about 35 wineries. Sierra Madre customers have ranged from big brands like Meomi to classic California Pinot brands such as Calera, Sanford and David Bruce to boutique operations like Hitching Post and Kunin.

Gallo had announced on May 3 the purchase of the less-well-known Rancho Real Vineyard, also in the Santa Maria Valley AVA. The 436-acre property is located along Highway 101 and is 13 miles southeast of the town of Santa Maria. The vineyard consists of 211 acres planted to Pinot Noir, Chardonnay, Syrah, Grenache, Viognier, Pinot Gris and Gamay.

Neither Gallo nor the sellers revealed the price of either transaction.

Nine deals since 2015

The deals were the latest of nine major vineyard/winery acquisitions since 2015 by Gallo, all aimed at fulfilling demand for wines in the company's premium division. The moves have added

an estimated 2,372 acres of vines to the family-owned company's portfolio, along with various brands and production properties. (See the interview with Gallo executive Roger Nabedian on page 58 for more details.)



The Sierra Madre vineyard, seen here, was first planted in 1971 and currently supplies grapes to 35 wineries. On May 3, E. & J. Gallo Winery purchased the 211-acre Rancho Real vineyard near Santa Maria, Calif.

In the Central Coast alone, the company already owned Edna Valley Vineyard in San Luis Obispo County, Bridlewood Estate Winery in Santa Barbara County and Talbott Vineyards located in the Santa Lucia Highlands appellation of Monterey County.

The popularity of Chardonnay and Pinot Noir and the continuing premiumization of the U.S. wine market are driving these purchases. The best examples of each varietal almost invariably come from moderate coastal climates, so that's where wineries need to shop for premium-quality grapes.

Sonoma County earned the highest average price per ton for Pinot Noir in 2017 at \$3,912, according to the California Grape Crush Report. Mendocino County was next at \$3,267, followed closely by District 8 (Santa Barbara, San Luis Obispo and Ventura counties) at \$3,028. District 7 Pinot Noir from Monterey and San Benito counties averaged \$1,765.

Robert Nicholson, a principal

of International Wine Associates, represented the seller of the Sierra Madre Vineyard acreage, Circle Vision, a diversified farming company. He said the sale was to help Circle Vision and its founder Doug Circle realign their assets.

"Some people are ready to move on, and some people are ready to move things off the table" to realign their assets, he said.

Regarding the Sierra Madre purchase, a Gallo spokesperson said, "We expect to continue selling grapes to the vineyard's existing customers while using some of the grapes for our own wines. We will honor all existing Sierra Madre Vineyard grape contracts and land leases."

Sierra Madre planted in 1971

Sierra Madre was first planted to vines in 1971 and has had several owners, including founders George A. Lucas and Sons, Dale Hampton and partners and Robert Mondavi Winery. In 2003 businessman and strawberry grower Doug Circle purchased 500 acres of Sierra Madre, according

to the Circle Vision website.

In a statement, Doug Circle said, "We feel blessed to have had the opportunity to shepherd this magical Central Coast vineyard for 15 years of its exceptional 47-year history, and are pleased that it is now passing to another family who will responsibly steward it into its next chapter."

Gallo has previously purchased grapes from the vineyard. "Sierra Madre Vineyard wine grapes consistently over-deliver," the spokesperson said. "This purchase also affirms Gallo's commitment to compete in the luxury wine segment and gives us the opportunity to continue making and selling our own luxury wine offerings in addition to developing new brands."

Nabedian, senior vice president and general manager of Gallo's Premium Wine Division, said, "This purchase supports Gallo's commitment to continue making and selling luxury wines, while growing the finest grapes in Santa Barbara County."

—Jim Gordon

Buyers seek coolest areas

As for the buyer, "I think it's very specific to the AVA, if you will," Nicholson said. "I think it's fair to say that as Pinot Noir explodes on a number of different premium quality levels, buyers are looking for the highest quality sources they can find, and that means the coolest areas they can find for Pinot Noir and Chardonnay."

Nicholson said that he expects Russian River Valley and Sonoma Coast properties "to remain buoyant" and that Monterey County's cool-climate Santa Lucia Highlands AVA continues to escalate in value. Nicholson was also involved in the sale of Monterey County's Talbott Vineyards to Gallo and the sale of Calera Wine Co. in neighboring San Benito County to Duckhorn Wine Co.

Nicholson singled out the Santa Lucia Highlands where Talbott's 565-acre Sleepy Hollow Vineyard is located as particularly hot for Pinot Noir properties.

What is encouraging vineyard and winery owners to sell?

Rhônes Finding a Home in Arizona

Paso Robles, Calif.—At the recent Hospice du Rhône event held April 27-28 in Paso Robles, wine writer and critic Jeb Dunnuck interviewed Todd Bostock of Dos Cabezas WineWorks based in southern Arizona's Sonoita and Willcox AVAs, and Maynard Keenan of Caduceus Cellars, based in northern Arizona's Verde Valley. The theme: high elevation wines, referring to the fact that most of Arizona's wineries produce wines from grapes grown between 3,500 to 5,500 feet above sea level.

For Dos Cabeza WineWorks' two southern-Arizona properties, Cimarron Vineyard in Willcox and Pronghorn Vineyard in Sonoita, rainfall hovers around 12 inches annually, "and most comes right at the end of ripening and going into harvest," Bostock said. "A lot of people perceive that heat and dryness are the problem [in Arizona], but it's really hail, water, and extreme cold."

To demonstrate how his estate excels with Rhône varieties, Bostock shared the 2015 Dos Cabezas "Meskeoli" from Cimarron Vineyard, a blend of all the white grapes grown there: Picpoul Blanc, Viognier, Riesling, Roussanne,

Malvasia, Albarino, and Muscat.

"We pick by hand and sort through it by hand — probably not like most people do. It's terribly labor intensive." After, he soaks the fruit whole-cluster for one day without adding sulfur dioxide, ferments in concrete and ages some of the

"A lot of people perceive that heat and dryness are the problem [in Arizona], but it's really hail, water, and extreme cold."

—Todd Bostock

wine in oak vessels for six months before bottling. "It's so arid and dry that evaporation is a real factor," he said, referring to neutral vessels like concrete, foudre, and large wood tanks. "Wines benefit from age in the cellar but if there's evaporation they lose freshness."

Bostock said because of the state's extreme climate the most consistent wines may ultimately prove to be blends. "You have to have

a constellation of things you can put together to create balance," he said.

Maynard Keenan owns 40 acres of vineyards spread over several sites near Jerome, Ariz., in addition to vineyards in Willcox. "Northern Arizona isn't as agriculturally-friendly as Southern Arizona in terms of cost of land and ease of farming," he said, noting that, in the basin of the Verde Valley where he farms, the terrain is rougher, more sloping, less hydrated and much cooler.

Of the 26 SKUs Keenan sells, one-quarter are Rhône-based, hailing primarily from his southern Arizona properties. "I feel like Syrah and Petite Sirah do much better down south for me," he said, but added that Grenache and Mourvedre appear to be doing well in the chillier, less predictable north.

For Keenan experimentation starts with choosing vineyard sites and extends into farming and winemaking: early picks, extended maceration, and submerged cap fermentation. For Caduceus Cellars' 2013 "Nagual del Agostina," a 100% Mourvedre from northern Arizona, he picked at 23.5° Brix followed by extended maceration in a 350-gallon tank and pump-overs on skins for a few weeks. Like Bostock, he will age his 2016 and 2017 Grenache in concrete eggs.

—Jamie Lewis

Everything Barrels.

From custom wine barrels made from the finest quality, air dried American Oak, to specialty barrels, to recycled half -barrels that enhance any landscape... we are Barrels Unlimited and the possibilities are endless. We ship every kind of barrel, in every size, to every corner of the globe. So no matter what your barrels needs, rest assured our barrels will put your product in the very best light.

BARRELS
UNLIMITED

Corporate Office | Jackson, Wyoming 1.307.733.1993
www.barrelsunlimited.com | West Coast Cooperative Charlestown, Indiana



Putting Their Faith in Biodynamic Grapes

San Francisco, Calif.—“The gift of the wine industry to the marketplace is the introduction to biodynamics,” said Elizabeth Candelaria, president of Demeter USA.

According to Candelaria and the Demeter Association, in 2006, most Demeter members consisted of small family — non-vineyard — farms, distributing produce regionally. But winery membership has grown extensively: in 2017 the association recorded a total of 603 Demeter wineries in 19 different countries, producing biodynamic wines from 32,514 certified acres.

Wineries choosing to farm and produce wines biodynamically come in all sizes, some remain small family farms, while others sell wines in the consumer marketplace. Yet it seems that within the industry, as well as in the larger marketplace, there remains preconceived notions and stereotypes about what biodynamic means and debates about the quality of the wines produced.

On May 7, Demeter USA gathered together viticulturists, winemakers, growers and scientists from across the globe to educate and celebrate what biodynamics really mean — in the

vineyard, in the bottle, on the shelf and in the glass.

“The most important part of the vineyard comes from the unseen,” said Jean-Charles Boisset, vintner and proprietor of Boisset Collection, which includes vineyards and wineries in Burgundy, Napa and the Russian River Valley. “The quality of a wine comes from the invisible part of mother nature; the feeding mechanism of the plant” he said, “*Terroir*, comes from underneath.”

Biodynamic farming prohibits chemical fertilizers, pesticides, herbicides and fungicides; it integrates animal life, animal feeds, perennial plants, flowers, trees, and composting to feed the soil; and farms are required to set aside and maintain at least 10% total acreage for biodiversity, which can include wetlands, grasslands, and forests.

Bob Lindquist, founder and winemaker of Qupé in Santa Maria, Calif., straddles both sides of the debate, crafting conventional wines from Bien Nacido vineyards, and biodynamic wines from vineyards in the Edna Valley.

His biodynamic wines are produced in small lots in limited releases, while his conventional

wines line the shelves of the consumer marketplace.

Though he’s lobbied the owners of Bien Nacido to transition to biodynamics, they’re hesitant. “It’s a complex process,” said Lindquist, referring to both the certification process and the investments required for the transition, namely the infrastructure: spray rigs, tractors, stirring machines that all meet the Demeter specifications.

When asked which wines he prefers, he points to his biodynamic wines. “Better grapes,” he said. “Better for the environment. ... Being a winemaker is a constant quest to get the best out of the land. Biodynamic farming is farming with observation and gives you better tools to be a better winemaker and make better wines.”

Lindquist said he’d like to increase his biodynamic wine production from Edna Valley and get those wines into the larger, consumer marketplace. “I’m doing this (biodynamic winemaking) because it means something to us but would love recognition in the marketplace.”

To those in the industry considering biodynamics, he encourages getting certified. “Companies like Whole Foods recognize that extra step and appreciate the Demeter logo. And when a company like that pays attention, it gets the consumer’s attention.”

— Stacy Briscoe



75 GALLONS
STAINLESS STEEL
TASTEFUL



LAGARDE

LAGARDEINOX.COM | 707.312.1123 | INFO@LAGARDEINOX.COM

Heitz Cellars Sold to Banking, Ag Investor

Napa, Calif.—A prominent banking and agriculture investor, Gaylon M. Lawrence Jr., has purchased Heitz Cellars in Napa Valley.

In a statement released April 18, Kathleen Heitz Myers, former president and CEO of Heitz Cellars said: “Our family founded Heitz Wine Cellars in 1961, and we have treasured our role in helping to shape the history of Napa Valley winemaking for three generations. We feel this is the right time for us to pass this rich legacy to another family.

“When we met with Gaylon, it seemed a perfect match. Fundamentally, in the wine business we are all farmers and with the Lawrence family’s history in agriculture we feel Heitz Cellars will be in good hands.”

Lawrence is the principal investor in his family’s agricultural company, Lawrence Group, which owns farmland in Illinois, Missouri, Arkansas, Mississippi and Florida where it is reported to be one of the state’s largest citrus growers. The Lawrences also own part of one of the nation’s largest, privately held HVAC distributorships, and seven community banks with branches in Arkansas, Missouri and

“With the Lawrence family’s history in agriculture, we feel Heitz Cellars will be in good hands.”

—Kathleen Heitz Myers

Tennessee. Gaylon M. Lawrence Jr. was most recently reported to be based in Nashville, Tenn., where he has been an active investor in the city’s banking industry.

Heitz Myers and her brother David Heitz were among the second generation of the Heitz family to manage the winery. The deal was reported to be worth as much as \$180 million although Heitz Myers would not confirm that amount.

“I’ve enjoyed coming to the Napa Valley for some time and have long admired the wine industry from afar,” Lawrence said in the press release announcing the deal. “Our family was fortunate to have an extraordinary opportunity to acquire such a remarkable family business with Heitz Cellars. We’re very excited about

the winery’s bright future.”

Lawrence has appointed wine industry veteran Robert Boyd as the new president and CEO of Heitz Cellars. “When I was approached about the role, the chance to help with the transition from one family to another was intriguing to me,” Boyd said. “I look forward to working with Gaylon and his family and to safeguarding the Heitz family legacy and all that goes with it.”

In February, Boyd had been promoted to the position of president of another of Napa Valley’s oldest, family owned wineries, Joseph Phelps Vineyards where he had been an executive since 2011.

Founders Joe and Alice Heitz acquired their first 8-acre property near St. Helena in 1961 and then purchased a 160-acre property in Spring Valley in 1964. Since then, the Heitz estate has expanded to 1,100 acres with 425 acres planted. Annual case production was around 40,000 cases.

The winery’s most famous wine is the Martha’s Vineyard Cabernet Sauvignon produced from a 34-acre vineyard near Oakville. Tom and Martha May have owned the vineyard since 1963 and the second generation of their family, Richard May and Laura May Everett, remain active in farming the vineyard.

— Stacy Briscoe

QUALITY STAINLESS TANKS

QST offers its clients.....
Professionally fabricated stainless tanks
35 years of tank fabrication experience
Performance & reliability guarantees
Custom designs & modern features
Quick & competitive tank project pricing
On site tank repairs & modifications
Special application tanks of all sizes
“In stock tanks” from 500 to 10,000 gallons



510 Caletti Ave. Windsor, Ca. 95492
Phone 707-837-2721 or Toll-Free 877-598-0672
www.qualitystainless.com Company Website
winetanks@aol.com email contact/sales info

Custom Fabricated Tanks for the perfect size & fit... or Ready to Ship “Stock Tanks”
Either way QST is ready to assist our clients!

Call QST today for information or pricing!

Slicing and Dicing Sauvignon Blanc Wines

Kelseyville, Calif.—Sauvignon Blanc rates high on the list of high-maintenance grape varieties. In the vineyard it's very vigorous, very susceptible to bunch rot and powdery mildew. In the winery it splits into multiple personalities with aromas as startling as cat-pee and struck flint.

But Sauvignon Blanc has its advantages. It can grow in heavy, deep, clay soils and tolerate high magnesium levels in the soil like few other popular varieties. Growers in California and New Zealand can hang 8 tons or even 10 per acre and not get complaints from winemakers. Regarding the wine styles, there are consumer bases for each of its multiple personalities.

Those are a few of the take-aways from an intense one-day, internationally accented symposium May 4 and a vineyard tour and public tasting on May 5 in Kelseyville, Lake County, Calif., where Sauvignon Blanc is a major force in the wine economy. Fourteen percent of all California Sauvignon Blanc grows here. The Sauvignon Blanc Experience was the third such major event in 16 years in Lake County.

About 120 winemakers, grape growers and trade members took home numerous insights

from a series of five presentations accompanied by tastings that sliced and diced the variety and varietal's diversity by clone, crop load, AVA, yeast and Brix levels. Grapes for the trial wines were grown largely in Mendocino and Lake counties and were vinified at the University of California, Davis.

Speaker John Buechsenstein is a veteran winemaker, an extension lecturer for the University of California and instructor at the Culinary Institute of America. "We had to make Sauvignon Blanc taste like Chardonnay in the 1980s," due to consumer tastes and the popularity of the moniker Fumé Blanc that Robert Mondavi coined for oak-aged, buttery, full-bodied Sauvignon Blanc.

"We have to thank the New Zealand producers for showing the world that Sauvignon Blanc has character—that it is a character in fact," Buechsenstein said. "Each Sauvignon Blanc should express its *terroir*," he said. "Not too much trouble with that. It asserts itself and makes unique, *terroir*-driven wines everywhere."

Almost everywhere, according to Gregory Jones, director of wine education at Oregon's Linfield College and a widely quoted authority



Panelists in a viticulture session were, from left, Daniel Bosch of Constellation Brands, Phil Freese of WineGrow and David Weiss of Bella Vista Farming.

on climate and wine. He said Sauvignon Blanc succeeds in a wide range of climates in Europe, New Zealand, Australia, South Africa and elsewhere. Jones said the differences in Sauvignon Blanc internationally are driven largely by diurnal temperature swings, which can vary from 18°F to 43°F between Europe and New Zealand on the low end and coastal and high-elevation areas of California on the high end.

Host organization, Lake County Winegrape Commission, will share some speaker presentations via sauvignonblancexperience.com. *Wines & Vines* plans to report on more research cited and tastings presented.

— Jim Gordon

No muss, no fuss filtration.



Filter your wine on-premises with ATPGroup Mobile Services. We'll bring our state-of-the-art equipment for Lees Filtration or Cross-Flow Filtration to your winery. Best of all, we'll do all the work, all the cleanup.



TO FIND OUT WHAT WE CAN DO FOR YOU, CONTACT ATPGROUP AT (707) 836-6840 OR ONLINE AT WWW.ATPGROUP.COM

Canadian Wine Trade Caught in Pipe Feud

Ottawa, Ont.—A running battle over plans to expand a pipeline to carry bitumen from the oilfields of northern Alberta to ocean-going tankers in British Columbia has once again caught wineries in the crossfire.

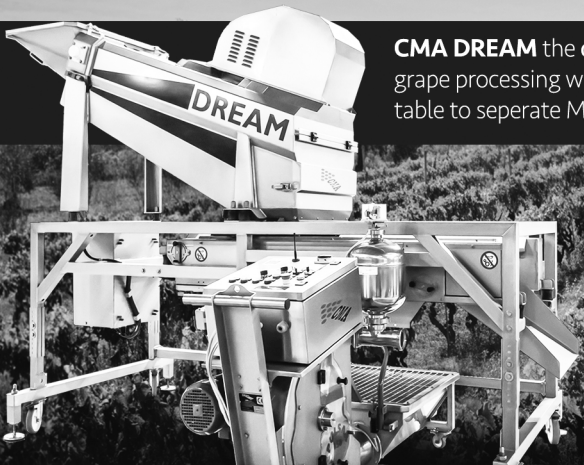
When the Supreme Court of Canada handed down its decision April 19 in the matter of *Gérard Comeau*, the New Brunswick man arrested by federal police in 2012 as he returned from a run across provincial lines to pick up cheap beer and spirits in Quebec, many saw it as a blow against the free movement of alcohol within Canada.

But the wording of the decision, not to mention its timing, suggests that the real target of the judgment wasn't the liquor industry at all, but a growing feud over the \$6 billion pipeline project.

"The court was very consciously thinking about the pipeline dispute," said Shea Coulson, counsel for the ad hoc Coalition of Small BC Wineries, a group of five B.C. wineries granted "intervenor status," or the legal privilege to participate in court proceedings. "Paragraphs 110 and 111 use language that make it clear



A legal fight between British Columbia and Alberta over an oil pipeline resulted in a supreme court ruling that has blocked the figurative pipeline of direct-to-consumer wine shipments.



CMA DREAM the destemmer for delicate grape processing with an integrated sorting table to separate MOG from the fruit.

PROSPERO

PROSPEROEQUIPMENT.COM
1-800-953-3736



GAI MLE661 the new monoblock for small to medium sized wineries filling still and carbonated products.

GAI
MACCHINE IMBOTTIGLIATRICI
UNICA FLESSIBILE
ELECTRO-PNEUMATIC
FILLING VALVE



Corporate Office Pleasantville, NY • West Coast Windsor, CA • Northeast Geneva, NY • Northwest McMinnville, OR • Canada Montreal, QC • British Columbia Kelowna, BC

that the court is thinking about the pipeline and the retaliatory measures taken by Alberta and proposed by Alberta because they explicitly use the word ‘punish.’”

B.C. opposes the pipeline on the grounds it poses a risk to the natural environment, especially coastal waters. While the province can’t stop construction of the pipeline, which has federal approval, it can tightly regulate its operations.

The strategy of B.C. outrages Alberta, as well as the neighboring province of Saskatchewan. Oil is a significant industry for both, and the two have introduced legislation that would give them authority to cut fuel supplies to B.C.

The unanimous decision by Supreme Court justices let restrictions on the movement of liquor under Section 121 of Canada’s constitution remain in place because the primary purpose of the law was to support local jurisdiction over liquor rather than restrict trade between provinces.

However, paragraph 111 of the court’s decision notes that laws reflecting “purposes traditionally served by tariffs, such as exploiting the passage of goods across a border solely as a way to collect funds, protecting local industry or punishing another province” could be considered impediments to the free movement of goods.

This interpretation means legislation in Alberta and Saskatchewan that cuts fuel supplies to B.C. would be illegal.

It also means Alberta’s move in early March to halt imports of B.C. wine in response to B.C.’s pipeline concerns was out of line. The ban ended in mid-March when B.C. pledged to obtain a legal opinion on its own stance.

Also in the offing is a report due this summer from the Alcoholic Beverages Working group established when the Canada Free Trade Agreement took effect last summer. The group gives its mandate as, “identifying specific opportunities and recommendations to further enhance trade in alcoholic beverages within Canada, while being mindful of social responsibility and international obligations.”

A four-week public consultation last fall yielded 500 submissions that will guide the group’s recommendations. “[It] obviously would be a slower process than a slam-dunk from the Supreme Court, but hopefully a positive outcome,” said Dan Paszkowski, president and CEO of the Canadian Vintners’ Association.

Paszkowski said vintners propose having each province license wineries that want to ship wines to local consumers. Couriers would make the deliveries, as currently happens with intra-provincial shipments, and wineries would

remit all applicable taxes and fees to the province.

Record-keeping and reporting tools today make compliance much easier than in 2002, when the post office first began accepting wine shipments, and online retailers began serving consumers. “Those things may have been a bit difficult 20 years ago; they’re not difficult today,” he said.

The real target of the judgment wasn’t the liquor industry at all, but a growing feud over the \$6 billion pipeline project.

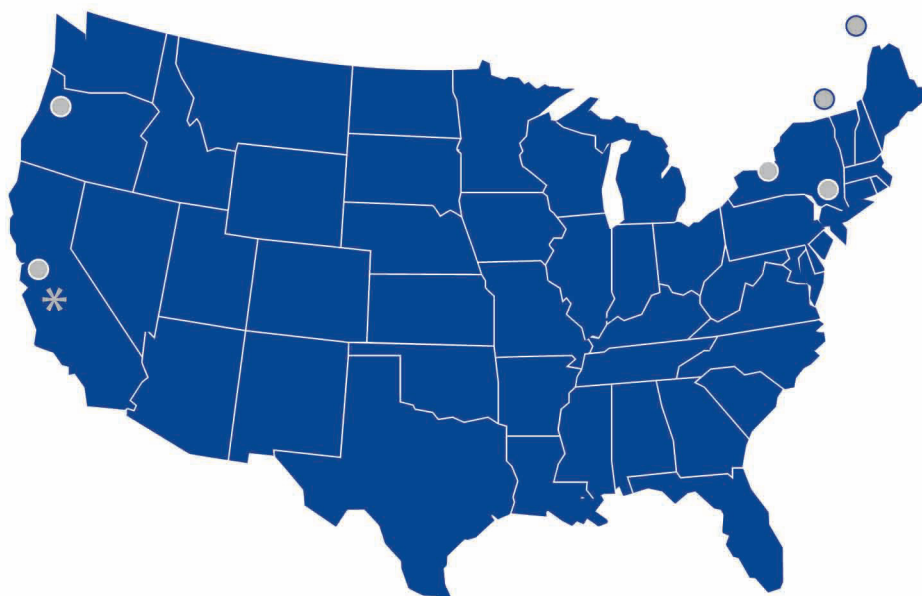
Paszkowski says centralized reporting to federal tax authorities might also be possible for interprovincial movement of liquor, further streamlining the process. The Supreme Court’s decision means business as usual for wineries, with some, like Haywire Winery in Summerland, pledging to continue shipping wine to whoever orders it, regardless of location.

— Peter Mitham

SERVING YOUR NEEDS

Since 1946, we have been manufacturing bottling and labeling machines with passion and constant innovation. Our machines—running from 15 up to 350 bpm—can be found in the world’s best wineries, and an international network ensures an impeccable post-sales experience. One of our fastest-growing markets is the United States, where for over 40 years we have partnered with Prospero. Now we are consolidating our presence here with seven service centers across North America as well as the GAI America branch in California (*), founded in 2016, to guarantee the highest level of support for our clients.

GAI AMERICA INC.
149 GROBRIC CT, SUITE D - FAIRFIELD CA 94534
TEL. +1 707 862 2323 - CONTACT@GAI-AMERICA.COM
WWW.GAI-AMERICA.COM



PROSPERO

GAI
AMERICA

Regional News

CALIFORNIA

Scheid promotes Nagengast to VP

Scheid Family Wines in Salinas promoted Dave Nagengast to vice president of winemaking. Nagengast joined the company in 2002 as consulting winemaker and has served as the company's director of winemaking since 2006. He will now oversee winemaking for all of Scheid's individual wineries and brands including Scheid Vineyards, Metz Road, District 7, Stokes' Ghost, VDR, Ranch 32, Ryder Estate and GIFFT. Prior to working for Scheid, Nagengast held winemaking positions at Storrs Winery & Vineyards, Mirassou and San Martin Winery & Vineyards.

Barra hires new winemaker

Michelle Winter is the new head of winemaking for Barra Family Vineyards in Redwood Valley. Winter will oversee all winemaking duties for the Barra family's Barra of Mendocino and Girasole Vineyards wine brands as well as the family's 2.9 million gallon custom crush facility, Redwood Valley Cellars.



Michelle Winter

Winter has 20 years of winemaking experience including time at Stag's Leap Winery and Rutherford Hill Winery in Napa Valley.

Central Coast Wine Services earns sustainable certification

Thornhill Companies announced its Central Coast Wine Services winemaking facility in Santa Maria has been certified sustainable. The company first earned California Certified Organic Farmers (CCOF)

certification in 2008 and passed another round of inspections for re-certification in 2017. To earn certification as a sustainable winery through the California Sustainable Winegrowing Alliance (CSWA), the company met another list of specifications and requirements to adopt sustainable practices, provide environmental stewardship, conserve natural resources and conduct socially equitable business practices.

Sangiacomo family introduces estate wines



Sangiacomo family

The third generation of the Sangiacomo family announced the launch of a new series of wines created from estate vineyards grown in Carneros, Napa County and along the Sonoma County coast. The wines will include appellation designated Pinot Noir and Chardonnay; single-vineyard designated Pinot Noir, Chardonnay and Cabernet Sauvignon; and a proprietary Pinot Noir called ViMaria, named after first-generation founders, Vittorio and Maria Sangiacomo.

Joseph Phelps Vineyard names CFO

Joseph Phelps Vineyards promoted Ami Iadarola to vice president and chief financial officer. In her new role, Iadarola assumes overall financial responsibility for the company's Napa Valley and Sonoma County winery and vineyard properties. With more than 30 years of accounting experience, Iadarola has held positions at both Stag's Leap Wine Cellars and Domaine Chandon prior to joining Joseph Phelps.

Truett-Hurst appoints new CFO

Karen Weaver was promoted to chief financial officer of Truett-Hurst

dark chocolate
maple syrup
creminence & roundness
well defined toasted oak characters
coffee, mocha
pronounced spice
Graham cracker
cinnamon, nutmeg
vanilla, coffee, butterscotch, caramel

Experience
OAK
ALCHEMY™

craft something unique

THINK OUTSIDE THE BARREL

CONSULT WITH OUR OAK INFUSION SPECIALISTS

SALES@INNERSTAVE.COM | 888-996-8781

CARNEROS WINE REGION, SONOMA, CALIFORNIA



Innerstave®



wine company in Healdsburg. Weaver has worked with the company as vice president and corporate controller for the past 11 years.

Clos de la Tech hires managing director

Clos de la Tech in Woodside appointed Vito Gambini as managing director. In this newly created position, Gambini will develop and implement a national strategic business plan designed to expand representation and sales at restaurant accounts and independent retailers.

NORTHWEST

Campisi new winemaker at Dunham Cellars

Dunham Cellars in Walla Walla, Wash., promoted Robert Campisi to the post of head winemaker. Campisi joined the winery in 2008 and will now help manage the development of a new series of wines



Robert Campisi

from Dunham's recently planted Kenny Hill estate vineyard. In his new role, Campisi will also oversee all aspects of winemaking operations and work closely with Dunham's vineyard manager, Ken Hart.

Abeja owners sell majority interest

Ken and Ginger Harrison, founders of the Abeja winery and inn in Walla Walla, Wash., have sold a majority interest in the company to two other firms: Arnie Prentice of Seattle's USI Kibble & Prentice and John Oppenheimer, founder and CEO of Seattle-based Columbia Hospitality. The Harrisons will retain significant equity ownership in the continued operations of the winery and will be actively involved in the oversight of the winery. The couple will also participate in the ownership of the inn through a separate limited-liability corporation. Oppenheimer has become

majority owner of the inn and Columbia Hospitality will oversee management and operations on behalf of the new owners. Wine-makers Daniel Wampfler and Amy Alvarez-Wampfler will continue to oversee winemaking operations.

Okanagan Crush Pad acquires new vineyard

Okanagan Crush Pad Winery in Summerland, B.C., acquired Seccrest Mountain Vineyards in Oliver, B.C. The 50-acre property includes a vineyard planted in 2000 with 38 acres of Pinot Noir, Gamay Noir, Chardonnay, Pinot Gris, Pinot Blanc and Gewürztraminer. The property has been under lease to Okanagan Crush Pad since 2010 and is currently transitioning to organic certification. Following this acquisition, Okanagan Crush Pad now has 80 acres of grapes and aims to plant an additional 55 acres at its Garnet Valley Ranch and Monro Avenue sites, to bring the total to 135 acres.

Okanagan wineries form new group

Seven British Columbian wineries including 50th Parallel Estate Winery, Culmina Family Estate Winery, Haywire Wines, Liquidity Wines, Painted Rock Estate Winery, Poplar Grove Winery and Summerhill Pyramid Winery, have formed a partnership, The Okanagan Wine Initiative. The association's goal is to share resources and collaborate on varying projects internationally, across Canada, and in its home market of British Columbia. The group has been working together informally for more than a year with staff from member wineries traveling abroad to wine trade fairs and working on industry issues such as export market development and sustainable business practices.

A to Z appoints Myers as manager of viticulture

Joey Myers is the new manager of viticulture at A to Z Wineworks in Dundee, Ore. Myers is a fifth-generation Oregon farmer and Willamette Valley native who brings almost two decades of vineyard management experience that includes growing seasons in France, Switzerland, New Zealand and California.



**TANNINS
MEGAZYME ASSAY KITS
YEAST NUTRIENTS
YEAST & BACTERIA**

800.585.5562

info@bsgwine.com
474 Technology Way

bsgwine.com
Napa, CA 94558

CENTRAL

Tabor Hill rebrands with new ownership

Following its acquisition by the Moersch Hospitality Group, Tabor Hill Winery & Restaurant in Buchanan, Mich., revealed a new brand identity, including a new contemporary logo designed by Las Vegas-based Virgen Inc. In tandem with the new logo, the winery also launched a new website.

Colorado approves cannabis 'tasting rooms'

State lawmakers in Colorado passed a bill that allows for licensed, cannabis "tasting rooms"

in the state. The bill, which was awaiting a signature by Gov. John Hickenlooper in early May, would allow for such tasting rooms by next year. The law would allow cannabis retailers to provide an area for customers to try cannabis products or consume products purchased at the dispensary. Customers would not be allowed to share cannabis products or bring in their own marijuana. Lawmakers hope the licensed tasting rooms will help prevent the consumption of cannabis in public areas, which is illegal.

EAST

Breakthru acquires Majestic

Breakthru Beverage Group in New York acquired Pennsylvania-based Majestic Wine and Spirits USA. According to the press release announcing the deal, Majestic will operate as an independent division of Breakthru Beverage Pennsylvania. The majority of the company's 35 employees are expected to join

the new Majestic Division of Breakthru Beverage Pennsylvania. Terms of the deal were not disclosed. While Majestic will operate as a separate sales division, the company will have immediate access to Breakthru's resources including training programs, digital marketing, analytics and insight tools.

SUPPLIER NEWS

Oeneo invests in cooperage, Seguin Moreau hires new rep

Oeneo Group acquired a 51% interest in Tonnellerie Millet, a

family-owned cooperage located near Saint-Emilion, France. Following the acquisition, Oeneo's winemaking division, which already included the Seguin Moreau cooperage, expanded its range of products and gained an additional production facility. Seguin Moreau Napa Cooperage also announced it hired Justin Moye as a member of its northern California sales team. Moye will be responsible for sales of barrels and barrel alternatives in Sonoma and Mendocino counties, Lodi and the Sierra Foothills.

Vinventions, Vinolok end distribution agreement

Vinventions, a wine closure supplier, and Vinolok, the manufacturer of the Vinolok and Vinoseal glass closures, announced the "mutual separation of their distribution partnership." Since 2015, Vinventions has distributed the glass closures but distribution will now be maintained by Vinolok, which is part of the Czech crystal company Preciosa.



From high tech to simple solutions

READY TO SHIP FROM OUR WAREHOUSE IN MICHIGAN



Shop online: gwkent.com

✉ info@gwkent.com

f GWKent1985

Scott Labs to distribute PALL

Scott Laboratories in Petaluma, Calif., announced it is now the exclusive distributor of new machines and all parts, service and technical support for existing and new PALL Oenoflow crossflow systems in the North American wine industry. Scott Labs technicians and PALL staff will be working together on service appointments in the upcoming months to ensure a seamless transition, according to the press release announcing the agreement.

Rottiers retiring from Valentin-Thierion

Valentin-Thierion Corp., the U.S. subsidiary of the supplier based in Epernay, France, announced that general manager Gerard Rottiers will be retiring after more than 40 years in the U.S. and global wine industry. Rottiers worked his first harvest in 1970 and will be moving to the Loire Valley where he will continue to work as a consultant to the wine industry. Antoine Dupont-Calderon, who was trained under Rottiers' supervision, will manage the North American branch of the company that has been in business for 155 years. Based in Napa, Calif., Valentin-Thierion specializes in sparkling wine equipment and technology.

Herwatt named CEO of Sonoma Cast Stone

James Herwatt is the new CEO of concrete tank supplier Sonoma Cast Stone in Sonoma, Calif. Herwatt has more than 30 years of experience in the wine industry and spent the past 22 years managing Cork Supply USA and Tonnellerie Ô. "This is a great opportunity to be working with Steve Rosenblatt and the entire Sonoma Cast Stone team to help expand concrete tank and barrel sales in the United States and throughout the world," he said in the press release announcing his hiring.

Custom sparkling facility

Christian Troussieux of Brut Bottling announced April 16 the launch of a new custom crush service for sparkling wine in Napa, Calif. The new business is a collaboration between Troussieux, Steve Ryan, general manager and vice president of Wine Foundry, and sparkling winemaker Craig Roemer. The partners plan to combine their areas of expertise: The Wine Foundry will be responsible for pressing, settling and primary fermentation; Brut Bottling will provide equipment needed for the desired style of sparkling — méthode traditionnelle, pet-nat, or carbonated wines — and Roemer will act as the over-seeing winemaker.

Kisabeth joins Sylvain

Famille Sylvain Groupe and Laurence Cheftel Inc. announced Tom Kisabeth is the newest member of cooperage's sales team. Kisabeth will concentrate on sales throughout Northern

California representing Tonnellerie Sylvain, Tonnellerie Meyrieux, and Marc Grenier Foudrierie.

SmaK acquires Flextank

SmaK Plastics in Vancouver, Wash., acquired wine tank supplier Flextank USA. SmaK Plastics has worked with Flextank since 2007 when the company began manufacturing the rotational molding of Flextank's tanks. In 2010, Flextank founders and previous owners John and Jan Smeaton hired SmaK Plastics' vice president of sales Mike Humes as their vice president of operations. In April, the Smeatons decided to sell

the assets of Flextank USA to SmaK Plastics with the intention of retiring to their vineyard in Adelaide, Australia. John Smeaton will remain on staff as a consultant in new product development while remaining active in the export market, according to the press release announcing the deal.

Correction

The name of packaging supplier Waterloo Container Company in Waterloo, N.Y., was given incorrectly in an article in the May 2018 edition of *Wines & Vines*. ❗

A True Artisan Always Uses The Right Equipment



Innovative Equipment Solutions For Superior Wine Production

Crushing | Pressing | Floatation | Filtration | Bottling | Packaging

The right equipment can be the difference between a *Work-of-Art* or a simple garage sale piece. Della Toffola offers 50 years of experience in the design and manufacture of innovative equipment that delivers artistry in each production run.



OMNIA High Solids Crossflow

www.dellatoffola.us

975 Corporate Center Parkway, Ste 130
Santa Rosa, CA 95407 - USA
Phone 707.544.5300
Fax 707.837.8742
Email dtgroup@dellatoffola.us

DELLA TOFFOLA
USA



TRUST

EXCELLENCE THROUGH TRADITION AND INNOVATION

Taste, Reliability, Unique Flavors, Superior Quality and Tradition

www.trustcooperage.com Barrels • (707) 337-4344
sales@trustcooperage.com Adjuncts • (707) 775-7065



Zenport INDUSTRIES **Vineyard Tools**
Pruning | Grafting | Tying | Harvest

Battery Powered Pruning Shears

- 1.25-inch and 1.5-inch cutting capacity models
- 15,000 pruning cuts per battery charge
- Includes lithium battery, harness, holster and carrying case

Grafting Tools

Tying Tools & Supplies

Harvest Shears

www.zenportindustries.com | 503-524-7289

You know how good your Zinfandel is...

Promote your wines to leading Zinfandel enthusiasts and extend your winery's relationship in the market.

JoinUs!

We are champions of Zinfandel—America's Heritage Wine. Become part of our proud legacy
zinfandel.org • 530-274-4900

Zinfandel Advocates & Producers is a 501(c)(3) non-profit organization. ZAP is dedicated to advancing public knowledge of and appreciation for American Zinfandel and its unique place in our culture and history.



Product News

Latest offerings and announcements



Light for night picking

Lazer Star Lights introduced a tower light to illuminate night picking or other work. The tower can be attached to a category 2, three-point hitch and stock wire harness and powered by the alternator on most tractors. The supplier reports the tower features LED lights that provide 84,000 lumens and can light up approximately four 8-foot vineyard rows. The tower can be adjusted for height and width ranging from 10 feet by 5 feet 4 inches to 13 feet 11 inches by 10 feet. Available options include a water cooler holder and 30-watt driving or bin lights. lazerstarlights.com

Blended barrel

Trust Cooperage introduced the Five Star barrel that is produced with a blend of European oaks and varying toasts and the result of a 10-year study on how toasts affect oak from 20 different regions. Recommended for well-structured Bordeaux varietals as well as Zinfandel and Pinot Noir, the Five Star is produced with staves with toast levels from light to heavy and, according to the supplier, can provide "natural varietal lift, sweetness, roundness of the mouth feel and very low tannin impact." barrelmakers.com

Originally developed for a batch of custom tanks, the manway is designed to spool easily off the tank and then glide smoothly open, so a cellar worker does not have to lean over the tank opening to move the manway. concretewinetanks.com

Fixed pumpover retrofits

Carlsen & Associates is now offering a complete package of equipment to retrofit existing fermentation tanks for dedicated, fixed-base pumpover systems. The equipment includes a pump, motor and variable frequency drive to match the diameter of the tank. Hoses or process piping connect the pump to the racking valve that requires an interior screen to prevent any material entering the pump. The system provides for pre-set pumpover duration and frequency that can be activated via a control panel or remotely. carlsenassociates.com

Barrel lifter

Barrel Safe unveiled a barrel lifter that the supplier claims can quickly and safely extract barrels from standard racks and the company's line of seismic-safety racks. The device can move nearly all barrels from 200 liters to 600-liter puncheons by placing claw "teeth" securely at the barrel chime. The arms are actuated by gravity and do not require power or hydraulic connections and can be operated by one person. barrelsafe.com



Vineyard materials

Phytelligence is now offering vineyard planting material in addition to fruit trees and other food crops. The company creates plant material with a micro-propagation method it calls MultiPHY that was developed at Washington State University in which each variety and type of plant produced by Phytelligence undergoes its own custom, gel formulation. All of the

company's production material is sourced from Foundation Plant Services and screened and retested for all 2010 viruses and other diseases. phytelligence.com

Digital doser

Matheson unveiled a programmable, digital dispenser to deliver a 6% sulfurous acid solution in milliliters. The doser runs on 110 AC power or rechargeable battery and can be operated remotely. Options include carts to accommodate 5-gallon or 42-gallon cylinders so the doser and solution can be moved around a winery as needed. mathesonwine.com



Mobile cross flow services

MC Cross Flow is a new mobile cross flow filtration supplier based in Creston, Calif., to serve the Central Coast region. The company's low-pressure cross-flow system can handle lot sizes from 30 gallons to 5,000 gallons at flow rates of 200 to 300 gallons per minute. The company claims it can remove yeast and bacteria to less than 10 cells per milliliter, and a nitrogen gas blow down cycle ensures wine loss is kept to a minimum. cmccrossflow.com

Automatic horizontal basket press

PAI Coquard's automatic horizontal basket press with tilted plate is available in the United States through Premier Wine Cask. The press features a simple design with a sliding cover plate on the top that opens completely to make loading whole clusters, destemmed or machine harvested fruit easier. Following the first cycle of the horizontal press plate, the pomace is mixed by gravity as it falls to the bottom of the chamber before being pressed in additional cycles. The supplier claims the mixing of the pomace is a gentle process that reduces oxygen pick up and solids. premierwinecask.com



Spray varnish screwcaps

Mala Closures unveiled a new product line of spray varnish screwcaps. The closures are available in 45 different, standard spray varnish colors or custom colors with a minimum order of 5,500. Other options include a glossy or matte finish, hot foil embossing and the addition of metal particles in the spray to provide a metallic or iridescent look. Stock colors are available with a minimum order of 1,100 closures. mala-usa.com



Wound sealant for vines

Miller introduced a natural polymer concentrate called Spur Shield to create a barrier to seal pruning wounds. The supplier reports the compound is a plant-based resin polymer that creates a natural skin to help heal the wound quickly and uniformly. Spur Shield is designed to mix easily into water and be applied by backpack or ground sprayers. After six to eight weeks the material completely polymerizes and becomes a powder that flakes off the vine. millerchemical.com

High efficiency air pumps

Sandpiper pumps released a new line of pumps designed to provide higher flows with less air consumption. The Evolution line of 2-inch and 3-inch air pumps provide up to 32% more flow while requiring up to 56% less air consumption. The company reports its pump design allows for the air distribution system to be serviced or cleaned without removing the pump from operation. sandpiperpump.com

LAZER STAR LIGHTS ESTABLISHED IN 1993

"THIS PRODUCT IS A GAME CHANGER!"
- JORDAN LONGBORG
TABLAS CREEK VINEYARD
PASO ROBLES, CA

LAZER STAR NIGHT HARVEST LED TOWER*

LED Technology with 84,000 Raw Lumens

Adjustable Height and Width

Powered Directly Through the Stock Electrical System

Operate without Added Manpower/Tractor

Attaches to Cat. 2, 3 Point Hitch

Limited 2018 Production
Reserve Today for August Delivery

NIGHTHARVESTING.COM
800.624.6234 • PASO ROBLES, CA

*Patent Pending

MADE IN THE USA

■ CLIFF OHMART

Pierce's Disease Control Program Research Successes

In 1999, vine deaths in large portions of vineyard acreage in Temecula made it clear to the California wine industry and state, local and federal agencies that the glassy-winged sharpshooter's (GWSS) vectoring of Pierce's Disease (PD) put the entire state grape crop at risk.

The next year, the California Department of Food and Agriculture established the Pierce's Disease Control Program (PDCP) to work with the grape industry, the US Department of Agriculture, County Agricultural Commissioners, the University of California and other state and local agencies on this serious problem (see sidebar for program details).

Due to the limited knowledge of PD and GWSS, the early emphasis was on funding research to develop new and better ways to manage the PD/GWSS issue. Recognizing the need and value of addressing this problem, and with the federal and state governments spending millions of dollars to control the spread of GWSS, the California winegrape industry chose to shoulder its share of the financial costs.

In 2001, an annual, value-based assessment on wine grapes was established, primarily to fund PD/GWSS research. To date the assessment has generated more than \$55 million.

PD/GWSS research successes cover a considerable range, starting with traditional management approaches such as containing the spread of GWSS, introducing and augmenting biological control agents for GWSS, and developing PD-resistant red and white grape clones. New approaches included inoculating vines with a benign strain

of *Xylella fastidiosa* (Xf; the pathogen causing PD) to prevent the colonization of the naturally occurring virulent Xf strain; using a mixture of bacteriophages that kill Xf, and applying a chemical called diffusible signal factor to vines to prevent Xf from moving and spreading. (The results from every PD/GWSS assessment-funded research project from the research symposium proceedings are posted at <https://www.cdffa.ca.gov/pdcp/research.html>.)

A very important milestone in PD/GWSS research was the University of California, Davis (UCD) Foundation Plant Services' 2017 pre-release of five wine-

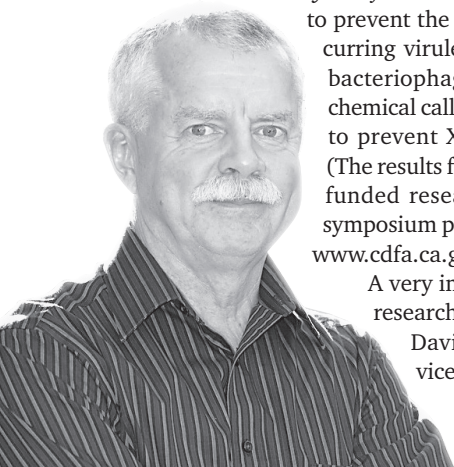


Clones 09314-102 (left) and 09331-047 are two of the Pierce's disease resistant clones bred by Dr. Andy Walker but have yet to become commercially available.

grape clones highly resistant to PD to participating nurseries. Wine has been made from each one and subjected to detailed tasting. They were developed by Dr. Andy Walker of UCD's Department of Viticulture and Enology using conventional breeding practices. New genomic techniques enabled Walker to identify PD-resistant genetic markers within months of seed germination so that new backcrosses could be made quickly. This resulted in a significant shortening of the standard breeding timeframe to develop PD-resistant vines that then could produce fruit to make wine for tasting trials. The clones are not yet available to growers while intellectual-property aspects of the new clones are addressed (See table pg. 29).

Assessment-funded research has produced several novel approaches to managing PD/GWSS. The University of Florida's Dr. Don Hopkins identified a benign strain of Xf that, when present in a grapevine before colonization by the natural virulent strain, prevents the development of PD if the vine subsequently becomes infected by the virulent strain. Dr. Hopkins is working with a private company to develop this practice commercially.

More recent research by Cal-Berkeley's Dr. Steve Lindow has identified a diffusible signal factor (DSF) that is produced by Xf during the later stages of vine colonization. When Xf first enters the vine, it moves around through the plant's xylem system. When populations build up, the concentration of DSF also builds up, signaling the bacterium



to stop moving and instead form clumps. Lindow has observed that high concentrations of DSF causes abnormal behavior of Xf and reduces its virulence in the vine. He is working on a way to get DSF into vines that might be adapted to commercial vineyard management. One idea would be to spray it on the vine in a formulation that would result in the DSF being absorbed and preventing the development of PD if the vine becomes infected with Xf.

Another significant development occurred in 2009 when the legislation for the PD/GWSS assessment was expanded to include research and outreach on other important pests and diseases of wine grapes. To date research has been funded on the European Grape Vine Moth (EGVM), red blotch virus, leafroll viruses, fan-leaf virus, the Brown Marmorated Stink Bug and the Vine Mealybug. One early success from this research is the development of a PCR assay for all variants of grapevine leafroll-associated virus-3 (GLRaV-3) that soon will be available for virus screening of planting stock.

While the PD/GWSS Board and assessment have led to important research, the PDCP also has generated its share of successes in PD/GWSS containment and management. When the PD/GWSS problem's magnitude was realized in 1999, the potential for rapid spread of GWSS throughout California was huge, due to the large host range of GWSS and the concentration of production facilities in the infested areas of southern California that ship nursery stock throughout the state. While assessment funds were not used for containment efforts, some very key research was funded to develop procedures for these nurseries that reduced the cost of containment and to work on pesticide-resistance strategies used in the containment program.

Since the start of the PDCP, more than 2.56 million GWSS biological control agents have been released in agricultural, riparian and urban environments in California. In 2016, three species of egg parasites of GWSS (*Cosmocomoidea ashmeadi*, *C. morgani*, and *C. morrilli*) were reared at the CDFA Arvin Biological Control Facility in Kern County. *C. ashmeadi* and *C. morgani* are native to California, and *C. morrilli* was introduced from the southeastern United States and Mexico, the native range of GWSS. In 2016, the three species collectively parasitized approximately 65% of GWSS eggs sampled in Fresno, Kern, Tulare, and Ventura counties. In general, the parasitism rate was low in spring but stayed above 50% during the rest of the season. The low parasitism rates and abundance of GWSS eggs in early spring suggest that it would be important to control overwintering GWSS adults before they lay eggs in the spring by integrating other control procedures.

One final, less obvious success attributable to the PDCP is the development of a network of industry groups, government agencies, university researchers and Cooperative Extension

PIERCE'S DISEASE RESISTANT CLONES

97% vinifera

09356-235: (red clone) 50% Sylvaner, 12.5% Cabernet Sauvignon, Carignane, Chardonnay

09331-047: (red clone) 50% Zinfandel, 25% Petit Sirah, 12.5% Cabernet Sauvignon

09314-102: (white clone) 62.5% Cabernet Sauvignon, 12.5% Chardonnay and 12.5% Carignane

94% vinifera

07355-075: (red clone) 50% Petite Sirah, 25% Cabernet Sauvignon

% vinifera not stated

09338-016: (white clone) 62.5% Cabernet Sauvignon, 12.5% Chardonnay and 12.5% Carignane

agents that can react quickly and effectively to address emerging pest problems. The eradication of EGVM in the North Coast of California, achieved in 2012, is an outstanding example.

In conclusion, I feel the grower-supported PD/GWSS research program demonstrates that great advances can be made in viticulture when significant money is made available for basic and applied research in a consistent way. It attracts the best minds to address a problem and provides sufficient financial resources to

perform the research in a timely manner to solve serious problems facing the winegrape industry. 🍷

Cliff Ohmart, Ph.D., was a senior scientist for SureHarvest for eight years and author of *View from the Vineyard: A Practical Guide to Sustainable Wine Grape Growing*. Previously he served as research/IPM director at the Lodi-Woodbridge Winegrape Commission. He has been writing about sustainable winegrowing issues for *Wines & Vines* since 1998.

PDCP FACTS

- Established within CDFA in 2000.
- Its mission is to minimize the statewide impact of PD and its vectors in California.
- The program has five components: 1) Contain spread; 2) Statewide survey and detection; 3) Rapid response; 4) Outreach, and 5) Research.
- It is a partnership that includes the California Department of Food and Agriculture (CDFA), the County Agricultural Commissioners, the United States Department of Agriculture (USDA), the University of California (UC), other state and local agencies, industry, and agricultural organizations throughout the state.
- In 2016, about \$22.3 million was spent on the combined PD/GWSS containment and research program.
- Grower assessment was established in 2001 to provide industry dollars for the program.
- Assessment is currently \$1.50 per \$1,000 of the value of grapes; there is no winery assessment.
- \$5.5 million expected to be generated by the assessment this year; more than \$55 million since its establishment.
- Historical spending of assessment dollars: 60% basic research, 12.6% applied research; 8.25% administration; 8% research-related services; 5.8% program support; 4.75% public outreach; 0.6% other designated pests and diseases.
- The PD/GWSS Board, made up of 14 representatives from the winegrape industry and one public member, advises the CDFA secretary on expenditures of assessment monies.
- The PD Research Scientific Advisory Panel, made up of university scientists and research experts in areas directly related to PD and its vectors, advises the CDFA PD/GWSS Board on research proposals and ongoing projects.
- A PD Advisory Task Force, made up of county agricultural commissioners, scientists, agricultural representatives and other experts, reviews program progress and develops recommendations for the CDFA Secretary.
- Annual call for research proposals that are reviewed by Ad Hoc Review Panels, PD Research Scientific Advisory Panel, the PD Research Screening Committee, and the PD/GWSS Board, with recommendations for funding made to the CDFA secretary.
- Annual PD/GWSS Research Symposium where researchers present progress on currently funded projects.

■ JIM BOYCE

Is China a Long-Term Play for U.S. Wine?

It sounds crazy but the United States sent less wine to China in 2017 than 2011 despite the imported wine market more than doubling there from 26.8 million to 61.5 million 9-liter cases. The Wine Institute listed 1.58 million cases of exports to China last year, down from 1.79 million cases seven years earlier, a performance as flat as week-old Schramsberg.

While the value numbers are better, the U.S. has nevertheless lost much ground in the China market. It is now a distant sixth as a wine source, behind France, Australia, Chile, Spain and Italy and has less than half the market share it held in 2011.

This reality check comes at a time of major change for U.S. wines in China. On the distribution front, a key story is the parting of importer Nanpu from E. & J. Gallo Winery and its Carlo Rossi brand, which has represented a major chunk of U.S. sales in China.

On a macro level, China put an extra 15% tariff on U.S. wine this year in response to U.S. tariffs on Chinese goods (see related article, May issue Top Stories). Plugged into a formula with value-added and consumption taxes, it means the fee to enter China is now roughly 67% instead of 48%. That is a substantial burden given competitors like Chile and Australia, with free trade agreements with China, can soon or already avoid the default 14% import tariff.

But even without Gallo's issues and that extra tariff, U.S. wine sales have long been stagnant. Why is this so, what could change the situation, and should anyone care?

Wine pros

U.S. wine sellers have big advantages in China. Food safety is a key concern — clients in China have some 30,000 “personal shoppers” in Australia alone to source items like vitamins and baby formula — and U.S. products are typically deemed high quality. U.S. producers also tend to use grapes that consumers are most likely to know, such as Cabernet Sauvignon, Merlot and Chardonnay. And the U.S. is a key destination for Chinese tourists, students and workers, thus providing exposure to American culture and products, including wine. Even those who do not visit tend to know quite a bit about the U.S., certainly more than the other way around.

There have also been intriguing U.S. wine promotions in China. A shining example is the 21-city California wine master class tour by The Wine Institute from mid-2015 to mid-2016, followed by a second tour last year. That got U.S. wines to key opinion leaders in emerging markets far beyond Beijing and Shanghai — more than 100 cities in China now have a population of over one million.

Along with the master classes, the Wine Institute has organized wine fair pavilions, export tours for wineries, and tasting events for trade, consumers and key opinion leaders, including at the U.S. Embassy in Beijing. Last year, it organized a six-week promotion with restaurant chain Element Fresh, which specializes in California-style food in a dozen cities. Other U.S. wine entities have also tapped the China market, most notably Napa Valley Vintners.

With these advantages and initiatives, why are import numbers so low?

Wine cons

Price is a key issue. When President Xi Jinping slashed luxury goods spending by officials and state-owned enterprises five years ago, expensive trophy wines were hit hardest. Consumers have since buoyed the market but many tend to be lower-volume, price-sensitive clients. Sellers seeking the high margins of the past are turning to big markups on cheap wines — the average Spanish bottle is claimed at U.S. \$1.50 at customs — or private labels that, in essence, dupe consumers. That makes cheaper U.S. wines largely a no-go, especially as they tend to leave a price trail on sites like wine-searcher.

Then there is visibility. U.S. wines are relatively rare on store shelves and restaurant menus. I took a Napa Valley Vintners delegation on a retail tour of Sanlitun, a Western bar and restaurant hub in Beijing, 20 months ago. We visited wine bars, shops and supermarkets and found few U.S. options: David Stone wines in a corner shop, an OEM Zinfandel in a wine chain, a Silver Oak-like label in a supermarket. Yet we saw craft beer from California, Oregon, Vermont, Michigan and elsewhere, selling for far more than local brews and showing a demand for higher-priced, quality U.S. products.

There is also the issue of urgency. France, Chile, Italy and Australia are more dependent on exports, while the U.S., the world's top wine market, drinks most of what it makes. On a well-organized Sonoma County Vintners trip a



few years ago, I was puzzled at how few trade people asked me about China. When I pushed, I was told sales to China were negligible, or even nonexistent, with a market like Canada more important.

A look at the numbers bears this out. Wine Institute figures state that only 12.5% of production is exported and, in 2017, only 3.7% of that went to China. That translates to about 1 out of every 250 bottles, one-sixth of what is shipped to Canada.

That doesn't mean China is irrelevant by any means. Consider the Hong Kong factor: in 2017, that duty-free zone ranked fifth by volume for California exports (behind the EU, Canada, Japan and China) and, impressively, third by value (behind the EU and Canada) as a destination for U.S. wines. And it offers a gateway to China.

"With a population of just about 7.3 million, we didn't empty all the 80 million bottles [we imported] ourselves — about half of the wine imported into Hong Kong was re-exported," said Paul Chan, Hong Kong's Financial Secretary, at last winter's Hong Kong International Wine & Spirits Fair. "It shouldn't surprise anyone here that the massive market of the mainland of China is the key destination of our wine re-exports."

But even with China and Hong Kong combined, the total volumes and values are still

relatively modest. The lure of a potential billion customers might glow but there is also the reality of where you are going to make your money next year.

Finally, there is market readiness. For all the talk of a new wave of Chinese consumers who buy wine based on taste and who are targeting the mid-range niche, the market still sees polarization between those who seek trophy wines, still typically from France or the Australian brand Penfolds, and those who circle the bargain bin for the cheapest wine possible.

U.S. wine consumers, on the other hand, seem to be more well-informed. I've written for *Wines & Vines* before about how faking U.S. wines is less lucrative because consumers of such labels are more knowledgeable. And those already committed to paying more than the minimum for wine provide some insulation from price rises due to tariffs.

In other words, a lot of factors — pricing, a (lack of) a sense of urgency by producers, and a still emerging taste-based market — suggest U.S. wines might simply be a longer-term play. You can't always force a result.

The long game

Does this mean we lack ways to encourage more Chinese to drink U.S. wines now? Approaching the market on a national, rather

than a state or regional level, might help. Both for those who don't know that the U.S., let alone California, makes wine, and for those who have studied, worked or visited beyond in wine-producing states such as Oregon, Washington, New York and Virginia. To this end, American Wine Merchants recently teamed with the U.S. government to make online sales easier for U.S. wines as a whole.

Reaching out to consumers with U.S. experience would also help. Last year, the American-owned wine club Sig Wine organized a Beijing tasting for 130 U.S. alumni group members. These are attendees who have extensive stateside experience, are interested in wine and are flush with disposable income. The tasting was not for U.S. wines but easily could have been.

And, in a similar vein, further pushing wines in venues with an American theme would reach people already predisposed to U.S. products. Going to an "American" restaurant that serves De Bortoli by the glass does not inspire. ☹

Beijing-based Canadian Jim Boyce has covered China's wine scene since 2005. He founded the website Grape Wall of China in 2007, has written about the wine market for a wide range of publications, and regularly organizes wine events for consumers and trade.

SUPPORT RESEARCH & WINE INDUSTRY NEEDS THROUGH THE AMERICAN VINEYARD FOUNDATION



Finding Solutions Through Research

ADVANCING METHODS TO ENHANCE WINE FLAVOR

The ability to monitor grape aroma compounds and their precursors will allow for a better understanding of how vineyard and winemaking processes influence the volatile aroma composition of wine. Dr. Ebeler's research uses innovative analytical chemistry approaches to analyze and understand glycosidic precursors in grapes and to profile free and glycosidically bound aroma volatiles in grapes and wine. For more information, visit AVF.org or contact Dr. Ebeler at seebeler@ucdavis.edu.

For a wealth of useful viticulture and enology research and information, visit AVF.org, ngr.ucdavis.edu, asev.org, iv.ucdavis.edu or ngwi.org

AMERICAN VINEYARD FOUNDATION • P.O. Box 5779, Napa, CA, 94581 • tel (707) 252-6911
Visit our Web site at www.avf.org for information on funding and current research projects

THE FIFTH ANNUAL WINES & VINES PACKAGING CONFERENCE

New Ideas, New Connections. A day of inspiration for your next packaging challenge.

AUGUST 9, 2018

Conference highlights include:

- Rewards of Award-Winning Packaging
- The Nielsen Co. on Packaging That Sells
- Overcoming Consolidation in the Supply Chain
- Cans & Kegs: Best Practices for Alternative Bottling



For schedule, speakers, sessions and registration information, visit wvpack.com.

THANK YOU TO OUR 2018 SPONSORS AND EXHIBITORS



To become a sponsor, contact Tina Vierra, events@winesandvines.com or 415.453.9700

Enzyme and Tannin Applications

Potential impacts on red wine quality

By Peter Salamone and Shaun Richardson

Enological tannins and enzymes are powerful winemaking tools. Proper use can improve the basic characteristics of a wine, from increasing the depth of color to imparting fuller and more supple tannins to the final wine. Other, subtler process improvements include better filtration, protection from oxidation and microbial control.

Enological enzymes

Commercial enzymes are now accepted by many as an integral part of winemaking. With many suppliers offering a vast array of enzymes under different brand names, the choice available to winemakers is staggering. Some view enzymes as commodity products to be purchased on price alone. However, significant differences in quality exist between supplier

offerings. A good understanding of enzymes and their specific role in winemaking applications is necessary to make informed decisions.

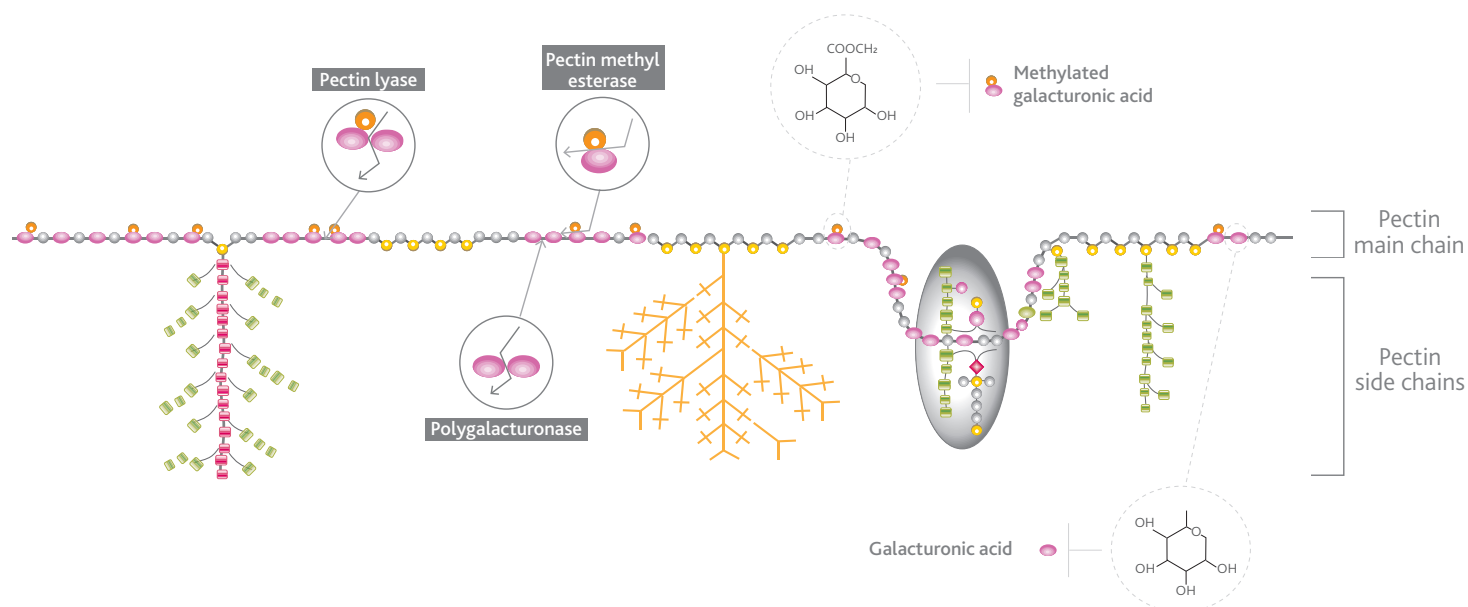
The main substrate target for enological enzyme applications in red winemaking is grape pectin (see Pectin Polymer Showing Structural Components and Sites of Enzyme Activity, above). Pectin, cellulose and hemicellulose are structural polysaccharides in the middle lamella and primary cell walls of grape cells.³ Red grape skins contain approximately 75% more cell wall tissue than grape pulp does.¹⁰ Cell wall polysaccharide structure changes with grape ripening due to increasing activity of the grape's own pectinases.

Pectinases liberated from the grapes themselves, however, are not very active under winemaking conditions.² Commercial pectin-

ase-based enzyme preparations derived from *Aspergillus* species are commonly used in red winemaking to enhance color and tannin extraction, to improve yield and to aid in clarification and filtration.³

The predominant enzyme activity in wine-making enzyme products is pectinase, which sounds simple. The problem is that pectinase is not one enzyme; it is actually a suite of many enzyme activities. The composition and proportion of those specific enzyme activities can change the appropriate optimal enzyme application. The main enzyme activities in a commercial pectinase are pectin lyase, pectin methyl-esterase and polygalacturonase. Secondary pectinase enzyme activities also contribute to the overall activity and can determine the optimal application.

PECTIN POLYMER SHOWING STRUCTURAL COMPONENTS AND SITES OF ENZYME ACTIVITY



Pectinase enzyme activity in red winegrape processing is targeted towards degradation of the main backbone of the pectin molecule. The concerted activity of pectin lyase, pectin methyl-esterase and polygalacturonase break the main rhamnose-galacturonic acid chain resulting in enhanced extraction of both tannin and colored anthocyanin molecules.

The increased enzymatic extraction of tannins in the form of grape proanthocyanidins can also contribute to the color stability of red wines over time as they react with anthocyanins to form derived pigments such as tannin-anthocyanin adducts.^{4,8}

Insoluble pectin, mostly in the middle lamella—the “glue” between cells—becomes more soluble as grapes mature and, as a result, its grip on the surrounding cell walls is loosened and the fruit becomes softer. The substrate of greatest concern in red winemaking is the pectin between grape cell walls and within the cell wall structure; a secondary concern is the soluble pectin released upon crushing ripe fruit. Depending upon the vintage and harvest conditions, a beta-glucanase/pectinase blend can aid in de-pectinization and breakdown of any beta-glucans present from mold pressure, which may cause filtration difficulties in later processing.

Another important factor to consider is enzyme purification, which is one of the major advances in winemaking enzymes over recent decades. During commercial enzyme production, the fungi produce a diverse suite of enzymes, including unwanted side activities including cinnamyl esterase. Cinnamyl esterase catalyzes the first reaction in the production of vinyl-phenols. This activity is always present in pectinase preparations if not removed by a specific purification step.¹

In red winemaking where the unwanted cinnamyl esterase activity is not fully inhibited by wine tannins as previously thought, in the presence of non-purified enzymes, the concentration of vinyl-phenol precursors will increase. The danger with formation of precursors of vinyl-phenols is, if *Brettanomyces* spoilage occurs, they will be first decarboxylated into vinyl-phenols by the cinnamate decarboxylase activity of *Brettanomyces* and then reduced into ethyl-phenols by the vinyl-phenol reductase activity only present in *Brettanomyces*. These ethyl-phenols have a much more intense medicinal/barnyard aroma than vinyl-phenols. The use of enzymes with elevated levels of cinnamyl esterase in red winemaking can lead to increased substrate for *Brettanomyces* off-flavor production.

A simple one-size-fits-all approach is rarely successful in winemaking applications due to factors including varietal differences, vintage variation, differences in winemaking practices and individual stylistic goals. The differences in available enzymes and enological tannins allows for winemaker control in selection and application of enzymes and tannins. However, the fruit quality and condition, process pathway and final style goals must be taken into consideration. In order to make informed decisions, there is much to know about both enzymes and tannins; these are complex products with multiple points of differentiation.

Commercial enzyme product differentiation

KEY POINTS

Enological enzyme products have many specific catalytic activities.

Enological tannins are complex and diverse tools.

Extraction and stabilization of color and tannins can be achieved through enzyme/tannin synergy.

is produced by the use of specific genus and species of fermentation organism and altering the fermentation conditions and substrates that determine the proportion of individual enzyme activities produced by the fermentation organism. Further product differentiation is achieved through proportional blending of enzyme preparations that have been produced with differing ratios of specific activities. Even though regulations limit the source organisms for enological enzyme production, different strains of the source organisms can have genes for isozymes that have the same activity but slightly different properties, such as pH and temperature optimums.

Use of an enzyme product with good extraction properties while not being overly aggressive and releasing too many soluble solids into the must or attacking the seed coat is of primary concern. A proper enological extraction enzyme should have a high PG (enzyme polygalacturonase) to PL (enzyme pectin lyase) ratio and be low in side activities of cellulase and hemi-cellulase which can release unwanted seed tannins. Enzymes such as Laffort's HE Grand Cru and Lafase Fruit are optimized for extraction of quality parameters such as color, tannins and aroma precursors. Lafase HE Grand Cru also contains high levels of a specific enzyme activity, Rhamnogalacturonase-II (RGII-ase), which selectively releases the pectin structure RGII, which aids in stabilizing color and structure in red wines.⁷

Enological tannins

Enological tannins are often used in red winemaking to achieve the same objective as enzymes in terms of color and structure improvement.⁹ The action of enzymes, however, is to extract more from the grape, whereas the action of tannins is to protect what is already extracted.

However, not all enological tannins are the same in terms of structure, composition or intended purpose. Commercially available tannin products fall into three categories: fermentation tannins, aging tannins and finishing tannins. The source material for the tannins and the extraction method and composition of the final blended product all contribute to the differentiation of the product, which, in turn, determines its intended application and impact.

Tannins are a structurally diverse group of molecules with quite significant differences, but from a simplified viewpoint we can separate enological tannins into two categories:

hydrolysable tannins and condensed tannins. Within each category there are main points of difference, and the diversity of structure and composition as well as polymer diversity make tannins very heterogeneous.

Even though tannins as a molecular class are very heterogeneous, there are some characteristic properties that tannins exhibit, including protein binding (sacrificial enological application); color stabilization depending upon reactivity; anti-oxidation effects; balancing body; and enhancing wine structure, as well as the potential of masking green pyrazine character. While the basic structure that makes tannins what they are provides for all of these activities, these properties can be exhibited to varying degrees based upon the source, extraction processes and final blending formulation. This differentiation of tannin products determines their optimal application and impact.

The two main classifications of enological tannins are hydrolysable tannins and condensed tannins. Hydrolysable tannins consist of a glucose molecule, either in ring (gallotanin) or linear (ellagitannin) conformation with gallic acid residues attached to the hydroxyl groups on each carbon. Condensed tannins are basic flavan-3-ol structures, which have substitutions off of the three-ring structure including gallic acid. These flavan-3-ol three-member rings can polymerize in many conformations and form the polymers that form the phenolic structure desired in fine wines. The association of other molecules in wine, including proteins, polysaccharides and organic molecules, along with hydrolysable and condensed tannin interactions, create the backbone of desired wine structure.

This discussion is mainly focused on fermentation tannin composition and application in red winemaking, hence the tannins should be easy to handle and prepare whether in liquid or powder form, while providing protein-binding/sacrificial effects to help preserve the early extracted grape skin tannins as well as providing good structure-building potential.

Ellagic tannins, mostly derived from oak or other wood extraction, provide good protein-binding capacity with some aging potential. Tannin reactivity with anthocyanins provides for color stabilization and preservation. Reactive catechins form an ethanal (acetaldehyde) bridge with anthocyanins beginning the polymerization process, which stabilizes color.

Enological fermentation/aging tannin products produced from grape skin tannins can be

somewhat reactive with anthocyanins but are quite expensive. Laffort has patented a process to produce highly reactive catechin tannins.⁶ The resulting commercial product, Tanin VR Color, has an approximately 10-fold higher reactivity than grape skin tannin products and an approximately 100-fold higher reactivity than standard fermentation tannin products, greatly facilitating stabilization of color in red wines.

The use of enological tannins is also recommended in the case of botrytis infection to minimize the oxidative browning caused by laccase (for more information, please review the website: awri.com.au). Tannins bind to protein surfaces and can inhibit enzymatic activity, including that of laccase at concentrations less than it takes to actually facilitate precipitation and removal.

Enzyme and tannin application criteria and potential benefits

Enological enzymes and tannins are not necessarily meant to be used in a formulaic or recipe fashion. There are specific circumstances where their use is most beneficial, as well as some stylistic goals that may necessitate consistent use.

The first consideration is the quality and condition of the fruit. Enzymes can certainly aid in extraction of fruit that is picked before optimal ripeness due to vineyard conditions, while mold pressure may indicate early tannin application with minimal pre-fermentation extraction either by maceration or enzyme application. When fruit conditions do not indicate an early enzyme application, an addition of a pectinase/beta-glucanase enzyme blend after pressing off the skins will help with wine clarity and filterability and will lower the microbial load in the resulting wine.

When using gentle cap-management techniques, an enzyme application can help the wine reach optimal color and tannin potential. In challenged vineyards or difficult vintages, where color and/or tannin is underdeveloped, enzyme extraction and tannin stabilization can be used to maximize these wine quality parameters. Selective extraction of wine quality components such as color, soft grape skin tannins and aroma precursors can be achieved by the proper enzyme selection and application.

Grape varieties that are high in soluble proteins when crushed are particularly good candidates for a sacrificial tannin addition at the crusher. Soluble proteins as well as cell-surface-bound proteins can bind and sequester the valuable grape skin tannins that extract early in the aqueous phase upon grape crushing. The application of enological tannins strong in protein-binding can help in preservation of the native grape skin tannins by occupying the protein surface tannin-binding sites present in the must.

Enological tannin addition can also help to fill in the structure and body of a wine. An early addition of tannin can allow for beneficial integration of the added tannin into the desirable oligomeric polyphenolic structures. In fruit that may be low in tannin, supplementation can fill in gaps in the structure that would otherwise compromise wine quality. As another tool in balancing the structure of challenged vintages, the availability of selective fining agents can work with enological tannin additions to achieve the balance sought.

Use of enological tannins is also indicated when fruit is compromised by mold or mildew. Tannins can react with mold proteins that give a musty character to wines and remove them, as well as neutralizing a portion of the laccase

activity that many molds produce, causing rapid and excessive oxidation of phenolics and resulting in color degradation and loss. High ellagic tannin products are generally good protein-binding options.

The benefits of enological enzyme and tannin application are plentiful. Proper selection and addition can maximize stable color and tannin, aid in building structure and assist in bringing flavor and aroma consistency across variable vintages. The addition of enological enzymes and tannins can be integrated into almost any existing maceration, fermentation and style differentiation or aging strategy.

Regarding the addition of enological enzymes and tannins with existing flash détente technology: The rapid extraction possible with flash technology almost necessitates the use of exogenous agents to balance and stabilize the resulting must and wine. Consult with a flash technology provider and enological product supplier for optimal product offerings and applications.

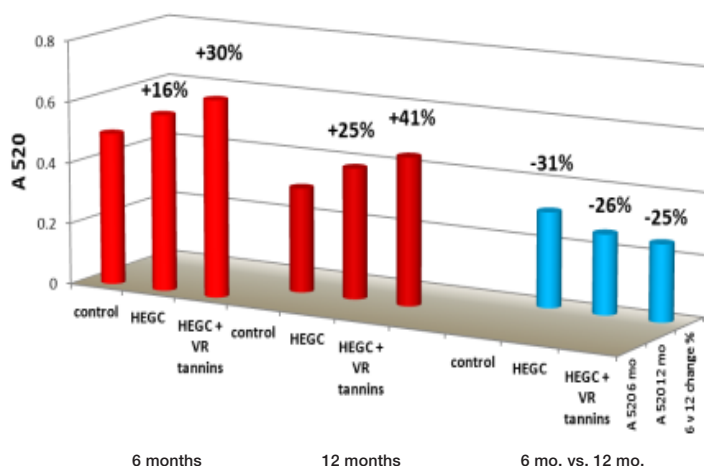
Case study: Optimization of color and tannin in Merlot

In this collaboration between Delicato Family Vineyards, Fresno State University and Laffort USA, Merlot fruit from the San Bernabe Vineyard in King City was donated by Delicato to Fresno State for use in a student-based trial of enological enzyme and tannin applications for the purpose of improving color and tannin extraction and stabilization in the finished wine. Laffort USA provided all enological products and assisted the Fresno State Winery in technical guidance of the student winemakers.

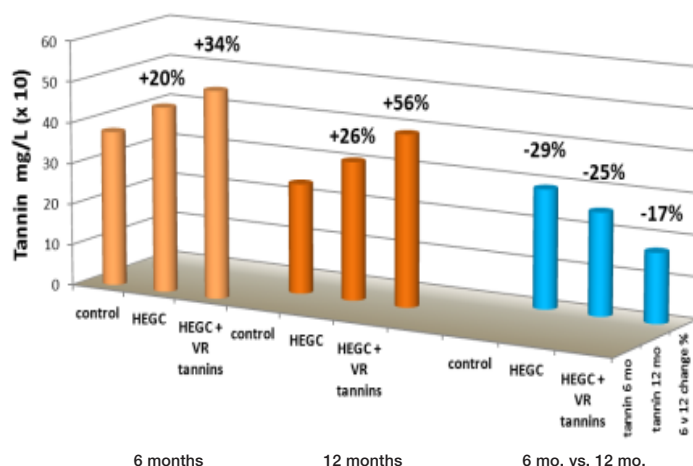
The trial was set up with three lots: a control of standard practice with no enzyme or tannin additions; one treatment of standard

STABILIZATION AND RETENTION OF COLOR AND TANNIN

Color Extraction and Stabilization



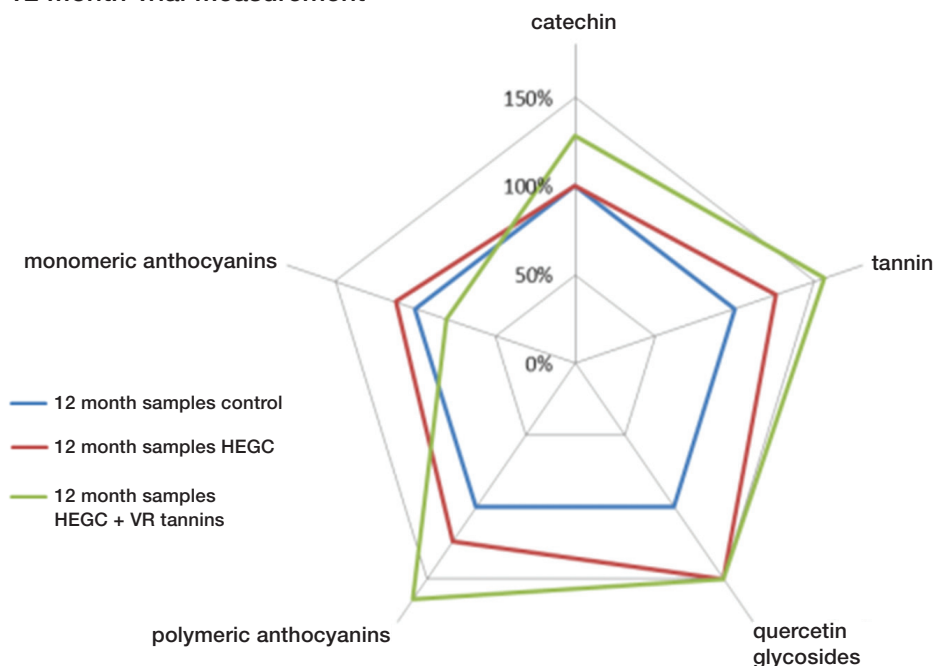
Tannin Extraction and Stabilization



Bar graph illustrations of the increase in color and tannin in enzyme-tannin treated wines versus control from 6 to 12 months in the first year of cellar/barrel aging. The percent reduction versus control over the same time period shows less losses of both color and tannin.

ENZYME-TANNIN APPLICATION EFFECTS ON RED WINE PHENOLICS

12 Month Trial Measurement



Spider graph of phenolic measurables for control versus enzyme-only versus enzyme-tannin treated wines at 12 months post-fermentation. Note the increase in enzyme extractable quality components and the dramatic increase in polymeric anthocyanins versus monomeric anthocyanins in the enzyme-tannin treated wine.

practice with a 40 grams per ton dose of Laffort HE Grand Cru enzyme; and a second treatment of standard practice with a 40 grams per ton dose of Laffort HE Grand Cru and a fermentation tannin addition of 200 ppm Laffort Tanin VR Supra at the crusher and a 300 ppm dose of Laffort Tanin VR Color at 5° to 7° Brix depletion during fermentation.

All other additions, conditions and treatments were kept as similar as possible. After primary fermentation in half-ton picking bins, the wines were pressed off and placed in neutral barrels for malolactic fermentation and aging. Samples were taken after primary fermentation, at six months post-fermentation and 12 months post-fermentation. After 12 months in neutral barrels, the wines were bottled under cork and placed in cellar conditions.

Trial measurements were standard wine chemistry panels done at Fresno State, HPLC phenolic measurement done at ETS Laboratories in St. Helena, Calif., and CIE-LAB and A520 spectrophotometric analysis also done at ETS Laboratories. Sensory evaluation was done in a blind tasting at Fresno State with a 19-member untrained panel consisting of Fresno State winemaking students, faculty and staff and Laffort personnel.

Previous studies of enological tannin application compared to oak chip use in fermentation have shown that lasting differentiation occurs after six months, with consistent characteristics developed at one year post-fermen-

tation. The sampling times of six and 12 months were based upon previous results.

The differences between control and treatments can be seen in Stabilization and Retention of Color and Tannin, on page 36, where the 12-month time-point amount of color in the enzyme-tannin treatment is 41% greater than in the control and the amount of tannin is 56% greater. As in all red wine aging, color and tannin naturally decrease over time. The differences between the six- and 12-month points are due to the reduced amount of color and tannin disappearance. The decrease in the enzyme-tannin treatment is significantly less than in the control and, along with the additional color and tannin extracted and stabilized early in fermentation, accounts for the improvement in these two important wine quality characteristics.

Looking at some specifics, the basic wine chemistries between control and treatments were not differentiated. The A520 data tracked along with the CIE-LAB data, with the differences reported in the color graph in Stabilization and Retention of Color and Tannin. The phenolics panel revealed significant differentiation, with the control wine analysis set as 100% for all parameters measured (see Enzyme-Tannin Application Effects on Red Wine Phenolics, above). The HE Grand Cru treatment shows good extraction of both tannins and anthocyanins, while the enzyme-tannin treatment has an increase in total tannin and catechin due to the 300 ppm addition of Laffort

Tanin VR Color (a reactive catechin with extremely low astringency characteristics), as well as a dramatic shift in the amount and distribution of monomeric and polymeric anthocyanins. The enzyme-tannin treatment reveals a large shift of monomeric anthocyanins into the pool of polymeric anthocyanins, a much more stable form of the colored compounds in red wines.

While the chemistry of the trial wines is quite interesting, quantitative evaluations of wine can only get you so far. Sensory evaluation of the wines is critical to understanding the impact of the quality components and characteristics that a trial seeks to impact and measure. The sensory panel determined in a blind tasting that the enzyme-tannin treated wine was preferred by a very wide margin of 79%, compared to 16% for enzyme alone and 5% for the control.

There were many other presentations of these trial wines beyond the Fresno State sensory panel, and in less formal settings, the 80% preference for the enzyme-tannin treated wine held up consistently (data not shown). Comments suggested that the color differentiation was so noticeable that the naked eye could detect the difference, and the depth of body and intensity of flavors were also noted as differentiating factors.

Powerful tools for your winemaking toolbox

This specific Merlot trial from the Central Coast may not create a paradigm in wine production, yet it does serve as an example where enological enzyme and tannin application can act to increase measurable and detectable quality parameters in a wine.

The doors left to be opened include the impact these treatments can have on the most important quality parameters of other varieties, as well as dose response differentiation under various variety and vintage conditions. The possibility of altering standard winemaking practices such as length of cold soaks, post-fermentation macerations, process applications and even yeast selection in response to integrating enzyme-tannin treatments into existing winemaking practices also brings the potential of additional impacts on specific wine quality characteristics. 🍷

Peter Salamone, an independent consultant, received his Ph.D. from Washington State University and has spent 18 years in both the biotechnology and wine production industries. Shaun Richardson, Laffort USA general manager, has spent 25 years in the wine industry, receiving his undergraduate degree in Oenology from the University of Adelaide, and MBA in Wine Business from Sonoma State University.

To see acknowledgments and references for this article, go to winesandvines.com and search under Magazine > Features > June 2018.

ENZYME & YEAST CULTURES SUPPLIER GUIDE

THE FOLLOWING LISTINGS INCLUDE COMPANIES ACTIVELY MARKETING FERMENTATION PRODUCTS AND SERVICES AND OTHER ITEMS ESSENTIAL FOR WINERIES TO STOCK UP ON BEFORE HARVEST.

AEB USA

111 N Cluff Ave, Lodi, CA 95240

P: (209) 625-8139

E: marco@aebusa.com

W: aebusa.com

Brands Sold: Pascal Biotech, Spindal, Fermol, Fermoplus, Endozym, Fermo-tan, Biolact, Arabinol, Ellagitan
Products and Services: Specialty ingredients and technical support in understanding and optimizing their usage.



AFTeK, INC.

740 Driving Park Ave, Ste H, Rochester, NY 14613

P: (585) 458-7550

E: aftek@aftefilters.com

W: aftefilters.com

Brands Sold: 3M, US-FIP Pumps

Products and Services: Supplier of all types of filtration and clarification equipment including crossflow, filter sheets, membranes and pre-filters, Dia-tomaceous earth, crushpad equipment, enzymes, fining agents, nutrients and tannins, oak alternative products.

AGROVIN USA

7700 Bell Rd, Unit A, Windsor, CA 95492

P: (707) 782-6371

E: agrovinaUSA@agrovina.com

W: agrovina.com/en.html

Brands Sold: Actimax, Becopad, Dosiox, Enozym, Estabical, Free K, Gomasol, Oxi_Out, Spirit, Tanicol, Viniferm, Viniferm OE

Products and Services: Agrovina's specialty-products plant manufactures products specifically formulated for various industrial applications: fining agents, stabilizers and fermentation nutrients for winemaking, and filtration adjuvants for various industries.



ATPGROUP

1230 Shiloh Rd, Windsor, CA 95492

P: (707) 836-6840

E: info@atpgroup.com

W: atpgroup.com

Brands Sold: Ashland Polyclar PVPP, Bartlett, CDR Wine Lab, Eaton Beco-Pads, EP Minerals, Fermentis Yeasts, Padovan, Parsec, Red Star Yeast, Siprem, Stolzie, Univar

Products and Services: Fining Agents, Specialty Tannins, Malolactic, Yeast and Yeast Nutrients, Cellular Supplies, Fine Chemicals, Winemaking Equip-

ment; Membranes, CDR Wine Lab, Stolzie glassware; Services such as mobile filtration, equipment repair and parts replacement.



BSG WINE

474 Technology Way, Napa, CA 94558

P: (707) 252-2550

E: sbrent@bsgwine.com

W: bsgwine.com

Brands Sold: Graver Technologies, Juclas, Kerry, Superfood®, Toasted Oak, Vason

Products and Services: Supplying select winemaking ingredients & equipment to North American wine & cider industries of all sizes. Specializing in innovative & value adding yeast, bacteria, tannins, enzymes, fining agents, oak adjuncts and filtration.

CAROLINA WINE SUPPLY

329 W Maple St, Yadkinville, NC 27055

P: (336) 677-6831

E: gil@carolinawinesupply.com

W: carolinawinesupply.com

Brands Sold: Amorim, Carlson Filtration, Charlois, Hanna Instruments, Laffort, Leroi, Marchisio, Nomacorc, Rack & Maintenance, Remco Hygenic Tools, Shelco Filters

Products and Services: Products include tanks, barrels, barrel racks, filters/filter pads, pumps, wine bottles, corks, capsules, yeast, nutrients, enzymes and oak alternatives. Full range of cleaning chemicals, processing chemicals, lab chemicals and supplies.

CFP Winemakers

One 21st St, Pittsburgh, PA 15222

P: (412) 232-4507

E: winesales@cfpwinemakers.com

W: cfpwinemakers.com

Products and Services: Specializing in wine grapes from California since 1952 and experts in servicing upstart and small wineries in the North East.

EATON

44 Apple St, Tinton Falls, NJ 7724

P: (800) 859-9212

E: filtration@eaton.com

W: eaton.com/wine

Brands Sold: BECO, BECO Protect & Membrane, BECOPAD, SIHA

Products and Services: Products for beverage treatment (stabilizers, fining agents, yeast and enzymes, nutrients) and filtration (BECOPAD, the world's first mineral-free filter sheet, BECODisc stacked filter disc, cartridges, housings and sheet filters).

ENARTIS USA

7795 Bell Rd, Windsor, CA 95492

P: (707) 838-6312

E: customerservice@enartis.com

W: enartis.com

Brands Sold: Alla France, Aroma Academy, Atago, Dujardin-Salleron, Station Oenotechnique de Champagne (SOEC), Thermo Scientific, Veriflow, Vinquiry, Vintessential

Products and Services: Vinquiry Laboratories analytical services (ISO/IEC 17025:2005 accredited by the A2LA), consulting, seminars, specialty wine-making products, reagents and laboratory supplies. Enartis, Vinquiry, MCW, Winy, SOEC.

ERBSLÖH GEISENHEIM, INC.

80 Pine St, Fl 24, New York, NY 10005

P: (212) 315-2196

E: info@erbsloeh.com

W: erbsloeh.com/en

Products and Services: Erbslöh offers a broad spectrum of process-optimized services and problem solutions for the beverage industries, e.g. yeasts, nutrients, bacterias, enzymes, fining agents, bentonite, crystal stabilization products.



FERMENTIS

7475 W Main St, Milwaukee, WI 53214

P: (414) 615-3300

E: fermentis@lesaffre.fr

W: fermentis.com

Brands Sold: Red Star

Products and Services: Fermentis is the business unit of Lesaffre in charge of development, marketing and sales of innovative and qualitative yeasts and yeast-based fermentation activators and functional products for the beer, wine and spirits industries worldwide.

FLEXTANK INC.

PO Box 82483, Athens, GA 30606

P: (877) 407-3348

E: admin@flectankusa.com

W: flectankusa.com

Brands Sold: Supa Tuff

Products and Services: The original manufacturer in the USA of wine maturation vessels to replace oak barrels and stainless steel. Make superior wine at a substantially lower cost. Poly fermenters, egg tanks, oak adjuncts and SS accessories.



GUSMER ENTERPRISES

81 M St, Fresno, CA 93721

P: (559) 485-2692

E: sales@gusmerenterprises.com

W: gusmerwine.com

Brands Sold: Arobois Oak, BASF Divergan F PVPP, Bioseutica, Bucher Vasilin, Cellu-Flo, Cellu-Stack, Cellupore, Chr. Hansen, FOSS-OenoFoss, FOSS-WineScan, Lysozyme, MicroEssentials, MilliporeSigma, Oak-Mor, OakAvantage, Oenological Enzymes, Pacific Ozone, Renaissance Yeast

Products and Services: Gusmer offers a full line of solutions for the wine industry including fermentation and processing aids, filtration media and equipment, analytical products and instrumentation, processing equipment and analytical laboratory services.

JUCLAS USA

470 Technology Way, Napa, CA 94558

P: (707) 259-1877

E: juclas.usa@vason.it

W: vason.com

Brands Sold: Corimpex, Juclas, Vason

Products and Services: Juclas USA is a manufacturer of wine filtration and juice separation equipment including: continuous clarification by means of flotation, cross flow filtration, reverse osmosis and tartaric stabilization of wines by means of ionic separation.

LAFFORT USA

1460 Cader Ln, Ste C, Petaluma, CA 94954

P: (707) 775-4530

E: laffortusa@laffort.com

W: laffortusa.com

Brands Sold: Actiflore, Argilact, Autolees, Casie Plus, Celstab, Charbon Actif, Dynastart, Energizer, Fresharom, Gecoll Supra, Gelarom, Gelatin Extra, Gelatine Extra, Geosorb GR, Ichtyocolle, Lactenos, Lafase, Lafazym, Lysozym, Malo-start, Mannostab, Microcol Alpha, Nobile, Nutristart, Oenolees, Oenosteryl, Ovoclaryl, Polyact, Polymust Press, Quertanin, Stabivin, Superstart, Tan'Cor Grand Cru, Tanfresh, Tannin VR Grape, Tannin Galalcol SP, Vegecoll, Viniclar, VR Supra, Zymaflore

Products and Services: Laffort produces a wide range of high quality and innovative winemaking products including yeasts, bacteria, nutrients, tannins, purified enzymes and fining agents.



LALLEMAND, INC.

PO Box 5512, Petaluma, CA 94955

P: (707) 526-9809

E: pjenkins@lallemand.com

W: lallemandwine.com

Brands Sold: Enoferm, LalVigne, Lalvin, Levuline, Uvaferm, Vitilevure

Products and Services: Lallemand began producing oenological yeast in the early 1970's. Over 40 years later our focus has grown to include bacteria, enzymes and fermentation aids for winemaking.

MEGAZYME

Bray Business Park, Bray, Co. Wicklow,
A98 YV29 Ireland

P: 35312861220

E: markets@megazyme.com

W: megazyme.com

Products and Services: Megazyme is your trusted partner for quality control in the wine industry. Our enzyme-based assay kits measure 15 key analytes influencing wine quality, consistency, and taste and our loyal customers include some of the biggest names in winemaking.

NAPA FERMENTATION SUPPLIES

NAPA FERMENTATION SUPPLIES

PO Box 5839, Napa, CA 94581

P: (707) 255-6372

E: napafermentation@aol.com

W: napafermentation.com

Brands Sold: Bel-Art, Buon Vino, Enartis Vinquiry, Ferrari, Hanna, Karcher, Lafort, Lallemant, Marchisio, Myron L, Oak Solutions, Remco, Rubbermaid, Seitz, Vee Gee Scientific, VWR, WineStix, Zambelli

Products and Services: Napa Fermentation Supplies offers an extensive line of fermentation products and winemaking equipment for the commercial wine industry and the hobbyist winemaker.

OENOFRANCE USA, LLC

755 Baywood Dr, 2nd Floor, Petaluma,
CA 94954

P: (707) 321-6363

E: fmacharddegramont@oenofrance.com

W: oenofrance.com

Brands Sold: Station Oenotechnique de Champagne (SOEC)

Products and Services: Our goal is to design specific, customized enological products bearing witness to our knowledge of the characteristics of each region and process. Our enological consultants are available to support you in designing the wines that define you.

**PICKERING WINERY SUPPLY**

841 Jones St, San Francisco, CA 94109

P: (415) 474-1588

E: info@winerystuff.com

W: winerystuff.com

Brands Sold: ACI Cork USA, Cornerstone Cooperage, Erbsloeh Geisenheim, O'Sullivan Coatings, Santa Rosa Stainless Steel, SuberOak Adjuncts, TESA, Tonnellerie Doreau, Tonnellerie Fouailly, Tonnellerie Vernou

Products and Services: French, Eastern European and American barrels, stainless steel tanks, oak alternatives, corks and capsules, food-grade paints, yeasts, nutrients, enzymes, fining agents.

**SCOTT LABORATORIES, INC.**

PO Box 4559, Petaluma, CA 94955

P: (707) 765-6666

E: info@scottlab.com

W: scottlab.com

Brands Sold: Anchor, Armbruster, ICAS, IOC, Koch Membrane Systems, Lallemant, Mazzei, Oenobrand, Pall, Relvas, ScottCap, ScottCart, Velo Acciai, Willmes

Products and Services: For over 80 years, Scott Laboratories has provided fermentation, filtration, equipment, packaging and laboratory services to the wine and distilling industries.

**SCOTT LABORATORIES, LTD. (CANADA)**

950 Brock Rd S, Unit 1, Pickering, ON

L1W 2A1 Canada

P: (905) 839-9463

E: info@scottlabsltd.com

W: scottlabsltd.com

Brands Sold: Guth, Icas, IOC, Lallemant, Manzini, MBF, Relvas, Seitz, Sterisun, Vaucher-Beguet, Velo, Willmes

Products and Services: For eighty years, Scott Laboratories has been meeting the needs of the beverage industry with innovative solutions and products including fermentation goods, filtration media, equipment, packaging products and laboratory services.

ST. LOUIS WINE & BEERMAKING

231 Lamp & Lantern Village, Chester-

field, MO 63017

P: (636) 230-8277

E: info@wineandbeermaking.com

W: wineandbeermaking.com

Products and Services: Knowledge, equipment and supplies for wine and beer-making. We specialize in small to midsized wineries. We are an authorized distributor for Virginia Dare Flavorings.

VA FILTRATION USA

PO Box 6799, Napa, CA 94581

P: (707) 552-2616

E: bryan@vafiltration.com

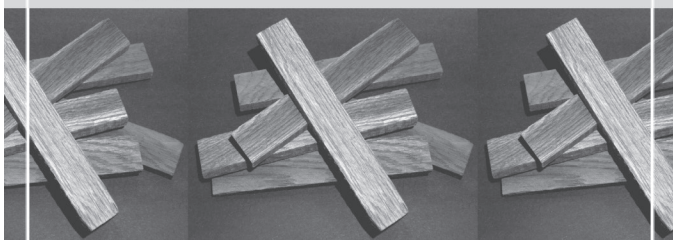
W: vafiltration.com

Brands Sold: Barrel Mate, Fosmos, Memstar, Sweetspotter

Products and Services: Mobile services including VA removal, taint removal, 4EP/4EG reduction, alcohol reduction, cross-flow, lees, TCA/TBA removal, smoke taint removal, ultrafiltration, juice concentration, wine concentration, enological products, micro-ox equipment.

...one winemaker says of our XOV French oak ministaves,

“My favorite barrel”



For those seeking vanillin, spice and sweetness, Suber-Lefort's XOV (extra oak vanillin) mini-staves are just the ticket.

6 inches long, they come already packed in infusion bags ready to drop directly into your tank. Much easier to use than tank-staves—and half the cost!—we also sell an inexpensive zip-tied version for your barrels.

Please contact
PICKERING WINERY SUPPLY
707-546-3400

**MOST ADVERTISING IS FILLED
WITH FAST-TALKING AND
FLASHY OFFERS. WE LET OUR
CHILLERS DO THE TALKING.**



Pro's new line of Chillers are leading the Industry. From a sleek design, to the touchscreen interface, to the IoT equipped control system, to even the low hum it makes while running at full power. Our Chillers turn heads all while being the best way to keep the wine industry cool. We're sure of it. Why not contact us directly at www.prochiller.com / 1-800-845-7781



TECHNICAL SPOTLIGHT

Ferrari-Carano Red Wine Production Facilities

Hilltop wineries offer multiple options for processing red grapes

By Andrew Adams

“So, three crush pads are what we have now,” says winemaker Rebecca Deike as she walked past one of those new crush pads at Ferrari-Carano Vineyards & Winery’s red wine-making facilities near Geyserville, Calif.

Deike provided *Wines & Vines* a tour of the company’s latest investment in winemaking, just as the buds on the nearby Cabernet Sauvignon vines were beginning to emerge from dormancy. It was a sunny, beautiful spring day with temperatures nudging past 70° F, but as

Deike spoke about improvements to the facilities, a semi cab hauling a flatbed trailer carrying two tracked tractors with spray rigs rumbled by in preparation for the “atmospheric river” that had been (accurately) predicted to dump several inches

of rain and bring humid conditions to the North Coast.

Those new buds would need a spray to keep mildew at bay in the estate vineyards, planted mainly to red varieties that are processed and fermented at the hilltop winery.

One of the new crush pads at the winery was designed and outfitted by P&L Specialties and

features a Heco-Pacific 7.5 ton gantry crane to off-load grapes brought in by gondola bins into a P&L Specialties receiving hopper and cleated incline conveyor emptying into a Puleo Vega 50 destemmer from Carlsen & Associates.

The other new crush pad is much smaller, operates more slowly and is a result of another notable change at the winery, founded by attorney and casino developer Don Carano and his wife, Rhonda, in 1981. In the summer of 2017, consulting winemaker Thomas Rivers Brown signed on to bring his expertise and magic touch to the winery’s Cabernet Sauvignon program.

Deike said she thought Brown would want to use the older but somewhat gentler crush pad that replicates a gravity-fed approach to processing but at a large scale. Instead, she said, he walked into the new winery and fell in love with the new small-lot tanks that left space for more rigorous sorting with an optical sorter.

Two estate wineries in Sonoma County

Red and white winemaking at Ferrari-Carano have been split since 2004, when the red-wine operation opened in an estate vineyard of about 250 acres. The vineyard is near the top of a hill on the northeast side of the Alexander Valley above the River Rock Casino. White winemaking is done at the original winery and tasting room at the north end of the Dry Creek

The new facility at Ferrari-Carano includes a new, high-volume crush pad on the outside of the building and a smaller setup including an optical sorter inside.

KEY POINTS

The investment in quality includes new tanks and an optical sorter.

An ongoing project is doubling the size of the winery’s cave system.

The older facility features a large conveyor on a swinging arm set above a semi-circle of tanks in a gravity-fed system.

Valley. Deike also joined the winery in 2004 as enologist after internships at other wineries. She was promoted to assistant winemaker in 2006 and associate winemaker in 2014.

Sarah Quider, who has worked at Ferrari-Carano since 1995, is the company's executive winemaker and oversees all production, including Pinot Noir at the Lazy Creek Vineyards winery in Anderson Valley under the day-to-day management of Christy Ackerman.

More significant than any of the new facilities or changes to the winemaking team was the death of Don Carano in October of 2017. Carano was 85 when he died at his home in Reno, Nev., and left behind a long list of business and personal accomplishments as well as five children, 11 grandchildren and six great-grandchildren.

Carano was a former U.S. Army officer and an attorney who founded the Eldorado Hotel and Casino in Reno before he and his wife fell in love with Northern California's wine country. Described in a Nevada newspaper obituary as "probably the most upwardly mobile individual in the history of 'The Biggest Little City,'" Carano's larger-than-life personality can still be seen in the near-reverence with which his winemaking staff speaks of him.

All hands remember his zeal for finding new vineyards and passion for maintaining them. Even during the 2017 vintage when Carano's health was in decline, he regularly drove around his expansive vineyard holdings with director of vineyard operations Steve Domenichelli, who has worked for Ferrari-Carano since 1987.

That focus on the vineyard side also helped spark the relationship between the Caranos and Brown. He is working closely with Domenichelli at select vineyard blocks in Alexander Valley and Knights Valley, including the Maacama Ranch, Don Carano's last vineyard acquisition. Ferrari-Carano now owns 1,900 acres of vineyards spread over 24 sites in six AVAs.

Deike said she is excited to be working with Brown and eager to share winemaking notes on the estate vineyards. "For me it's really a bonus to get to work with him and to see what he really focuses on," she said.

Flexibility and focus

Deike said she followed his recommendation and purchased a new VitiSort optical sorter from Key Technology to process grapes after destemming. Grapes are dumped on a vibrating sorting table where any leaves or other MOG is removed prior to flowing through the destemmer.

Brown also chose a VitiSort for the Mending Wall winery that he designed and equipped in time for the 2014 harvest. Brown is a part owner of the exclusive custom-crush facility in St. Helena.

Deike said she thought Ferrari-Carano might need two of the optical sorters, but one proved sufficient with a throughput rate of



An incline, cleated conveyor carries pomace to a membrane press (above) and a large rotating arm with a conveyor carries destemmed and sorted grapes to the top hatches of tanks at the older facility.

about 5 tons per hour. She said her crush-pad team really enjoyed working with the machine, and the results were immediate. "Everything comes out looking so perfect," she said.

Destemmed and sorted berries are collected in a hopper feeding a large Waukesha pump that transfers them to tanks. The new winery is equipped with 40 new Westrac stainless-steel tanks that hold 5 to 30 tons. Pumpovers are done by air pumps through a screen and sump, and tank temperatures are monitored and managed via a TankNet system.

When fermentation is complete, the pomace is dug out into bins that are dumped into a portable, cleated incline conveyor from P&L

Specialties. The conveyor dumps into a Willmes membrane press. P&L Specialties also designed and fabricated a series of cast-in-slab waste augers to remove pressed pomace and stems.

Half of the cellar is left empty to be used as a cold room for grapes awaiting processing. The 40,000-square-foot building also houses two warehouses that Ferrari-Carano is using for all its case-goods storage. The winery previously had been renting warehouse space.

The new winery might have the latest in tanks and processing equipment (as well as motion-sensor lights that turn on when anyone walks into the building), but the older winery is by no means less impressive.



Ferrari-Carano Vineyards & Winery

8761 Dry Creek Rd., Healdsburg, Calif. 95448 • ferrari-carano.com • 707-433-6700

OWNERS

Rhonda Carano

EXECUTIVE WINEMAKER

Sarah Quider

ASSOCIATE WINEMAKER

Rebecka Deike

CONSULTING

WINEMAKER

Thomas Rivers Brown

DIRECTOR OF VINEYARD

OPERATIONS

Steve Domenchelli

YEAR BONDED

1981

DIRECT-TO-CONSUMER

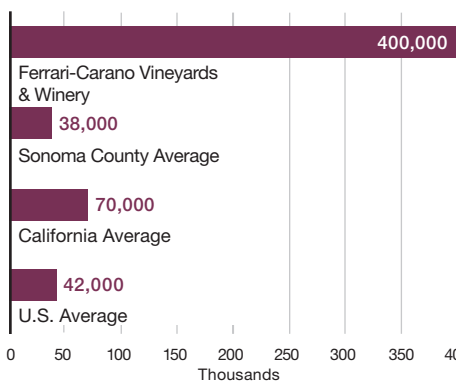
SALES

5%

VINEYARD ACREAGE

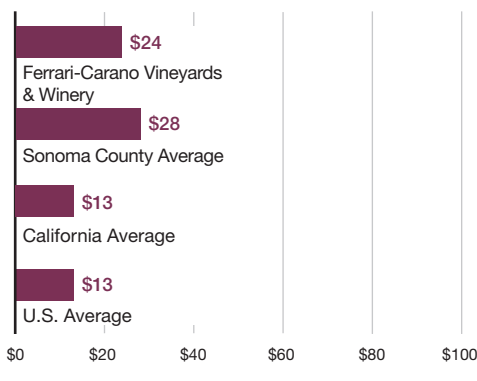
1,900

WINERY CASE PRODUCTION



Source: Wines Vines Analytics

WINERY AVERAGE BOTTLE PRICE



Source: Wines Vines Analytics

The Technical Spotlight is a regular feature highlighting wineries in North America that have recently opened or undergone major renovations and improvements. *Wines & Vines* seeks to report how facility design and winemaking equipment is used to achieve a particular winemaking style while also exploring new trends and techniques being used in the industry. If you think your winery would be a good candidate for the feature, contact us at edit@winesandvines.com.

BUILDING THE WINERY

Architect	Ken LaFranchi , lafranchidevelopment.com
Contractor	Eddinger Enterprises , eddingers.com
Engineering	Civil: Kurt Kelder , kelderengineering.com Plumbing/Mechanical: TEP Engineering , tep.net Structural: MKM & Associates , mkmassociates.com
Flooring/concrete	Carm's Concrete Custom Concrete & Overlay , (707) 431-0829

PACKAGING AND OTHER SERVICES

Bottling	MBF mono block, MBF North America, Inc. , mbfnorthamerica.com Norton foiler: Criveller Group , criveller.com labeller: P.E. Labellers, PE USA, Inc. , pelabellers.com Bel case folder: Wexxar Bel , wexxar.com Norton case gluer: Criveller Group , criveller.com
Glass	Tricor Braun , tricorbraun.com ; Saverglass , savglass.com
Corks/Closures	M. A. Silva USA , masilva.com ; Scott Laboratories , scottlab.com ; Amcor Flexibles American Canyon , stelvin.com
Capsules	Amcor Flexibles American Canyon ; Ramondin USA , ramondin.com
Label printing	Multi-Color Corp , mcclable.com

MAKING THE WINE

Crush pad	Heco-Pacific 7.5 ton hoist; receiving hopper; cleated, incline conveyors; P&L Specialties , pnlspecialties.com
Destemmer	Pueleo Vega 50, Carlsen & Associates , carlsenasociates.com ; Selective Process Winery L, Pellenc America, Inc. , pellencus.com
Optical sorter	VitiSort, Key Technology, Inc. , key.net
Fermentation tanks	Westec Tank & Equipment, Co. , westectank.com
Temperature control and monitoring	TankNet, Acrolon Technologies, Inc. , acrolon.com
Ammonia chiller system	APCCO , apcco.net
Steam	Barrel Steam LB-75, Electro-Steam Generator Corp. , electrosteam.com
Barrel washers	Aquablaster, AquaTools, Inc. , aaquatoools.com ; Poseidon 7.67 pressure washer, Nilfisk , nilfisk.com
Ozone	SGA2, Carlsen & Associates
Pumps	Waukesha 320 PD must pump, Waukesha 60 PD pumps, Yamada Air pumps, RLS peristaltic must pump, Carlsen & Associates
Nitrogen Generator	Parker Hannifin , parkern2.com
Presses	Siprem 10HL VS50 Press, Willmes 30HL Press



Wines are bottled on site with a line featuring an MBF filler.

Large-scale, gravity-fed system

On the crush pad of that facility are two Pellenc Winery Selectiv' L destemmers that have been rigged to work off of one shaker table to reach a process rate of up to 30 tons per hour. The destemmed berries then are carried into the cellar via an elevated conveyor that feeds one of the more unusual grape-processing systems.

Inside the cellar, several banks of stainless-steel tanks are arrayed in a half-circle. Above the tank tops is a large swinging arm set on a track, like a minute hand on half of a clock face. Grapes flow up to the swinging arm, which is equipped with a large conveyor that carries grapes to one of three openings that feed berries in through the top hatches of the tanks. The swinging arm is operated remotely and can be positioned above any tank. The multiple openings on the swinging arm allow the winemaking team to drop grapes into whichever tank is set to be filled. At the outer edge of the array of tanks is a row of oak fermentors made by Seguin Moreau and Tonnelerie Taransaud.

The swinging arm doesn't move fast, and Deike said she and the rest of the winemaking team need to be mindful of that when selecting tanks to fill so that the crush crew isn't left waiting for the electric-powered arm to move into position.

Spray On, Birds Gone.



Spraying Avian Control® replaces netting for a fraction of the cost.

Without Avian Control® we would clearly need to net our vineyard. Avian Control® allows us to get our grapes to full ripeness. Providing us the flexibility to leaf pull and hedge right up to the very end.

—Jack Tomasello, Tomasello Winery, Inc., Hammonton, NJ

Avian Control®
Liquid Bird Repellent

Call Today For More Information

888-707-4355

Sales@AvianControl.com • www.AvianControl.com

born
to run

NEW! CONSISTA-HOPPER™

Gently and evenly meters whole clusters onto your sorting table

- Large hopper accepts full 1/2-ton bins. No waiting!
- Adjustable for cluster size
- Fits over belted or vibratory sorting tables
- VFD speed control
- Lockable swivel casters
- Easy-to-sanitize design



- Food-grade star rollers



P&L SPECIALTIES™

HIGH-PERFORMANCE CRUSHPAD EQUIPMENT

www.pnlspecialties.com ■ p. 707 573 3141 ■ f. 707 573 3140

1650 Almar Pkwy, Santa Rosa, CA 95403

Licenses: CA #803431, WA #PLSPELS923BZ, OR #180330

A VINTAGE INTERRUPTED BY FIRE

On Oct. 9, 2017, Ferrari Carano's red-wine production winery was humming along in the midst of another busy vintage. When winemaker Rebecka Deike arrived that Monday morning she had about 60 active ferments and another full day of receiving grapes scheduled. Instead, after a night of wild, unpredictable winds she discovered the winery had no power. Those grape deliveries were canceled, and Deike and her team scrambled to find a generator, which they did and were able to get some work done. "That night the power came back on and we got our night crew in, and we started feeling like 'OK, we're going to be OK.'"

But as she and almost everyone else in the region were soon to realize, the fires had just begun. Eventually the flames from the Pocket Fire began to close in on the mountaintop winery, and a day later it was evacuated. "The fires came right up against our property," Deike said. "It was really scary."

The fires did come close—the black scars from the blazes were still visible in early April—but never damaged the winery. By the end of that first week of fires, Ferrari-Carano secured a permit from Sonoma



While the October 2017 wildfires threatened the mountaintop winery and forced all winery personnel to evacuate, the flames did not damage the facility.

County to send in a winery and harvest crew to check on the cellar and pick any remaining grapes. Deike recalled a sprawling convoy of employee cars parked along Highway 101 awaiting an escort to get up to the vineyards and winery. "It was a whole vineyard crew and our cellar crew in this huge convoy of cars. It had to be at least 50 cars," she said.

She said a few of her fermentations were a bit more sluggish than normal but that, on the whole, everything stayed relatively stable. "The day we got back in I just wanted to cry," she said. "You feel like these are your children who you're taking care of, and you

just abandon them and you're crossing your fingers hoping everything is going to be OK."

The wines did OK and the remaining Cabernet Sauvignon grapes were picked. The wine produced from those grapes remains separated from the rest of the vintage as the winemaking staff continues to evaluate for any hint of smoke taint. "We actually do it all the time anyway," Deike said. "Keeping all the vineyard blocks separate is something we're quite used to."

Defranceschi,
your **perfect partner**
for the entire
wine-making process.

SACMI has a century-long history,
made up of thousands
of people and skills.
For your next winery, though,
we'll be one thing only.

A sole partner, capable of providing
constant support, from the vine
to shipment of the finished bottle,
ensuring you can always count on
the utmost professionalism.

This is Defranceschi:
technology and innovation
at the service of tradition.

www.defranceschi.sacmi.it

defranceschi
a company of **SACMI**

AgCode III



THE MOST COMPREHENSIVE
VINEYARDMANAGEMENT
SOLUTION IN THE INDUSTRY

Utilizing AgCode's AM3 Timecard Functionality, available on all your Apple iOS devices, data collection from pesticide to labor management has never been easier!

PLANRECORDPRODUCE

877.250.8435 | contact@agcode.com | agcode.com



Winemaker Rebecka Deike with the winery's new VitiSort optical sorting machine.

When the red-wine production facility opened, Ferrari-Carano also moved a bottling line from the original winery to the new one. That MBF Synchrofill line was bottling Merlot at a rate of around 70 bottles per minute when *Wines & Vines* visited the winery, and Deike pointed to a new Parker Hannifin nitrogen generator used to provide gas for dosing on the line and support other winemaking operations.

Opposite the older winery are the entrances

for a cave system that was dug into the hillside when the winery was built. The caves are an intersecting grid of tunnels that provide 46,000 square feet of barrel storage. When completed, the expansion project will double the amount of available storage.

All regular barrel work such as topping and sulfur-dioxide additions are made in the caves. Cellar workers use custom-built ladders on wheels that roll along the barrel rows. The

ladders loop over the top of the rows so two workers can access both sides of a row. When wines need to be racked, the barrels are moved to a large covered area between the winery and cave entrances where the crush pad for the older facility is located.

Depending on vintage, vineyard, price and variety, Deike said she uses up to 50% new oak. Almost all of that is French, complemented by a small portion of Eastern European. Deike draws from "a whole bunch of different coopers" and said that with each vintage she's evaluating toasting, stave thickness and other barrel options.

While it's perched on the top of a hill between vistas of Alexander Valley and the rugged Mayacamas Mountains separating Sonoma and Lake counties, the mountaintop winery is not a visitors' attraction. Wholly dedicated to production, it houses no administrative or sales offices, or tasting room nor is it permitted to host events. "We don't even get mail delivered here," Deike said. "We have to go down to the estate winery every day to get our mail."

The views might go unappreciated by visiting tourists, but Deike and the winemaking team appreciate more space, new equipment and multiple crush pads to handle small and large grape lots. 🍷

A simple solution to inoculate your barrels

malotabs™

Selected Wine Bacteria in Tablet Form

Tested and approved for its efficiency, Malotabs™ is available for white and red wines and complements fresh and fruit driven wines with balanced mouthfeel.



1 tablet

+



1 barrel

Easy to add for complete dispersion of bacteria throughout the barrel

SCOTT
LABORATORIES

707-765-6666 • www.scottlab.com

Sparkling Wine Custom Crush Services

OUR SERVICES

Complete Custom Crush
Bottling (Sparkling Wines)
Mobile Bottling - Counter Pressure
Mobile Bottling - Tirage (May 18)
Riddling and Disgorging - (July 18)
Wine Storage

METHODS

Methode Traditionnelle
Pet-Nat
Carbonated Wine
Sparkling Cider

Napa

BRUT BOTTLING

For information, call 707.492.4862

CRUSH PAD EQUIPMENT

Supplier Guide

THE FOLLOWING LISTINGS INCLUDE COMPANIES ACTIVELY MARKETING CRUSH PAD EQUIPMENT, GRAPE PROCESSING AND OTHER WINEMAKING EQUIPMENT TO BE USED DURING HARVEST.



AFTEK, INC.

740 Driving Park Ave, Ste H, Rochester, NY 14613

P: (585) 458-7550

E: aftek@aftefilters.com

W: aftefilters.com

Brands Sold: 3M, US-FIP Pumps

Products and Services: Supplier of all types of filtration and clarification equipment including crossflow, filter sheets, membranes and pre-filters, Diatomaceous earth, crushpad equipment, enzymes, fining agents, nutrients and tannins, oak alternative products.



ATPGROUP

1230 Shiloh Rd, Windsor, CA 95492

P: (707) 836-6840

E: info@atpgroup.com

W: atpgroup.com

Brands Sold: Ashland Polyclar PVPP, Bartlett, CDR Wine Lab, Eaton Beco-Pads, EP Minerals, Fermentis Yeasts, Padovan, Parsec, Red Star Yeast, Siprem, Stolzle, Univar

Products and Services: Fining Agents, Specialty Tannins, Malolactic, Yeast and Yeast Nutrients, Cellar Supplies, Fine Chemicals, Winemaking Equipment; Membranes, CDR Wine Lab, Stolzle glassware; Services such as mobile filtration, equipment repair and parts replacement.

BUCHER

vaslin

BUCHER VASLIN NORTH AMERICA

3100 Dutton Ave, Ste 146, Santa Rosa, CA 95407

P: (707) 823-2883

E: info.northamerica@buchervaslin.com

W: bvnorthamerica.com

Brands Sold: Bucher, Cazaux, Costral, Delta, Flavy, Sutter

Products and Services: Bucher and Sutter presses, Delta destemmers and grape reception from sorting to pumping. Costral bottling line. Cazaux pumps. Fully staffed service and spare parts department.

CARLSEN & ASSOCIATES

1439 Grove St, Healdsburg, CA 95448

P: (707) 431-2000

E: info@carlsenassociates.com

W: carlsenassociates.com

Brands Sold: Puleo, Waukesha, Yamada

Products and Services: Carlsen & Associates designs, manufactures and represents equipment for many aspects of the wine industry. We provide everything from complete crush pad packages to valves, fittings and hoses.



CRIVELLER GROUP

CRIVELLER GROUP

6935 Oakwood Dr, Niagara Falls, ON L2E 6S5 Canada

P: (707) 431-2211

E: mail@criveller.com

W: criveller.com

Brands Sold: Alphafilter, Enolmeccanica Valebelbo, Enoveneta, Fimer, Ganimede, Ghidi, Milani, Newtec, Norton, Officine Pesce, OMAC, Poggio, TEM

Products and Services: Complete Enoveneta crush pads; Fimer bottling equipment; Newtec automatic & semi-automatic labellers; Alphafilter filtration equipment; custom fabrication of rotofermenters, plunger tanks, stainless steel tanks; various pumps and Ganimede fermenters.

CUSTOM METALCRAFT

PO Box 10587, Springfield, MO 65808

P: (417) 862-0707

E: nikkih@custom-metalcraft.com

W: custom-metalcraft.com

Brands Sold: TranStore®

Products and Services: TranStore® portable stackable square wine tanks, barrels and related processing equipment.

DELLA TOFFOLA

USA

DELLA TOFFOLA USA, LTD.

975 Corporate Center Pkwy, Ste 130, Santa Rosa, CA 95407

P: (707) 544-5300

E: dtgroup@dellatoffola.us

W: dellatoffola.us

Brands Sold: AVE Technologies, GIMAR, OMB, Priamo, Sirio Aliberti, Zitalia

Products and Services: Della Toffola offers over 50 years of experience in the design & manufacture of innovative equipment. We deliver high quality crushing, pressing, filtration & floatation systems, bottling and packaging lines as well as outstanding support & service.

EURO-MACHINES, INC.

497 Edison Ct, Ste G, Fairfield, CA 94534

P: (707) 864-5800

E: info@euromachinesusa.com

W: euromachinesusa.com

Brands Sold: Europress, Hans Dampf, Kiesel, Romfil, Scharfenberger

Products and Services: Scharfenberger Europress grape press, Euroselect destemmers, incline belts, sorting tables & stainless steel tanks, Kiesel pumps & mixers, Hans Dampf steamers, Romfil cross flow filters.

LAKEVIEW VINEYARD EQUIPMENT, INC.

40 Lakeshore Rd, RR #5, Niagara-on-the-Lake, ON L0S 1J0 Canada

P: (905) 646-8085

E: admin@lvequipment.ca

W: lakeviewvineyardequipment.com

Brands Sold: Clemens, Collard, CoupEco, Durand-Wayland, Gregoire, Infaco, Orchard-Rite, Pellenc

Products and Services: Sell and service new and used grape harvesters, vineyard sprayers, frost protection wind machines, vine trimmers, mechanical leaf removers, crush pad sorting equipment, cultivators and electric pruners.

MIO VIGNETO PRODUCTS

130 Minerva Way, San Ramon, CA 94583

P: (415) 531-6450

E: dwightb@miovigneto.com

W: miovigneto.com

Brands Sold: Amma, Bev-Tech, Evrostroj, Jaklic

Products and Services: We offer custom tanks, Slovenian oak, chestnut, cherry and other wood barrels, fermentors and casks to 2,500 gallons, horizontal membrane presses and winery equipment to fit our client's production needs.

OGLETREE'S, INC.

935 Vintage Ave, St. Helena, CA 94574

P: (707) 963-3537

E: speers@ogletreecorp.com

W: ogletreecorp.com

Products and Services: Design and fabrication of winemaking equipment. Consulting, design, fabrication and installation. Conveyors, catwalks, hoists, receiving hoppers and process piping. Structural steel and pre-engineered metal buildings.



P&L SPECIALTIES
HIGH-PERFORMANCE CRUSHPAD EQUIPMENT

P&L SPECIALTIES

1650 Almar Pkwy, Santa Rosa, CA 95403

P: (707) 573-3141

E: sales@pnlspecialties.com

W: pnlspecialties.com

Brands Sold: MAS

Products and Services: P&L manufactures high performance crushpads designed to maintain yield, labor & time. Such as: Customized Sorting, MOG Removers for Optical Sorting; Whole Cluster Metering & Conveyors, Bin Dumpers & Catwalk/Crushpad Design. US Dist. for MAS Presses.

PROSPERO

PROSPERO EQUIPMENT CORP.

123 Castleton St, Pleasantville, NY 10570

P: (914) 769-6252

E: info@prosperocorp.biz

W: prosperoequipment.com

Brands Sold: Barison, C.M.A., Dogliotti, GAI, Italfilters, Liverani, Omac, WINUS

Products and Services: Complete service providers for all beverage equipment in North America and Canada. We provide service and technical support to all small, medium and large scale wineries, breweries and beverage companies.

REVOLUTION EQUIPMENT SALES

3466 Brickway Blvd, Ste 104, Santa Rosa, CA 95403

P: (707) 573-3154

E: sales@revolutionequipmentsales.com

W: revolutionequipmentsales.com
Brands Sold: Bucher Vaslin, Carlsen & Assoc., CME, Demoisy, Diemme, M.A.S, P&L Specialties, Pellanc, Tom Beard Co., Willmes

Products and Services: High-quality used winery equipment that can be warranted and serviced by P&L. Great prices on presses, crusher-de-stemmers, sorting tables, tanks, bottling, pumps and now featuring press parts. Sign up online for timely specials "Steel of the Week."



SCOTT LABORATORIES, INC.
 PO Box 4559, Petaluma, CA 94955
P: (707) 765-6666
E: info@scottlab.com
W: scottlab.com

Brands Sold: Anchor, Armbruster, ICAS, IOC, Koch Membrane Systems, Lallemand, Mazzei, Oenobrand, Pall, Relvas, ScottCap, ScottCart, Velo Acciai, Willmes
Products and Services: For over 80 years, Scott Laboratories has provided fermentation, filtration, equipment, packaging and laboratory services to the wine and distilling industries.



**SCOTT LABORATORIES, LTD.
 (CANADA)**

950 Brock Rd S, Unit 1, Pickering, ON L1W 2A1 Canada
P: (905) 839-9463
E: info@scottlabsltd.com
W: scottlabsltd.com
Brands Sold: Guth, Icas, IOC, Lallemand, Manzini, MBF, Relvas, Seitz, Sterisun, Vaucher-Beguet, Velo, Willmes
Products and Services: For eighty years, Scott Laboratories has been meeting the needs of the beverage industry with innovative solutions and products including fermentation goods, filtration media, equipment, packaging products and laboratory services.

TOM BEARD CO

1650 Almar Pkwy, Santa Rosa, CA 95403
P: (707) 573-3150
E: sales@tombeard.com
W: tombeard.com
Brands Sold: BlueMorph UV, P&L Specialties, VinWizard
Products and Services: Tom Beard Company designs and manufactures barrel washing machines with

retrofits of recycling systems that save wineries 50% water use. Products include: 2- and 4-barrel cabinet washers, bin/lug washing machines and custom barrel process centers.

UNION JACK

657 S Hurstbourne Pkwy, #264, Louisville, KY 40222
P: (800) 672-8119
E: support@unionjackstable.com
W: unionjacktools.com
Brands Sold: Columbia, Decade, Harold Moore, HBC, LaCrosse, Remco, Unifork, Unirake
Products and Services: We sell crushpad tools, harvest bins, knives, forks, shovels, mixing paddles, punch-downs, fruit hoes, tank brushes, squeegees and other hygiene tools for wineries and vineyards.

VALLEY PIPE & SUPPLY

PO Box 551, Fresno, CA 93709
P: (559) 233-0321
E: sales@valleypipe.com
W: valleypipe.com
Brands Sold: BCM, CEP, CME, Defranceschi-Sacmi, Milani, Platinum Pump, PMH-Vinicole, Protec, Socma, Spadoni, Sraml-Niko, Tecnicapompe

Products and Services: Full line of the highest quality crush pad equipment, tanks, pumps, filtration, optical sorting and miscellaneous winery supplies you can depend on. With a full machine & fabrication shop we can customize what is right for you.

VANCE METAL FABRICATORS

251 Gambie Rd, Geneva, NY 14456
P: (315) 759-2118
E: cjennings@vancemetal.com
W: vancemetal.com
Products and Services: Stainless steel tanks, catwalks, pump over carts and custom hoppers for wineries, cider houses, micro breweries and distilleries.

THE VINTNER VAULT

3230 Riverside Ave, Ste 140, Paso Robles, CA 93446
P: (805) 226-8100
E: info@thevintnervault.com
W: thevintnervault.com
Brands Sold: AG Inox, Borelli, Dhea Softpress, ENOS, Garballotto, IMMA
Products and Services: Quality equipment and service. Whether you are starting a new winery or expanding on an existing one, Vintner's Vault has all the supplies and expertise you need.



*Where Experience is
 a Tradition*

- ENTAV Licensee
- 2010 Protocol material available
- Certified virus and disease test protocol

21208 State Road 113, Knights Landing, CA
 Phone: 530-735-6821, Cell: 530-379-5007
 www.guillamenurseries.com

Sutter EPC 25/35/50/90

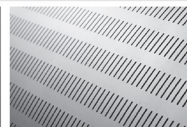
The choice for quality pressing
 BPA-free membrane



EPC pneumatic press
 Outstanding results to express your difference



Color, adjustable
 touch screen



Sutter specific
 perforations



High-end tank
 and membrane

ORDER YOUR SUTTER TODAY

SUTTER

Bucher Vaslin North America
 www.bvnorthamerica.com
 sales.northamerica@buchervaslin.com
 (707) 823-2883

**BUCHER
 vaslin**



Producing Cabernet Wines at Different Price Points

Winemakers dissect the varietal from high-volume production to small-lot wines

By Andrew Adams

Cabernet Sauvignon is the most popular red varietal wine with consumers and critics and the grape is expected to soon surpass Chardonnay as California's leading wine grape variety by tonnage and acreage.

In light of the varietal's dominance, four different Cabernet wines at four different price points were dissected in a tasting and panel discussion at the Unified Wine & Grape Symposium earlier this year. The session included presentations by the vineyard manager and winemaker responsible for four wines.

Moderating the session was Chris Munsell, director of winemaking for E. & J. Gallo Winery's premium wine program. Munsell said when he "was a wee lad in the winemaking world" a marketing executive told him for any wine to be successful it needed to be of good quality, known by consumers and profitable for everyone involved.

He said no other varietal or red blend has received as many 100-point scores as Cabernet Sauvignon and its popularity and profitability are obvious by the grape's place in the wine industry. When Munsell was introducing the panel he said he would not be surprised if Cab had outpaced Chardonnay in terms of total production in the 2017 vintage, but

when the California crush report came out about a month later, Chardonnay had held on to its top spot, barely. Growers harvested 614,565 tons of Chardonnay and 601,473 tons of Cabernet. Both varieties had a 14% share of the state's total wine grape harvest.

"Cabernet Sauvignon is also in a unique position where you see wines from from 7 to 8 bucks a bottle all the way up to 700 or 800 bucks a bottle and everything in between. Very few other varietals have that scope," Munsell said.

At \$13 consistency is key

Evan Schiff oversees winemaking of Francis Ford Coppola Winery's Diamond line of wines that includes 13 different varietals, two of them being Cabernets. He presented the 2014 Ivory Cabernet with a retail price of \$12.99 that is sourced from a Lodi AVA vineyard managed by Vino Farms.

Craig Ledbetter, vice president and partner at Vino Farms, said a portion of the grapes for the Ivory label Cab are from a vineyard on the easternmost edge of the Lodi AVA in the sub-appellation of Borden Ranch. The vineyard was planted in 1990 and cultivated with bi-lateral spur until 2009 when it was transitioned for mechanical minimal pruning.

Ledbetter said that change was not intended to save money or increase production but simply to get it pruned in a timely way. He

Cabernet grapes undergo a cold soak of about a week prior to fermentation in the cellar of Lede Family Wines.

KEY POINTS

At lower prices, creating uniformity and consistency is paramount.

At higher prices, winemaking is minimalist while vineyard work increases.

At all price points, extraction is carefully monitored and controlled.

FRANCIS FORD COPPOLA WINERY

Geyserville, Calif.

2014 Diamond Series "Ivory Label"

Cabernet Sauvignon

Price: \$13

Production: 200,000 cases

Appellation: California AVA

Source: 250 growers throughout state

Yields: 8 tons per acre

Farming costs: \$2,000-\$3,000
per acre

Cold soak: None

Fermentation/skin contact:

Six days, no extended maceration

Oak: 12 months, barrel alternatives,
micro-oxygenation

Alcohol: 14%



RODNEY STRONG WINE ESTATES

Healdsburg, Calif.

2014 Knights Valley Cabernet

Sauvignon (10% Malbec)

Price: \$35

Production: 11,000 cases

Appellation: Knights Valley,
Sonoma County

Source: purchased

Yields: 3.5-4 tons per acre

Farming costs: \$8,000 per acre

Cold soak: five days

Fermentation/skin contact: pump
overs, extended thermal 86°F
maceration

Oak: 100% French oak barrels,
50% new

Alcohol: 14.5%



SEVEN HILLS WINERY

Walla Walla, Wash.

2014 Seven Hills Vineyard Cabernet
Sauvignon (2% Petit Verdot)

Price: \$50

Production: 21,000 cases

Appellation: Walla Walla Valley

Source: estate vineyard

Yields: 3.25 tons per acre

Farming costs: \$6,000 per acre

Cold soak: 1-2 days

Fermentation/skin contact: firehose
pump overs, 3x per day, no extended
maceration

Oak: 100% French oak,
40% new 22 months

Alcohol: 14.6%



LEDE FAMILY WINES

Yountville, Calif.

2014 Cabernet Sauvignon (9% Petit
Verdot, 5% Cabernet Franc, 4% Malbec
and 2% Merlot)

Price: \$78

Production: 7,246 cases

Appellation: Stags Leap District

Source: estate vineyard

Yields: 2.5 tons per acre

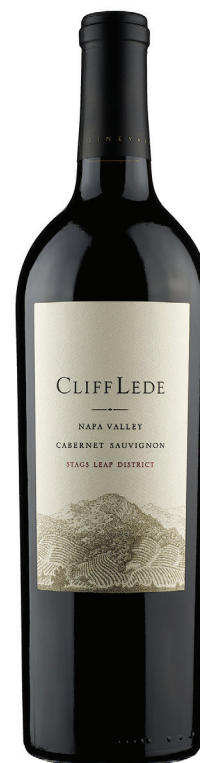
Farming costs: \$10,000 per acre

Cold soak: seven days

Fermentation/skin contact: Pump
overs, punch downs and *délestage*, ex-
tended maceration of up to five weeks

Oak: 100% French oak barrels,
75% new, 21 months

Alcohol: 15%



said the company manages about 1,000 acres of mechanically pruned vines and if they had to be pruned by hand it wouldn't be completed until the end of March.

He said that mechanically pruned vines result in more speckled light exposure and much smaller bunches and berries, providing for a good juice to skin ratio. The vines also produce two to four times as many bunches.



Evan Schiff, Francis Ford Coppola Winery

Schiff said all of the grapes used for the Diamond line are contracted and come from approximately 250 growers in all of California's appellations. On average the Cabernet is picked at 26° Brix for mature fruit flavors and no greenness. He eschews cold soaks and instead inoculates and adds enzymes to help ensure all potential color can be extracted in a fairly quick fermentation. "For the average machine harvested fruit coming from 2 to 3 hours away we want to get it in the fermentor. We want to get it going," he said.

He said that enzymes help to ensure fermentations last only about six days on average, so he can manage his tank space better. Schiff uses Coppola's in-house phenolic assay that dictates winemaking only in conjunction with sensory analysis. "We don't make our wine by the numbers only and we don't taste without the numbers," he said.

At 2° Brix he generally presses but may press earlier if there is sufficient tannin. After a gentle fining with Isinglass, the wine then goes to tank where it ages on barrel alternatives and micro-oxygenation at a rate of about 3 mg/liter per month. Schiff stressed the importance of checking the wine's basic chemistry and tasting every week while using micro-ox. He also uses multiple oak suppliers to help create some complexity and will spread the

oak among several tanks rather than concentrate it in just a few.

Final blends are built with sensory and tannin analysis with a goal of consistency and to fill enough tanks to support as many as five bottling runs per year. "It's really all about consistency at this price point," he said.

Night harvest for \$35 wines

As Rodney Strong Wine Estates' wine grower, Ryan Decker manages the company-owned vineyards and works closely with supplying growers. He and winemaker Justin Seidenfeld discussed the winery's 2014 Knights Valley Cabernet Sauvignon, which has a retail price of around \$35 and total production of around 11,000 cases.

Decker said most of the vines for this wine are cane pruned leaving two canes although high-vigor areas are set to four. He said everything is managed by hand and with minimal leaf pulling as the soil helps keep the vines in check and excessive pulling could lead to sunburn in the warm afternoons of Knights Valley. "You can overexpose the fruit really easily out there," he said.

Most of the grapes are machine harvested at night. Decker said that ensures they are picked when it's as cool as possible and arrive at the winery as cold as possible. A few blocks

WINE CLUB CRUISING

Engage your club members by hosting a wine cruise
with award-winning Food & Wine Trails!

We arrange travel to premier wine regions around the world using preferred cruise lines, tour operators and an extensive network of sommeliers and culinary specialists.

Find out how you can...

- ENHANCE Brand Loyalty
- Add VALUE to Wine Club Programs
- ACQUIRE New and RETAIN Club Members
- Earn REVENUE and FREE TRAVEL for the winery
- INCREASE Direct to Consumer Wine Sales

PLUS...

- Fully Funded, NO RISK programming
- Collaborative marketing that tells YOUR STORY

Contact America's oldest and largest wine travel specialists:

FOOD
& WINE
TRAILS
EPICUREAN TOURS

1-800-367-5348

www.foodandwinetrails.com

info@foodandwinetrails.com

CST#2020386-50

Sampling of our winery partners:

- Ridge Vineyards
- Rombauer
- Martinelli
- V. Sattui
- La Crema
- Hartford
- Darioush
- Duckhorn
- Schramsberg



Wine Travel
Specialists

NAPA FERMENTATION SUPPLIES

Pneumatic Stand for Foil Spinner

Takes 27-32mm Capsules
Spinner is 110v
Table Top Unit



Contact us today!

575 Third St. Bldg. A Napa CA 94559

707-255-6372 | napafermentation@aol.com

www.napafermentation.com

are picked by hand to retain the whole clusters. Farming cost in Knights Valley is about \$8,000 per acre.

Seidenfeld said Rodney Strong completed a new production winery in 2014 and outfitted it with

consistent oak impact. "We really like what those barrels do so I took a gamble, and so far we're pretty happy," he said.

All of the wine is filtered because Seidenfeld said he's had too many bad experiences from not



Justin Seidenfeld, Rodney Strong Wine Estates

square, stainless steel fermentation tanks by La Garde because they offered a good juice to skin ratio that resulted in wines with structure and soft tannins. It also allowed him to work small-lot fermentations. "We were able to keep all the blocks separate and found something quite special," he said.

After a cold soak of about five days, Seidenfeld said he initiates a spontaneous fermentation by warming the tanks. The caps are managed with an automated pumpover system that alters the number and duration of pumpovers by Brix. Seidenfeld said he'll run a pumpover every 8 hours until the must hits 15° Brix and then dial that back until around 2° Brix when the wine will get just one 20-minute pumpover.

Once dry, the wine then goes through an extended thermal maceration in which the must is kept at 86°F until it's ready to be drained and pressed. Following pressing, Seidenfeld lets the wine settle for 24 hours then splash racks it into barrels. He said the oak program is 100% French with about half new and most of those are the new Vicard Generation 7 barrels built with staves analyzed for tannin content. Seidenfeld said they do seem to offer a more

filtering and his main responsibility is to provide the best product possible.

Walla Walla Cab at \$50

Adding a little perspective from the Northwest was Casey McClellan, winemaker and founder of Seven Hills Winery in Walla Walla, Wash. McClellan produces around 21,000 cases per year and his 2014 single vineyard estate Cabernet retails for \$50.

While Eastern Washington enjoys abundant sunshine and 16-hour days during the growing season, McClellan noted the winters can be severe and it's not uncommon for ravaging frosts to strike in November. "The balance we have to get at is to grow an adequate crop that is fully ripe by no later than mid-October to avoid the risk of a severe frost event that ends the growing season before you want it to," he said.

"In recent years we've experienced 76 degrees one day in early November and the next day it was 15," McClellan said. "No vine likes that, and your season is over when that happens. We do a lot of thinking about managing that risk and paying very close attention to heat accumulation during the season and we will aggressively thin to make sure we ripen a crop to



At Gusmer, we know that every wine has a story and that every winemaker can make their own mark within the industry. That's why for over 90 years, Gusmer has offered a full range of innovative enological tools that enable your creative expression through unique and interesting wines. Equipment, analytical instruments and processing aids brought to you from leading suppliers in the wine industry, all backed by strong Gusmer technical support. The options for expression have never been greater and the tools have never been better – so go ahead, express yourself and create your own story.

MicroEssentials™
Fermentation Nutrients

Gusmer Filter Media
Filter Sheets, Lenticular Cartridges,
Cellulose Pre-Coat Fibers

Gusmer Oak Products
Oak-Mor®/Oak Advantage® Chips
and Granular Oak

CHR HANSEN
Improving food & health
Malolactic Bacteria,
Non-Saccharomyces Yeasts

RENAISSANCE
YEAST
H₂S Preventing
Saccharomyces Yeasts

FOSS
OenoFoss -
FTIR Analytical Instrumentation

Polyphenolics®
Enological Tannins

Arôbois
French Oak

MILIPORE SIGMA
Membrane Cartridge Filters,
Laboratory Consumables

BUCHER
vaslin
Cross Flow Filters, RO Systems

BASF
The Chemical Company
Newtrition
Divergan F - PVPP

PACIFIC OZONE™
Portable Ozone Systems

bioseutica™
Lysozyme

Gusmer
Enterprises, Inc.®

West Coast: Fresno, CA Tel: 559.485.2692
Napa, CA Tel: 707.224.7903
Windsor, CA Tel: 707.836.1056
Midwest: Waupaca, WI Tel: 559.485.2692
East Coast: Mountainside, NJ Tel: 908.301.1811

www.gusmerwine.com | sales@gusmerenterprises.com | YouTube f t i n

maintain continuity of vintages and supply to the market.”

Part of Cabernet’s success in Washington can be attributed to it being one of the more winter-hardy *Vitis vinifera* varieties. Growers in the state also don’t have to contend with phylloxera and McClellan said the vineyard is own-rooted like most others in the state. The vineyard is sustainably farmed and certified through the LIVE program. Yields run about 3.25 tons per acre and pricing is around \$10,000 per acre. McClellan expects prices to keep rising. The farming costs are about \$6,000 per acre. “I’m seeing more California faces up there and you’ll probably bring your pricing with you,” he said.

He said because the wine is a high-revenue lot he has to carefully manage his tanks to ensure he has the capacity to get it in before any frosts. McClellan picks at around 25° to 26° Brix looking for aromatics and flavors while remaining a meal-friendly wine with the potential to age for 10 years.

The grapes are destemmed then pass through open rollers before getting transferred to open-top tanks via a progressive cavity



Casey McClellan, Seven Hills Winery



pump. A brief cold soak is followed by fire hose pumpovers in which McClellan likes to turn the tank volume three times. After 10 to 14 days the wine is typically close to dry. He presses and settles before racking in to mostly 36-month Seguin Moreau barrels with a portion designated for Taransaud barrels.

PREMIUM BARRELS SAVOIR FAIRE

CUSTOM MADE - HANDCRAFTED BARRELS

WWW.SANSAUD-USA.COM

NEW EDITION

Winery Planning and Design, Edition 17

Dr. Bruce Zoecklein, Editor

This electronic publication offers more than 1,500 pages of planning and design features of interest to both wine and cider producers.

Topics Include:

- Business planning
- Construction and production economics
- Winery design considerations
- Sustainable designs and practices
- Energy and water use
- Equipment
- Refrigeration
- Caves and gravity flow
- Wastewater management
- Sanitation, winery labs, HACCP planning

To review a Table of Contents, visit vtwines.info

Priced at \$198 plus shipping.

Order at practicalwinery.com, click on Bookshelf.

The FERM-Rite Fermentation Bung

THE BOSWELL COMPANY

First in Value & Service Since 1981

145 Jordan Street, San Rafael, CA 94901

415-457-3955 • www.boswellcompany.com

The wine industry has trusted Kennedy/Jenks Consultants for professional environmental engineering services since the 1950s. We specialize in providing cost-saving, sustainable solutions to meet winery needs.

OUR SERVICES INCLUDE:

- Wastewater
- Water Supply
- Storm Water
- Solid Waste
- Facility Planning
- Design
- Construction Management
- Hazardous Materials
- Water/Energy Audits
- Air Emissions and Odors
- Regulatory Compliance
- Land-Use Permitting/CEQA

e: BobChrobak@KennedyJenks.com
t: 415.243.2150

Kennedy/Jenks Consultants
Engineers & Scientists

www.KennedyJenks.com/wine

While he keeps experimenting with extended maceration, McClellan said he continues to prefer a standard extraction of two weeks at the most. “I keep trying them and keep saying we can do better with just normal skin contact of 10 to 14 days,” he said.

He also filters prior to bottling to ensure a reliable product.

Less intervention in the cellar at \$78

Likely no one in the audience was surprised that the highest-priced Cabernet in the session came from Napa Valley, but at \$78 per bottle the 2014 Lede Family Wines Cabernet Sauvignon is almost a bargain when compared to other Napa Cabs.

Discussing the wine were vice president and general manager Remi Cohen and viticulturist Allison Cellini, who said the wine came from two estate vineyards that comprise 56 small lots from nearly 60 acres. Cohen described the Stag’s Leap district blend as “really the heart and soul of our production.”

In the vineyard designed by David Abreu, the vines are trained to low head-height vertical shoot positioning at 3-foot vine spacing and 5 to 6-foot row spacing. Cellini said the vineyards demand precision and she’s very lucky to work with an in-house crew that has been tending them for nearly five years. She said she conducts several canopy adjustments passes based on quality to achieve about 12 to 14 clusters per vine for 2 to 3 tons per acre. The grapes are harvested into the much-loved little yellow lug boxes, known as FYBs, and brought to the winery.

“What we like about doing this is that we feel the heavy lees of the wine protects the wine and flushes out the wine.”

—Remi Cohen

Cellini said she’s able to make “micro decisions” in the vineyard and farm with such precision because her vineyard workers know the estate so well. “The majority of the people on this crew have been at our site for four or five years so having the same people year after year really allows us the ability to fine tune and get to know the vineyard,” she said.

When asked about farming costs, Cohen said at the low it probably came to \$12,000 to \$14,000 per acre.

Cohen said had winemaker Christopher Tynan sat on the panel he likely would have said everything is done in the vineyard, and



Remi Cohen, Lede Family Wines

while she said there is a minimalist strategy in the cellar that belies an incredible amount of work. “On the other hand we know that he does take an incredible amount of meticulous care and attention in what he does in the winery,” she said.

At the crush pad, the grapes are dumped onto a Bucher Vaslin conveyor for a hand sort-

ing that is followed by an optical sorting from a Pellenc machine. She said the winery made the smart move to lease a Pellenc sorter in 2011, so it was easy to recently upgrade to the company’s latest machine.

Sorted berries are dropped into tanks with a unique hoisting system that Cohen said can move about 1.5 tons of whole berries. A long cold soak of up to a week is followed by fermentation managed with a few pumpovers per day. The winery uses truncated, stainless steel tanks to help keep the cap submerged. One a lot is in the tank it will stay there for up to 40 days of maceration and is tasted daily to evaluate mouthfeel and tannin development.

All of the lots stay separate into barrel, where they also rest on the lees through the entire *elevage* that can last more than 20 months.

The extended time in the tank and barrel as well as the myriad lots help Cohen and the rest of the winemaking team make the best final blend possible. “What we like about doing this is that we feel the heavy lees of the wine protects the wine and flushes out the wine,” she said. “Secondly it gives us the opportunity by keeping all the lots separate — which is a lot more work, topping each individual lot and maintaining each individual lot — but we get to watch the lot mature,” she said. “We have that flexibility all the way up to bottling.” 🍷

HIGH-QUALITY PRODUCTS FOR GROWERS

We help you make growing easier.



SpecTrellising offers a variety of knitted, small-mesh **bird nets** with 10-year UV warranties.

Check out our Vineyards Catalog online, or call for more information on sizes and pricing.

WHEN YOU'RE TOO BUSY TO DEAL WITH INFERIOR EQUIPMENT

Bird Netting • Battery-Powered Tools • Bins • Brackets
Crossarms • Ground Anchors • Irrigation • Posts & Extenders
Pruners • Support Stakes • Ties • Snippers/Loppers • Vine Shelter

For Vineyard trellising products and other catalogs visit spectrellising.com

SPEC TRELLISING



800.237.4594

Cold Stabilization and Malolactic Fermentation

Commentary: A call to action

By Richard Carey

Two products that could help winemakers produce significantly better wines should prompt wineries to seek approval from the Alcohol and Tobacco Tax and Trade Bureau (TTB), which has not fast-tracked these items.

The first is Zenith, a colloidal material that will cold-stabilize both white and red wines permanently. Enartis developed the product and introduced it at this year's Unified Wine & Grape Symposium.

The second is a bacteria, *Lactobacillus plantarum*, that can consume malic acid to finish malolactic fermentation (MLF) more quickly and completely and with fewer side metabolites. *L. plantarum* is approved internationally for use in wine and in the United States for beer, but not for wine.

Zenith Uno and Zenith Color

Zenith Uno is for white wines, Zenith Color for red wines. White wines, unlike red ones, must be heat-stabilized prior to addition. K-polyaspartate (KPA) is the functional compound of the new colloidal cold-stability agents for use in wine. The chemical process polymerizes L-Aspartic acid into K-polyaspartate (KPA).

KEY POINTS

Two new products from Enartis will enable winemakers to cold stabilize their wines using a colloidal material known as K-Polyaspartate (KPA). Zenith Uno is for white and light rosé wines and Zenith Color will stabilize dark rosé and red wines. The potassium ion of KPA, a colloid, chelates with the tartaric acid anion and prevents bitartrate anion formation and precipitation over time.

KPA has several other benefits: trials have found that KPA does not affect the color of red wines; it is a sustainable product from a water- and energy-consumption standpoint.

Meta Tartaric Acid (MTA) and Carboxymethylcellulose (CMC) are two other colloidal compounds used for cold stability. Both are temporary means of achieving cold stability that have been shown not to be permanent.

A bacteria known as *Lactobacillus plantarum* has been found to be better at malic acid metabolism than *Oenococcus oeni* in that it does not produce acetic acid, biogenic amines or carbamates. It is especially useful for wines with a pH above 3.4. Research shows it is best to co-inoculate *L. plantarum* with the primary alcoholic fermentation organisms.

K-POLYASPARTATE: PERFORMANCE STABILIZING SYNERGIES

Application trials: Shiraz 2017 — 6 days at -4°C

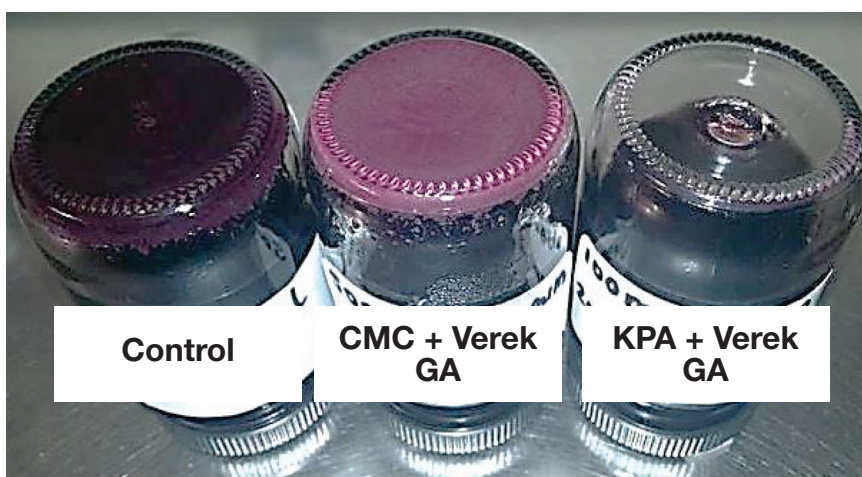


Figure 1: When CMC and KPA (Zenith Color) were added to stabilize Shiraz wine, KPA did not react with anthocyanins and the wine retained its color.

More than 14 research and university entities have been involved in research to validate the functionality of this compound in cold-stability. These institutions include universities

in France, Italy, Spain, Portugal and Greece.

Tartaric-acid crystallization occurs in wine because tartaric acid has the ability to remain temporarily in solution even though it is above its saturation point in an alcohol-water solution. This state is commonly known as supersaturation. The tartaric acid will crystallize and produce glassy-looking crystals in wine when two ions of tartaric acid come close enough to each other. Most frequently, there is some particle (usually potassium bitartrate or KHT) that acts as a nucleation point, causing the ions to exceed the saturation point and crystallize. These ions form the first crystal, which can start a chain reaction to create more crystals. As a colloid, KPA envelops the tartaric acid anion and prevents the ions from getting close enough to precipitate.

In trials comparing the most common methods of achieving cold stability, KPA was more efficient as compared to other methods of cold stability. The standard method measures μS , as a determination of conductivity in wine.

This is the determining factor in measuring the tendency for cold stability and is defined as a drop-in conductivity of less than 5%. The test wines were well above the standard threshold for cold stability, which indicates that the solution they were in was more conductive than those that were cold stable.

Carboxymethylcellulose (CMC) is the current colloidal material used extensively to cold-stabilize wines. It does not quite lower the conductivity for all wines sufficiently below the threshold to maintain a guaranteed cold-stable wine. MTA (a commonly known polymer of tartaric acid) is a material that wineries have used to obtain cold-stability. Zenith has been shown to be better than MTA and equal to KHT.

Colloidal products such as CMC have a propensity to remove color from wine, a vexing problem for winemakers. Figure 1 shows an application trial in which CMC and Zenith Color were added to samples of Shiraz and then held for six days at -4° C. Additional amounts (possibly 50% or more) of CMC would be necessary to get close to cold-stabilization, and the wine still would not achieve the same color level as a wine treated with KPA.

The CMC drop in color shows the degree to which color is removed from red wines when cold-stabilization procedures are introduced. When CMC is added, the material entraps the anthocyanins and might reduce or remove much of the color from red wines. In contrast, Zenith has virtually no color loss. The use of Zenith would allow wineries to lower the cost of production for sweet red wines, to market all red wines more quickly and do so without the danger of future color loss or tartrate formation.

Cold-stability treatments should give wineries the assurance that once a wine is tested as cold-stable (Figure 2), the treatment will continue to work over time. Tartrate stability is a statistical issue, defined by the chance that two ions can come together in an environment where they are locally above saturation. Crystallization is a lower-energy state waiting for a trigger. KHT is the enabling molecule that can trigger crystal formation and reduce the tartaric-acid molecule population to the probability of crystal formation approaching zero.

Stabilab is an instrument that follows the process of conductivity change. Its algorithms measure the asymptotic conductivity curve that changes with increasing amounts of time and/or KHT additions. It is a very accurate – but expensive – solution, and ultimately the winemaker chooses how far down that curve is comfortable enough for a commercial winery.

The “rule of thumb” for KHT addition generally has been defined as 4 g/L KHT at either 0° C or -4° C as the end point where conductiv-

ity does not change by more than 5% after addition of KHT to the wine. The requirement that the wine be lowered to these temperatures while the process unfolds is time-consuming and labor-intensive. KHP addition is tested manually by mini contact test or the automated Checkstab and uses a 3% drop in μS .

CMC was found to prevent crystallization with a simple liquid addition and stirring. Its mechanism of action, and that of KPA, can be likened to replacing the “empty” space between the tartaric-acid molecules in traditional cold-stability action to filling the empty space with Nerf Balls. In this situation, two tartaric acid molecules can’t get close enough together to crystallize because CMC and KPA molecules surrounding tartaric acid act like Nerf Balls to prevent them from getting close enough to crystallize.

Whereas both molecules envelop the tartaric-acid anion, the KPA product envelops its target more tightly and thus protects it more completely from precipitation over time (Figure 3).

Adding anything to a wine just before bottling can be a risky endeavor. Winemakers need to know that nothing will change the filterability of the wine being packaged. Fortunately, KPA does not affect the filterability of wine.

There are a number of secondary benefits to using KPA. A strong trend in the wine industry supports the use of products that are more sustainable in terms of energy, impact on the environment and the consumption of other resources. Zenith (KPA) and CMC are shown

to be close to each other as more sustainable products from a total energy-consumption standpoint.

The reduction of water consumption by wineries is another critical component for sustainable product use. The industry has widely different levels of water consumption, in part depending on the cold-stabilization process used (see Figure 4). By far the worst consumer of water during cold-stabilization is electrodialysis, which has been adopted by many larger wineries because of the great energy savings over traditional cold-stabilization methods. Both CMC and KPA are among the lowest in water consumption.

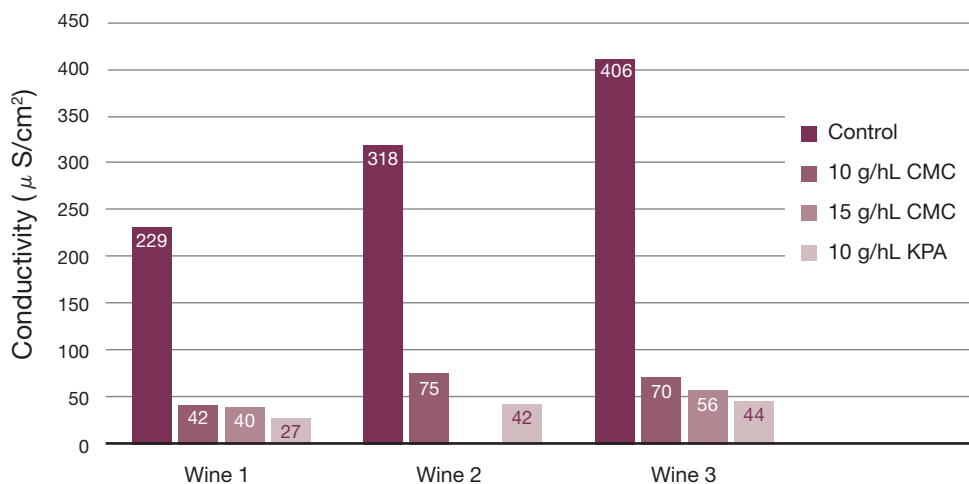
It should be noted that while CMC and KPA are low in energy and water consumption, only KPA is more certain to provide permanent cold-stabilization.

Finally, a cost-of-use comparison shows that this product might help change how wine is produced. Only the KHT method is close to colloids when it comes to the total cost to achieve cold-stability in wine.

Several wineries have tried Zenith, from very large ones such as Arterra Vins Canada in Ontario, Canada to small Eastern wineries such as Mount Felix Vineyard & Winery in Havre de Grace, Md. Others include Precept Wine Brands in Seattle and Brick & Mortar Wine Group in Healdsburg, Calif.

Enartis, and the wine industry, recently learned of one regulatory step toward approval. The FDA has indicated it will accept KPA as a GRAS (“Generally Recognized As Safe”) product.

STABILIZATION OF 2017 WHITE WINES — CMC VS KPA



White Wines				
μS	<30	30-50	50-70	>70
Stability level	very stable	stable	at risk	unstable

Figure 2: In tests comparing CMC and KPA for stabilization in white wines, CMC did not provide as complete protection from bitartrate precipitation as KPA.

Although the above information has been submitted to TTB, the agency has not given final approval of this product. Apparently, TTB would like to hear from industry people that winemakers want to use this product before the agency will give its approval. I suggest that wineries send their comments and urge TTB to approve Zenith for use in wine production.

Lactobacillus plantarum

There is a wealth of active research on alternate organisms to *Oenococcus oeni* for conversion of malic acid into lactic acid. However, some of the reported literature has been inaccurate in its interpretation.

Among many different strains of LAB (*Lactobacillus* Bacteria spp), *L. plantarum* is one of the better organisms for acid conversion, especially for higher pH wines (above 3.4). In addition, its diverse and complex metabolic pathways provide complexity to wines, according to Lucio et al.¹

The research on this organism addresses three methods: inoculation of LAB into must pre-alcoholic fermentation, co-inoculation and addition post-alcoholic fermentation. Despite the inference by Lucio et al. that pre-alcoholic fermentation is the preferred method, in my discussions with colleagues involved in current research, there seems to be a changing consensus that co-inoculation might be the better method. This conclusion developed and evolved as several strains have been identified and selected that are better suited to this production environment. These strains are more complete in their metabolism of malic acid into lactic acid, especially in high-pH wines.

Malolactic-fermentation organisms have two types of metabolic pathways for basic respiration: heterofermentative and homofermentative. *O. oeni* is heterofermentative, meaning it will use multiple energy sources for

survival, including hexoses. *L. plantarum*, in contrast, is not able to metabolize hexoses, which means that *O. oeni* can produce acetic acid but *L. plantarum* will not.

LAB organisms have been saddled with another misconception^{3,4}: That they produce biogenic amines and carbamates, neither of which are desirable in wines. Biogenic amines are compounds responsible for causing headaches as well as noxious aromas and flavors. No producer wants putrescine or cadaverine in its wines, and consumers who are sensitive to histamine or tyramine don't want them, either.

Through research, we now know that certain LAB organisms, including *L. plantarum*, do not produce biogenic amines or carbamates, but actually degrade and remove those substances from the wines in which they are used for MLF². It also has been found that *S. cerevisiae* and *O. oeni* are active producers of acetic acid, biogenic amines and carbamates. Often in stressed fermentations *S. cerevisiae* produces significant quantities of biogenic amines. The carbamates might be produced by certain LAB, but not by *L. plantarum*.

Unfortunately, there is a lot of old information online that has not been updated. One example is the University of California, Davis Department of Viticulture and Enology's website. In their descriptions of various bacterial species, the site specifically mentions that there is concern about the *L. plantarum* organism as a possible producer of acetic acid, biogenic amines and carbamates. This mention might be one of the reasons TTB has not acted on adding *L. plantarum* to the list of approved organisms.

Similar to the Zenith product, perhaps the only way *L. plantarum* will be allowed for use in wine production will be if the industry petitions TTB. Those wineries or winemakers who would like to see how this organism will affect

their wine production can obtain limited samples of *L. plantarum* from Lallemand. If a winery decides to try this organism, Lallemand requests that they co-inoculate with yeast. In addition, the winery must understand that it won't be able to sell wine treated with *L. plantarum*, at least in the short term.

It should be noted that winemakers should not go to ATCC to purchase off-the-shelf cultures because they likely will be dissatisfied with the results. Companies such as Lallemand that provide yeast specifically for winemaking have found that *L. plantarum* must be grown in a specific culture solution to stabilize it and tune its tolerance for wine.

The fact that *L. plantarum* is approved for use in beer, but not wine has led to a "Call to Arms" to petition the TTB to allow the use of *Lactobacillus plantarum* as an alternate organism to *O. oeni*. If readers agree with the proposition, they can write to TTB at the address below to ask not only for the ability to trial-test this organism, but for its experimental use and sale in the production of wine. Despite repeated attempts, TTB has not returned calls requesting answers about their reasoning for not allowing its use in wine. Lallemand staff members said they have had the same experience.

If readers agree with the proposition, they can write to TTB at Alcohol and Tobacco Tax and Trade Bureau, 1310 G Street, Washington, DC 20004 to ask not only for the ability to trial-test this organism, but for its experimental use and sale in the production of wine. 📧

Richard Carey, Ph.D., is a wine consultant in Lancaster, Pa., and owner of Tamanend Wine, Inc.

To see references for this article, go to winesandvines.com and search under Magazine > Features > June 2018.

K-POLYASPARTATE: PERFORMANCE

Resistance over time

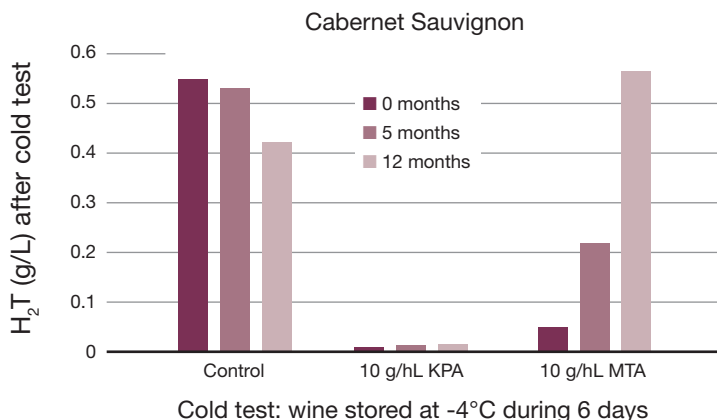


Figure 3: Cold stabilization of wine using MTA is temporary, due to hydrolysis after 12 months in the bottle.

STABILIZATION WITH COLLOIDS: KEY BENEFITS

Greater sustainability of winemaking process: Water consumption

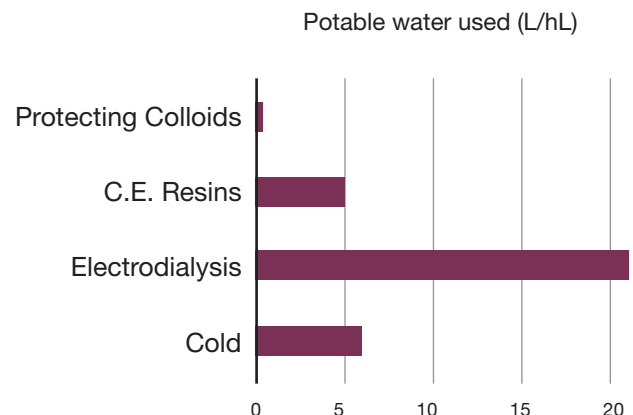


Figure 4: In comparison with other methods of treating the wine, colloid compounds provide cold stabilization using the least amount of water.

Reveal

aromas and flavors
& ferment efficiently

SafEno™ GV S107

Ideally adapted to premium whites

SafEno™ HD S62

For deeply colored and structured reds

SafEno™ HD S135

For full bodied... and smooth reds

SafEno™ STG S101

For fruity red and rosé wines

SafEno™ CK S102

For aromatic white and rosé wines

SafEno™ BC S103

The choice for extreme conditions

SafEno™ UCLM S325

Varietal characters at their best

SafEno™ UCLM S377

For long ageing and fruity red wines

SafEno™ VR 44

For safe fermentations and prise de mousse

SafEno™ SC 22

The original starter yeast

SafEno™ NDA 21

Ideal for elegant fruity style red wines



 THE OBVIOUS CHOICE FOR BEVERAGE FERMENTATION



To help you create the wine you desire, our experts have developed an innovative range of active dry yeasts responding to every need. From stable to difficult fermentation conditions, our solutions will help to ferment and reveal specific flavors in your wine. Discover our full range on www.fermentis.com



Fermentis
LESAFFRE FOR BEVERAGES

Exclusively distributed by
 **atp group**

Call us on (707) 836-6840 – Send us an email to enology@atpgroup.com

A CONVERSATION WITH

Roger Nabedian

The Gallo executive discusses Orin Swift, Stagecoach and market economics

By Jim Gordon

Roger Nabedian, a 32-year employee of E. & J. Gallo Winery, has made many headlines in recent years for orchestrating high-profile, high-priced acquisitions of vineyards, wineries and brands. As senior vice president and general manager of Gallo's Premium Wine Division, he is

in charge of 40 brands produced at 28 wineries around the world. The division includes more than 7,500 acres of vines on 24,000 acres of land.

Nabedian has helped secure and lead the integration of winery acquisitions in recent years, including Louis M. Martini, William Hill Estate and The Ranch Winery in Napa Valley, J Vineyards in Sonoma County and Columbia Winery in Washington State, to mention a few. A further move in the premium direction was the company's April 2017 acquisition of the 1,300-acre Stagecoach Vineyard property in Napa Valley, which included 600 acres under vine that produce mostly high-end Cabernet Sauvignon grapes. The real estate itself was worth at least \$180 million, according to Napa County records.

In 2016 Nabedian's division acquired Napa-based Orin Swift Cellars from founder Dave Phinney, who continues

to direct winemaking. Orin Swift was then a 100,000-case brand. Phinney had created The Prisoner wine brand and later sold it to Huneeus Vintners, who subsequently sold it to Gallo competitor Constellation Brands for a reported \$285 million.



Q You are in charge of E & J Gallo's premium wine division. What is its mission?

Nabedian: Gallo's simple mission has been to provide the best-quality wine at a value to consumers in a way that will have the broadest appeal, and within the economics of the wine trade. So whether it was Hearty Burgundy, or Boone's Farm or Martini Monte Rosso Cabernet, the mission has been pretty consistent.

If I were a consultant, I would tell you to break the market down and ask, where are the profit dollars available? Back in the '90s or '80s this profit pool was being generated at more premium price points that Gallo wasn't participating in. It was apparent you have to play there and you have to play there successfully to sustain your business. We want to participate and excel in all segments of the wine market, no matter how you want to define them.

E. & J. GALLO WINERY'S RECENT ACQUISITIONS

Property	When	Type	Location	Acres	Vine Acres
Sierra Madre Vineyard	May 2018	vineyard, brand	Santa Barbara County	542	151
Rancho Real Vineyard	May 2018	vineyard	Santa Barbara County	436	211
Stagecoach Vineyard	March 2017	vineyard, brand	Napa County	1,300	600
Ranch Winery	Dec. 2015	vineyard, winery	Napa County	70	27
Talbot Vineyards	Aug. 2015	vineyard, winery, brand	Monterey County	565	550
Asti Winery & Souverain	July 2015	vineyard, winery, brand	Sonoma County	535	275
Orin Swift	June 2016	brand, tasting room	Napa County	0	0
Cypress & Palisades	May 2015	vineyard	Napa County	642	258
J Vineyards & Winery	March 2015	vineyard, winery, brand	Sonoma County	300	300
Total				4,390	2,372

Q Is Gallo observing the market and giving people what they want or leading the market?

Nabedian: I think we are early adopters, and we are good at amplifying the market. We weren't the first with Pinot Grigio but it was starting to become popular, and we created a brand called Ecco Domani in 1996 that I think helped define the Pinot Grigio category in the United States. Another example is the red-blend phenomenon that occurred a little less than 10 years ago. We weren't the first to launch a California red blend and market it uniquely, but Apothic helped define the category.

Q What recent acquisitions are you especially pleased with?

Nabedian: In acquisitions we try to be focused on wherever we think our biggest opportunity is, whether it's a different appellation or area, or focused on a different varietal. As an example, we sought to acquire William Hill because we saw it as a credible vehicle to sell Chardonnay. It was a bigger acquisition for us than some of the others we had done prior, so just acquiring it and having success and demonstrating to ourselves that we could do this well began to shift the company's paradigm on how we think about acquisitions.

I think in five years I'm going to say the same thing about two other acquisitions. One is Orin Swift, a very different acquisition for us, not only because of the personality of the brand and how it fits into the marketplace but our ability to work close with its founder and leader, Dave Phinney. Part of the acquisition is being able to develop a partnership with him, and that has changed the way we think about evolving in the wine business.

And that led us to Stagecoach Vineyard in Napa Valley. Look, we've been investing in vineyards for a long time. The family has been very aggressive about trying to find the best vineyard land possible and investing in it for the long term. I don't want to suggest Stagecoach is unique in that way

but its size, scale, and the price point in which the wines that are grown there play, is a very different step forward for us.

Q What will happen with Stagecoach?

Nabedian: We have 90 customers, and we value them. We respect their commitment to the wines that they make from that vineyard. My expectation is that we will continue to do business with many of them. Obviously, we see it also as a great source for us to build our existing businesses like Louis M. Martini, like Orin Swift, even potentially William Hill. We will innovate from that vineyard. As a result, we expect to sell a fair amount of [Gallo-brand] wine made from the grapes grown on that vineyard, but I am sure we will continue to sell grapes to customers from there. Monte Rosso is an example. The Gallo family bought it in 2002, and so here we are 15 vintages later and we still sell grapes off of that vineyard to a handful of customers. My sense is that 20 years from now we will still do business with people from Stagecoach.

Q How do you see the wine market in general? Is it on a strong foundation so that it could still grow through the next recession?

Nabedian: For the first time in my memory global demand will be higher than global production in 2017. It will be interesting to see what the effect will be on a global basis of a slowing wine market and a short 2017 vintage. Prices are probably going to elevate and as those wines come to market we'll see how the market is able to absorb that.

The wine market continues to grow, particularly above \$10, and I think there's reason to feel confident that growth will continue. I think the greater question is at what rate will it grow. Will it grow by volume at 1% or by volume at 3 or 4%? And what is the value to volume ratio?

The U.S. is still one of the fastest growing wine markets in the world even though it's the largest wine market in the world now. 🍷



BENCHMARK CONSULTING



23
YEARS

OF EXECUTIVE
WINE INDUSTRY
RECRUITMENT
EXPERIENCE

Benchmark Consulting is the leading resource for exceptional industry talent, **career** placements and understanding the needs of our clients.

We offer **organizational and leadership consulting**, with guaranteed placement services for up to 2 years on position searches.

We are **specialists in the Wine Industry**, with focus on C-level, sales, marketing, and industry production.

Our success is attributed to our integrated **wine industry knowledge**, personal attention to each client company, and **proven business processes**.

707-933-1500
www.benchmarkhr.com

Benchmark Consulting
1030 Seminary St., Suite A-3
Napa, CA 94558



New Tools to Limit Wine Spoilage

Interaction of temperature and ethanol may help control *Brettanomyces*

By Melissa Hansen

Once *Brettanomyces bruxellensis* takes hold in a winery, eradication is formidable, often requiring more than one approach to keep the wine-spoilage yeast at bay. Recent findings by Washington State University show that the interaction between storage temperature and alcohol concentration may be a useful tool to manage *Brettanomyces*.

Brett, as it is commonly called in the wine industry, is a wild yeast associated with the spoilage of red wine. Unlike other yeasts such as *Saccharomyces*, which converts sugars to alcohol and carbon dioxide, Brett is very difficult to control. Though some wineries prefer the earthy and gamey aromas imparted by small amounts of Brett in red wine and believe it adds complexity and aging ability to young wines, a little can quickly turn into too much. When concentrations exceed sensory thresholds, Brett can result in wine with “barnyard” aromas that smell like a wet dog, horse stables, sweaty horse blankets, wet wool or sweaty shoes.

Dr. Charles Edwards, a professor at Washington State University in Pullman, focuses his research on problem alcoholic fermentations and spoilage organisms of concern to winemakers. His most recent study, supported by the Washington state wine industry and the Washington State Wine Commission, investigates factors that impact Brett’s growth and ability to survive under various conditions.

Edwards’ research includes taking oak barrels apart to learn the depth of penetration and survivability of Brett in oak staves under various conditions and sanitation treatments such



Brian Carter, winemaker and owner of Brian Carter Cellars, says alcohol, sulfur dioxide and cellar temperature are the three best tools against Brett contamination.

as steam, and examining Brett survivability in the winery waste/pomace. The overall goal of his research is to develop effective Brett control measures for wineries.

Edwards’ work with graduate student Taylor Oswald was recently published in the *American Journal of Enology & Viticulture* (68:2 2017). His report, “Interactions between Storage Temperature and Ethanol that Affect Growth of *Brettanomyces bruxellensis* in Merlot Wine,” is summarized below.

Temperature and ethanol (alcohol) concentration are two factors known to affect the growth of *B. bruxellensis* in synthetic media and wine. Previous research found that the optimum temperature for growth of *B. bruxel-*

lensis was from 77° to 83° F in synthetic media.⁴ Growth was found to stop above 95° F.³

Growth in wine and synthetic media have been observed at temperatures as low as 50° F. Researchers also have found that *B. bruxellensis* can tolerate ethanol concentrations as high as 15% (v/v),¹ but few studies have looked at the interactions among control methods as a way to limit or manage spoilage by *B. bruxellensis*. For example, the interactions between sulfur dioxide and dimethyl dicarbonate and sulfur dioxide and temperature can affect yeast viability.^{2,6} Additionally, interactive impacts have been studied at pH of 3.4, 3.7 or 4.0; alcohol at 10%, 12.5% or 15%, and free sulfur dioxide of 0, 30 or 50 mg/L on *B. bruxellensis*.⁵

“Our study looked for a relationship between alcohol concentrations and storage temperatures,” Edwards says. “We wanted to see if winemakers could use ethanol (alcohol) present in the wine and the temperature of storage together as another barrier to manage Brett.”

The WSU researchers found that the interaction between storage temperature and alcohol concentration is important and can help wineries limit and lower the risk of Brett infections. The combination of storage temperatures below 54° F and alcohol concentrations of 14% or more resulted in a decline of Brett populations below the detection limit for up to 100 days.

Washington state winemaker Brian Carter of Brian Carter Cellars believes the research findings are useful Brett-management tools. Although he uses temperature to help control Brett in his winery in Woodinville, Wash., this information reinforces his practices. “Alcohol levels, temperature and sulfur dioxide are the three most important defenses to use against Brett,” he says.

Although many small wineries do not have multiple barrel and storage rooms, Carter says the synergistic interactions between alcohol level and storage temperature can still be applied. “Armed with this information, winemakers should avoid situations where lower alcohol wines are kept at higher temperatures

KEY POINTS

Cold storage temperature is critical to prevent Brett spoilage.

Alcohol content is a key factor in a wine’s susceptibility to Brett.

Different strains of Brett can behave and react differently to control methods.

for extended periods of time. This would be particularly true during malolactic fermentation, when free sulfur dioxide levels are low or non-existent.”

Carter suggests that winemakers could use the information to make decisions on the basis of wine style. If Brett is an issue in a winery, winemakers could opt to have higher alcohol (15% or more) in their wines as a means to prevent Brett.

Bottom line: Cold storage temperatures can help lower the risk of Brett. Wines with low alcohol have a higher risk of Brett than high-alcohol wines and should be kept in the coldest rooms of the cellar, when possible. Knowledge that high-alcohol wines have lower risk of Brett could potentially be part of a winemaker's decision-making process if Brett is a problem in the winery.

Study methods

The study used two strains of *B. bruxellensis*, F3 and I1a, in Merlot wines obtained from a commercial winery. Total sulfur dioxide was measured and removed. The wines of five alcohol concentrations (12%, 13%, 14%, 15% and 16%) were held at four temperatures (54°, 59°, 64° and 70° F). Volumes of wine were fixed. Variable proportions of ethanol:water mixtures were added to yield wines with different alcohol percentages. After supplementing the wines with glucose, fructose and a yeast extract, pH was adjusted to 3.75. The wines were sterile-filtered and incubated for 24 hours under the four temperature treatments before inoculation with the same amount of the two Brett strains (10⁴ cfu/mL, the number of colony forming units per milliliter).

The wines were monitored for 100 days by sampling twice per week for the first four weeks and then once per week thereafter. After 100 days, concentrations of volatile acidity (primarily acetic acid), 4-ethylphenol (4-EP) and 4-ethylguaiacol (4-EG) were quantified. 4-EP is the compound responsible for contributing earthy and rustic sensory characteristics, also described as animal, smoky or medicinal aromas. 4-EG is the compound associated with bacon, spice and clove aromas. Both compounds are associated with the earthy and barnyard odors resulting from Brett-tainted wines.

Temperature and alcohol interaction

A synergistic response from the interaction of storage temperature and alcohol concentration impacted the growth and production of acetic acid, 4-EP and 4-EG in both strains of Brett. The combination of low storage temperatures (54° F or less) and higher alcohol concentrations of 14% or more resulted in populations at levels below the detection limit of 30 cfu/mL for up to 100 days. At the lowest temperature of 54° F or less, neither strain of Brett grew well, regardless of the alcohol level.

However, when temperatures were 64° F or higher, both strains grew well in the wines containing 12%, 13% and 14% alcohol and reached peak populations of 10⁶ cfu/mL in those wines in 40 days or less. Growth of Brett was inhibited in the 15% and 16% alcohol wines, and the high alcohol wines also showed longer lag phases at the lower temperatures.

Strain I1a reached a population of 10⁶cfu/mL within 20 days of inoculation in the 12% v/v alcohol wine maintained at 64° F, but it required 40 to 70 days to reach the same population in the 13% and 14% alcohol wines maintained at the same temperature. In the low-alcohol wines of 12%, stored at the coldest temperature of 54° F, both strains showed a decrease in culturability, and recovery was slowed or nonexistent. Additionally, growth of the two strains was retarded in wines above 14% alcohol.

Both strains could not be recovered from the 16% alcohol wines regardless of temperature.

Strain differences

The two strains generally displayed similar growth patterns under the various temperature and alcohol treatments, except for the 15% alcohol wines, where strain differences were observed. Here, F3 appeared to be more inhibited and showed less growth and reduced concentrations of acetic acid, 4-EP and 4-EG at the higher temperatures than strain I1a. The F3 strain never reached populations above 10⁴cfu/mL in the experiment, even when wines were held at 70° F.

The different responses of the two strains in the 15% alcohol wines reinforces the concept of genetic diversity within the *Brettanomyces* genus. “What that suggests is that you have to be very careful about what strain you have in your winery, because there are situations where they behave differently,” Edwards says. “The diversity of *Brettanomyces bruxellensis*, a single species, seems to be quite large. We do not know much about Brett strains from a genetic standpoint or how they behave in different matrices.”

What about cellar humidity?

Humidity was not part of Edwards' study. Humidity of a cellar does affect the loss of water and alcohol through the wood. Humidity is often added to barrel rooms to control topping losses, and there is some cooling effect from humidity, but humidification is done in addition to using a refrigeration system for temperature control. From a temperature point of view, temperature affects humidity but not vice versa, Edwards explains.

“Humidity is crucial to maintain during storage because you are trying to balance the ethanol and amount of water passing through the wood,” he says. “But this study looked for whether or not there was a relationship that winemakers

could use between the amount of ethanol present in the wine and storage temperature.”

Wines in the study were not stored in wood, and Edwards did not try to learn if exterior humidity has an effect on the growth of microorganisms inside a wood barrel. If there is any effect from humidity, he believes it would be indirect.

Defenses and barriers

Defense technology is a risk-management concept used in food manufacturing. It is based on the theory that you should not rely on just one approach to limit the growth of spoilage microorganisms but should use a series of barriers or defenses that the organism must overcome to still remain active or in large enough concentrations to be an issue. If enough defenses are used, the organism is eliminated or eradicated. In the case of Brett, the goal is to control levels below sensory thresholds.

Several methods to control *B. bruxellensis* previously evaluated by the Edwards laboratory include the use of sulfur dioxide, dimethyl dicarbonate, chitosan and filtration. These are all helpful barriers that have been shown to be useful to manage Brett.

With today's trend of higher alcohol wines ranging from 14% to 15%, winemakers may be able to take advantage of cellar temperature to head off potential issues with this particular yeast, Edwards notes.

“Each winemaker has to consider all the parameters of a given wine that pertain to Brett, such as history, pH, sulfur dioxide and filtration,” he adds. “In short, what is the risk to that particular lot? Then the winemaker has to find a balance that uses enough risk management barriers without breaking the bank.”

Keep it cold

For wineries that have multiple cellar rooms, keeping the lowest alcohol wine in the coldest room may be a viable option. For those with one cellar room, Edwards suggests wine be kept at the lowest temperature that is economically feasible. He recognizes that energy costs for refrigeration can be expensive in some wine regions, but where feasible, cold temperatures can be used as another barrier against Brett. 

Melissa Hansen, research program manager for the Washington State Wine Commission, works to make viticulture and enology research supported by the Washington wine industry more accessible to the state's growers and winemakers. Hansen was a journalist for nearly 20 years for *Good Fruit Grower*, a Washington-based magazine, and was involved with California's table grape and tree fruit industries for 15 years.

To see acknowledgments and references for this article, go to winesandvines.com and search under Magazine > Features > June 2018.

Case Studies in DtC Success

How two Central Coast wineries have found sales success through the tasting room

By Jaime Lewis



The “crux” to Daou winery’s DtC strategy is its hospitality staff.

When it comes to improving the tasting room experience, how much is enough to lift the bottom line? According to a few winery executives who’ve led their teams to increased direct-to-consumer (DtC) sales, the answer lies in implementing calculated changes, some large and some small, both internally to staff and externally to the guest.

The insights came during a panel discussion at this year’s WiVi conference in Paso Robles, Calif.

“There are a million wine brands; there are a million wine regions,” said Maeve Pesquera, senior vice president at Daou Vineyards and Winery in Paso Robles, Calif., during the session. “Every winemaker I’ve ever met is super passionate about what they’re doing and they all have a really great story. So how does the Central Coast and our winery specifically beat through that noise and break through the fray?”

Pesquera comes from a background in marketing luxury, having spent 14 years with national brand Fleming’s Prime Steakhouse & Wine Bar, most recently as national director

for wine and beverage, culinary strategy and innovation. She transferred her expertise in fine dining to Daou in 2016 and has managed hospitality for the winery, which produces 25,000-35,000 cases annually, ever since. “To me, the crux is our people,” Pesquera said. “For us at Daou, we put the people at the middle of our equation always. That starts with internal associates first and radiates out to our customers after.”

Pesquera said she has created a principles and beliefs document to define success for the company, and by which performance is measured. “We’re looking for people who are emotionally intelligent, who are kind and gracious, who have a giving heart — giving for the sake of giving. We can teach them how to sell wine and tell our brand story.”

As such, she said Daou develops many people from within and has, in the last six months, promoted three associates to manager level.

That document, however, is a living one, and therefore subject to regular change. “The marketplace has evolved,” she said. “We have to take out all our brand assets, literally and

figuratively, about every six months, and ask ‘Are they relevant?’”

Emulate successful retailers

“Most of us have been to an Apple retail store,” said panelist Tim Snider, president at Fess Parker Winery, which produces 65,000 cases



Addendum Wines’ new tasting room only offers seated tastings.

annually in Santa Barbara County. “Are they stocking the shelves and hoping for the best? No. When you go in, it’s about interaction, learning, and discovery, with people on hand to guide the experience. There’s a sense of community and excitement. What we’ve done at Fess Parker and what I think can work across the board is to bring those concepts to the consumer now.”

Snider, who’s been with family-owned and operated Fess Parker for almost 20 years, discussed how the company has evolved its tasting room experience since opening 30 years ago. “We do have a traditional bar, and we’ll pour wine and staff will educate. But as we’ve added new spaces, experiences and opportunities, the majority of our guests are gravitating to these other experiences.”

The similarity to successful retailers like Apple, he says, is a focus on education, discovery and learning.

One such space, Snider said, is the tasting room for sister brand, Epiphany Cellars, where the bar has been augmented by “a whole new tasting room format that’s seated, interactive, and education-based.”

And in another sister space for Addendum Wines, seated tastings are the only option.

“They’re focused on education, discovery, and learning. They’re fun, interactive, exciting, and they’ve done very, very well.”

The emphasis on education extends first and foremost to staff, Snider said, citing the introductory certification of eight tasting room attendants with the Court of Master Sommeliers, as well as several others at levels 1 and 2. “If our staff can speak intelligently about Puligny-Montrachet in the context of Chardonnay in the Sta. Rita Hills as well, they’ll be better equipped to deliver a learning experience for our guests.” 🍷

Jaime Lewis is a wine and food writer based in San Luis Obispo, Calif. Her work has appeared in *Edible*, *Sommelier Journal* and *Tasting Panel Magazine*.



INOXPA®

RV CPG

NTE Butterfly and Ball valves

INOXPA USA, INC
3721 Santa Rosa Avenue - Suite B4 - Santa Rosa - CA 95407
Tel. +1 707 585 3900 - Fax +1 707 585 3908 - inoxpa.us@inoxpa.com
www.inoxpauusa.com



Gomberg, Fredrikson & Associates

Market Research for the Wine Industry

We perform extensive market research and data collection to create the wine industry’s leading databases and reports

Products include:

- **The Gomberg-Fredrikson Report:** “The Executive Marketing Report of the Wine Industry”
- **WineData Wine Pricing Report:** Competitive supplier pricing for more than 13,400 products
- **Distributor Market Service:** Gain a competitive advantage by analyzing your position in the wholesale market

www.gfawine.com • 707.940.3922 • inquiry@gfawine.com



How to Stay Motivated – Wash. Rinse. Repeat.

We are often hear: “How can I stop checking out on the job halfway through my day?”

Or essentially: “How can I keep myself on task and motivated through my work day?”



People working in winery tasting rooms can often experience a bit of burn out and no longer look at guests as warmly as they once did.

Self-motivation takes practice. It is a skill we need to develop and practice daily. When master motivator Zig Ziglar would hear anyone say: “Motivation just doesn’t last.” His reply was always, “Well neither does bathing, that’s why we recommend it daily.”

How to know when you need to work on motivating yourself?

- When you look for projects and not for guests.
- When you inwardly groan when people are approaching you.
- When you feel you should get hazard pay for repetitive stress syndrome for having to repeat yourself over and over again.
- When you focus on the negative parts of the job.
- When your coworkers annoy you.
- When time seems to drag.
- When you can’t wait to leave work.
- When instead of being charming and warm, you are short and sullen.

A good leader will be on the lookout for staff burnout and take steps to increase job satisfaction and pride in the workplace. Leaders can sometimes miss it, so we need to recognize it for ourselves. What can we personally do to stay motivated?

Here are 10 WISE Tips:

1 Step back and take time to remember

how you felt the very first time you walked into your winery. Remember the sights, the smells or whatever it was that triggered your senses. Remember that the guests who are walking in are experiencing just that. We need to remind ourselves how people are feeling as they walk in, and if there isn’t a warm and friendly greeting, it could become overwhelming. What would your expectations be if you were a guest?

2 Sometimes you just need to take a short break.

When you do, give yourself a pep talk. Remind yourself what our guests deserve. They deserve the best, and you are the person to give them the best. It is not fair to them if you are giving them your bad day, they deserve much more than that.

3 Smile. If you make yourself smile, even when you don’t feel like it, you eventually feel like it because it’s contagious with all the people around you. Get that smile on and get back to it and start engaging with the guests. Give them your best because you are so good at who you are and what you do. Make the guest feel that the best decision they made today was to come and see you.

4 Use the Platinum Rule. Most people know about the Golden Rule, to treat others the way we want to be treated. At WISE, we take this to the Platinum Rule: Treat others the way THEY want to be treated. How do they want to be treated? You’ll never know unless you ask the open-ended questions to find out their preferences and engage with them. You have

amazing gifts. Share them with your guests. It's fun and helps break the monotony.

5 Celebrate your successes. Think about your most successful days of selling and what made those sales successful and challenge yourself to do it again or beat your own goal. When you can challenge yourself and have fun doing it, time flies by.

6 Take a walk. Whether on your own or taking a group of guests for an impromptu walk in the vineyards, cellar, or wherever, just change up your routine. Get some fresh air and a change of pace.

7 Create a tradition with coworkers. Give yourself something to look forward to at different points of the day or different days of the week. Whether you celebrate when you reach a sales goal, have a weekly bowling league with coworkers or something else that you can look forward to, try and make a tradition out of it.

8 Do something creative at different points of the day. During slower times, role play with your coworkers to find new ways to sell to different types of wine buyers; work with the merchandising team to create more compelling displays. During busier times, find ways to be creative in your conversations with guests — in appropriate ways, of course.

9 Learn something during downtime. What else can you find out about the wines, vineyards, *terroir*, or other things about your wines and brand? What's of interest to you? Explore it and share it.

10 Remind yourself about your important role at the winery. Years of hard work to plant and cultivate the vines, worry about weather and pests, harvest, bottling and aging have gone into creating this beautiful wine, and now it is yours to sell by cultivating great relationships with guests who want to taste it. What an honor!

The great thing about our winery tasting rooms is that we get to practice our skills daily. If we make a mistake, it's not nuclear physics; the place isn't going into meltdown. We can come back tomorrow and practice again. The more you practice, the easier self-motivation becomes, and soon it will be second nature to you. So practice motivating yourself. Rinse and repeat. You'll shine. 🍷

WISE Academy (Wine Industry Sales Education) offers a comprehensive curriculum designed specifically for wine industry professionals, and is celebrating its 10th year in 2018. Learn more at wineindustrysaleseducation.com.

EXPERTISE THROUGH
EXPERIENCE

HOYT SHEPSTON, INC.

CUSTOMHOUSE
BROKERS

Ocean & Air
International Freight
Forwarders

Serving your
Import - Export Needs

161 Starlite St., Ste A
South San Francisco, CA 94080
wine@hoyt-shepston.com

(650) 952-6930

Fax: (650) 952-5691

Wines & Vines Digital Edition



View this issue on your tablet,
smartphone or online at
winesandvines.com/digitaledition

WINE&VINES
winesandvines.com



☆ TTB LABEL ☆ APPROVALS

Low per-label costs
Gov't. Liaison Negotiations or Footwork
Reasonable Hourly Rates

TRADEMARK SEARCHES

As Low as \$185

Your trade names or designs are searched
at the U.S. Patent Office to help establish
valuable ownership
or avoid costly legal liability.
Over 100 years' total staff experience
handling every government liaison need
for industry.

Phone or write for details.
Government Liaison Services, Inc.
200 N. Glebe Rd., Suite 321
Arlington, Virginia 22203
Phone: (703) 524-8200 Fax: 525-8451
TOLL-FREE 1-800-642-6564
Major Credit Cards Accepted
www.trademarkinfo.com
Since 1957

THE CLEAR ADVANTAGE

MicroVantage
Ultra Premium Filter Series

MicroVantage Filters and Housings are the
solution for your ULTRA FILTRATION needs.

Contact us at 1.800.543.5843 or info@shelco.com to
learn why Shelco is the only place for all your filtration needs!



www.shelco.com | Made In The USA

100 BRADLEY STREET • MIDDLETOWN, CT 06457 • 800-543-5843

Wine East

Covering Eastern North America

Partners Seek to Revive Texas Winery

Lubbock, Texas—CapRock Winery owners Tommy and Jana English announced that the winery has partnered with Texas grape grower Steve Newsom and entered into a joint venture intended to restore it to the front rank of Texas wineries. Newsom will be in charge of all winemaking and grape sourcing decisions, but the English family will still be involved.

Originally called Teysha Cellars when the winery was built in 1988, the name was changed to CapRock in 1992. Despite Texas law at the time not even allowing tasting rooms or sales from the facility, and there being little market for Texas wine, the founders built a 23,000-square-foot, 15,000-case capacity winery, and a “Napa quality visitor

center.” The original plan was to establish a well-known brand by selling premium Texas wine from multiple varieties of local grapes in 5,000 case lots.

The winery, however, went bankrupt and was purchased by its financier, Plains National Bank, which sold most of its interest in 2001 to Saragossa Wine Group, L.L.C. Lubbock businessman Don Roark owned the winery from 2003 to 2009 when CapRock filed for Chapter 11 bankruptcy protection. It was sold at auction, then sold again in 2013. Two years later Tommy and Jana English purchased it.

Newsom, who owns 100 producing acres of more than 20 *vinifera* varieties, has a business plan for CapRock to produce premium wine with 100% Texas grapes. His vineyards



Steve Newsom plans to make wines produced with 100% Texas grapes through a new joint venture at CapRock winery.

and Texas' growing vineyard acreage will help ensure a ready supply of grapes at progressively more competitive prices. The CapRock brand name will likely be replaced by a new one (possibly English-Newsom Cellars) and Anthony Mosley, formerly with Texas Custom Wine Works, will be winemaker.

—Andrew Chalk

What sets us apart?



The Waterloo Container Team

EXPERIENCE

- Family Owned and Operated since 1980
- Extensive Expertise in the Wine Packaging Industry
- Total Package Provider
- Commitment to Customer Service
- Customized printing, sleeving and packaging

WATERLOO CONTAINER
company

Supplier of Wine Bottles, Caps, Corks and Closures

888-539-3922 • waterloocontainer.com



Bolstering Wine and Vineyard Education

Dobson, N.C.—As the number of wineries and the acreage of grapes across the country have increased, so too has the demand for trained professionals to teach vineyard and winery workers at all skill levels.

Surry Community College, Dobson, N.C.

The Shelton-Badgett North Carolina Center for Viticulture and Enology at SCC houses a state-of-the-art commercially bonded winery and also has a five-acre vineyard. SCC hired Sarah Bowman as its new viticulture instructor this winter.



Sarah Bowman

Bowman first became interested in viticulture when she took a university wine appreciation course at Southern Illinois University. She earned a bachelor's in journalism in 2010, a master's in horticulture in 2013, and will be completing her doctorate there while working full time at SCC. Her thesis will be an analysis of different cover crop systems in vineyards. At SCC she will be teaching and also managing the five-acre Surry vineyard.

The University of Minnesota Extension, Minneapolis, Minn.

Annie Klodd became the new assistant extension professor for fruit and vegetable production at the University of Minnesota Extension in January. Klodd grew up in Indianola, Iowa, where her family owns Annelise Winery that has 10 acres of vineyards and produces 2,000 cases of wine, according to Wines Vines Analytics.

Klodd received her master's in plant biology from The Pennsylvania State University in 2015. After



Annie Klodd

graduation, she continued to work for Penn State Extension as a weed management specialist and also led a national outreach program on integrated weed management.

Highland Community College, Wamego, Kan.

Candice Fitch-Dietz recently joined the enology-viticulture program at the Highland Community College (HCC) in Wamego. As viticulture instructor and vineyard manager, Fitch-Dietz will be responsible for teaching three to nine credits per semester, will develop and lead workshops and maintain the four HCC vineyards, including the research vineyard



Candice Fitch-Dietz

that was planted in 2013 with 44 different varieties. Her goals are to get the new vineyards up and going, and to grow the viticulture program at Highland. Fitch-Dietz most recently was a horticulture extension in the three-county Golden Prairie extension district in western Kansas.

—Linda Jones McKee

Formerly Zenan USA

Add some
class to
your
drinking
glass

Call 866-607-7823
For Competitive Pricing

PREMIER BRANDED GLASSWARE



Déjàbrew™
Be Memorable

Dejabrewusa.com

Info@Dejabrewusa.com

Viticultural Mapping by UAVs, Part 1

Unmanned aerial vehicles provide data for precision viticulture

By Andrew G. Reynolds, Ralph Brown, Marilyne Jollineau, Adam Shemrock, Elena Kotsaki, Hyun-Suk Lee, Mehdi Shabanian and Patrick Kelly

Wine composition and quality are related to several vineyard variables that can be observed and managed in the field. However, vineyards are variable with respect to soil texture, moisture and depth and other variables such as organic matter, cation-exchange capacity and major and minor elements. As a result, vineyards also vary in vigor, yield, and fruit composition. Such variability within and among vineyards has been recognized for centuries and can be ascribed to a combination of soil, local climate, vine vigor, and other factors that ultimately affect wine quality. This is referred to as the *terroir* effect.³⁴

EDITOR'S NOTE

This is the first installment of a two-part series on using unmanned aerial vehicles (UAV) to obtain data to help vineyards implement precision viticulture. The authors look at the different UAV platforms, hardware, sensors and image processing. The second article will review the use of UAVs in viticulture and will include the results of a study done in Ontario vineyards.

Traditional viticulture aims to maximize wine quality by tailoring variety selection and cultural practices to this local *terroir*. *Terroir* can be characterized in the field by mapping bedrock, soil, and vineyard meso-climate, and, at a finer level, by mapping variables such as soil moisture, vine water status, yield components and berry composition. Much of this mapping must be ground-based (including below the soil surface in trenches and drill holes). However, many of these variables now can be measured or estimated from the air using standard aircraft or satellite remote sensing technology.

Research in Ontario vineyards since 1998 has produced spatial maps and quantified spatial variability in soil composition, vine elemental composition, vigor, vine water status, vine winter hardiness, yield and berry composition.^{15, 16, 25-28} These variables have been analyzed to determine relevant spatial relationships among them. Maps showing clear zones of different vigor, yield and vine water status have allowed wineries to produce wines from these unique zones that are different chemically and sensorially.^{15, 16} Also, researchers have accumulated evidence of relationships between vine vigor and vine water status vs. wine sensory properties, and by doing so, with efforts of others elsewhere,³⁴

have helped explain the essence of the *terroir* concept.

Tools and methods have been developed relatively recently to observe and measure this inter- and intra-vineyard variation, and then to use the information for more efficient vineyard management.⁵ These tools and methods can be used for the implementation of “precision viticulture” techniques. Simply defined, precision agriculture in general is informed agricultural management at a fine spatial scale. Its purpose is to enable targeted crop management due to the understanding and accurate mapping of the variations of crop or canopy properties of interest.

The implementation of precision viticulture involves three main steps:

1. Observation of vineyard variables associated with vineyard performance (data collection);
2. Interpretation and evaluation of the data;
3. Implementation of targeted vineyard management practices and/or selective harvesting strategies.⁵

Targeted vineyard-management practices might include timing and rate of application of fertilizer, water, pesticide or herbicide

KEY POINTS

The images produced by unmanned aerial vehicles (UAVs), or drones, have a higher spatial resolution than those produced by satellites and conventional aircraft. UAVs have other advantages: a higher flexibility of use, lower operational costs, and they are not affected by cloud cover.

The potential application of the acquired data should determine which remote sensing platform is chosen. When the goal is accurate mapping of intra-vineyard variability so that precision viticulture practices can be implemented, UAVs are the best choice.

UAVs equipped with appropriate sensors can collect useful information

such as leaf temperature, vine water status, and canopy vigor. Those sensors can gather thermal, visible, hyperspectral and/or multispectral images. Hyperspectral sensors, for example, can gather a broader range of wavelengths; a thermal camera can gather image data to determine canopy variables such as water stress.

Acquired images are first orthorectified to remove the effects of tilt and terrain. The raw images are also georeferenced using ground control points previously measured with a ground-based device or UAV's onboard GPS. At that point, images can be mosaicked, or stitched, together using georeferenced-based stitching software.

sprays, and/or the use of mechanical or hand labor for pruning or harvesting.

The basic premise of precision agriculture is that inputs to farming practices are in response to information gathered with the intent of affecting outputs through an “information feedback-loop system.”¹⁵ Applied to viticulture, there is a focus on understanding the spatial and temporal (time-based) variability in wine grape production.⁹ Grape growers traditionally have accepted variability within vineyards as normal, which is a basis for the *terroir* effect.



Figures 1a and 1b show examples of UAVs. Figure 1a (left) is a fixed wing SenseFly eBee; Figure 1b (right) is a multi-rotor type UAV flying over a vineyard.

With years of experience, zones in vineyards can be subdivided into individually rated vineyards of higher or lower quality. Increased availability of geomatics software has allowed grape growers to apply information from vineyards to precision agriculture, and to target inputs to specific regions of their vineyards.

Precision viticulture has been evaluated in New World regions California,¹² Australia⁵ and New Zealand,³² as well as Old World regions such as Spain³⁵⁻³⁸ and France.¹ In Ontario, geomatic technologies were used to identify zones of different water status in Cabernet Franc,²⁸ Pinot Noir¹⁵ and Riesling.²⁵⁻²⁷ Zones of lowest water status were associated with highest monoterpenes in Riesling berries¹⁶ and highest anthocyanins and phenols in Cabernet Franc.²⁵⁻²⁷

Data acquisition is central to the implementation of precision viticulture. Traditionally, data were acquired on the ground by thorough sampling of various canopy and/or soil variables. This kind of extensive sampling is both time-consuming and expensive. As with any sampling, the accuracy of the data is dependent on the size of the sample population. Remote sensing techniques have been developed to help mitigate drawbacks of traditional sampling.

Early remote sensing “platforms” were satellite- or conventional aircraft-based. These were used to acquire visible, multispectral, hyperspectral and thermal aerial images of vineyards utilizing various cameras and sensors. Multispectral sensors have several band

measurements (e.g., green, red, near infrared [NIR]) in each pixel of the images they produce. Hyperspectral sensors measure energy in narrower and more numerous bands (up to 200) than multispectral sensors, which provide a continuous spectral measurement across the electromagnetic spectrum. Hyperspectral sensors are more sensitive to subtle variations in reflected energy, but they are also very expensive.

The usefulness of traditional aerial images initially was limited because of the images’ low

the proximally-sensed data are relatively easy to access.

These ground-based technologies generally have been limited to agronomic crops such as corn.³ In Ontario, GreenSeeker was used in six vineyards to find relationships between the normalized difference vegetative index (NDVI) values and variables such as yield, berry composition and vine water status.²⁵⁻²⁷ Relationships were apparent between NDVI data collected by GreenSeeker vs. soil moisture and leaf water potential (Ψ), in addition to yield

spatial resolution. Conventional aircraft, and to a lesser extent satellites, still are being used for research and precision viticulture, but the newest, very promising remote sensing technology that has emerged over the past decade, is the unmanned aerial vehicle (UAV) or drone. Drones can collect much more detailed information, and sometimes at a lower cost, than is possible from aircraft or satellites, mainly because they allow for acquisition of aerial images of a higher spatial resolution than other remote sensing methods. Once data from UAVs are gathered and processed, it can then be used along with ground-based measurements for precision viticulture. This is revolutionizing precision agriculture and promises to assist in defining wine-quality zones at lower costs compared to traditional remote sensing methods.

Proximal sensing

A simpler technology also might have potential use in vineyards and other crops. The recent introduction of GreenSeeker and other proximal sensing (ground-based) technologies could allow growers to identify unique zones within vineyards without use of aircraft, satellites or UAVs.¹⁹ If these zones can be identified easily from the ground, and associated with clear differences in berry composition, it is possible that different wines of varying price points could be created from these zones at minimal cost. Data validation is still necessary, as with remote sensing, to determine if there are relationships between proximally sensed data and other variables of agricultural relevance, but

components and berry composition.

Furthermore, zones indicative of virus infection such as grapevine leafroll-associated virus 3 (GLRaV3) and grapevine red blotch virus (GRBV) could be defined using this technology. Leafroll is one of the most destructive and widespread diseases in all grape-growing regions, causing poor color development, and significant reductions in vine growth, size of clusters and berries, and Brix.⁸ Red blotch is a recently discovered virus characterized by reddening of the leaf area between the main veins.¹⁷ There has been limited experience in measuring unique vegetation indices (“spectral signatures”) beyond NDVI in virus-infected plants, including one study for GLRaV²² and another with GRBV.²⁰

Remote sensing–UAV platforms

UAVs have been used for agricultural purposes only relatively recently. Satellites and manned aerial vehicles are still used to obtain aerial images for research and agricultural purposes. There are advantages and disadvantages to each of these types of remote sensing.

The time flexibility varies for the different types of remote sensing platforms. Use of manned aircraft depends on the availability of aircraft, and satellites are limited by their coverages.³ Manned aircraft flights have fewer time constraints than satellites but can be expensive and difficult to organize.⁴ The spatial resolution of the airborne platforms is also of great importance, depending on the application of the aerial images. Satellites can take

images of large areas, but the resolution is generally not detailed enough for precision viticulture applications.¹⁸ The spatial resolution of aerial images acquired by satellites or manned aircraft is optimally 20-50 centimeters per pixel.³³ UAVs have a higher flexibility of use and lower operational costs, and due to a UAV's ability to fly lower to the ground than other airborne platforms, the resolution of the aerial images can be much higher than with conventional aircraft or satellites. The resolution of UAV-acquired images can be as high as 1 cm. per pixel.

Matese et al.¹⁸ compared three remote sensing platforms (UAVs, aircraft, satellites) in terms of their technical, scientific and economic performance. Aerial surveys were performed by all three platforms to access their ability to assess spatial variability of vegetation in two vineyards in the Veneto region of Italy. They characterized advantages and disadvantages into two main categories: *mission* and *processing*.

The *mission* category covers planning and execution of the aerial surveys. These include: ability to deal with different weather conditions and the scheduled practices of the vineyard; ability for the platform to reach the site being surveyed; the need for multiple flights to acquire the whole area of interest, and reliability of the platform. Compared to satellites or aircraft, UAVs operate closer to the ground (90-120 m; $\approx$ 400 ft.), have more flexibility in scheduling, and are not affected by cloud cover. However, UAVs have a much shorter range and less endurance than aircraft and satellites.

The *processing* category includes computation factors needed to transform the raw images into a final product. These factors include payload, resolution, precision, mosaicking (whereby a single image is created from multiple images) and geocoding efforts and processing time. The advantages of UAVs over aircraft or satellite are higher resolution and precision of the aerial images, but depending on the size of the area being flown, a greater number of images might be required to survey a given area. The increase in the number of images required to survey an area increases the cost and processing time due to increased mosaicking and geocoding.

Aircraft require fewer images to cover a survey area, so both processing cost and processing time are decreased, whereas satellite images require no mosaicking or geocoding but have a much lower spatial resolution. As for cost, an economic breakeven point between UAVs and the other remote-sensing platforms exists between 5 and 50 hectares of area coverage; use of aircraft remains at a similar cost with satellites over a large range of survey areas.

The choice of remote sensing platform depends on the anticipated application of the

acquired data. The higher the spatial resolution of the image, the better it will represent the potential intra-vineyard variability of the survey area. Accurate mapping of the intra-vineyard variability is essential for appropriate implementation of precision viticulture practices. Thus, UAVs are the best choice for remote sensing in regard to precision viticulture implementation.

UAV hardware

UAVs are either a fixed-wing type platform (see Figure 1a) or a multi-rotor type platform (Figure 1b). The two different platforms allow for different payloads. For example, Zarco-Tejada et al.³⁷ used two fixed-wing UAVs, one with a 2-meter wingspan with a 5.8-kilogram payload and a UAV with a 5-m wingspan with a 13.5-kg payload. In comparison, a multi-rotor UAV platform used by Santesteban et al.²⁹ had a 2-kg payload, while a multi-rotor UAV platform used by Turner et al.³³ had a 1-kg payload. The payload dictates the length of flight and what sensors a UAV can carry. UAVs utilize both hardware and software to ensure that the UAV can retrieve data. The UAV hardware uses vari-

ous components for flight navigation and accurate determination of the UAV's relative position. A flight control board consists of a pressure sensor and accelerometers to calculate and align the UAV in relation to gravity.²⁴ The navigation system, consisting of a digital compass²⁹ or a magnetometer³⁵ and a GPS module, allows a UAV to be programmed to fly autonomously and bring itself back to the operator.

Aside from hardware required for flight and accurate positioning, the hardware used for measuring of canopy variables of interest must be considered. Of crucial importance, UAV platforms have a camera mount for attaching a sensor or multiple sensors. The UAV "Viptero" had servomotors that compensated for the pitch and roll of the UAV.²⁴ They also used an elastic suspension system to decouple the camera from the UAV platform to dampen the vibration caused by the UAV's rotating propellers.

UAV sensors

UAVs equipped with appropriate sensors can collect useful information (leaf temperature, vine water status, canopy vigor, etc.) and the

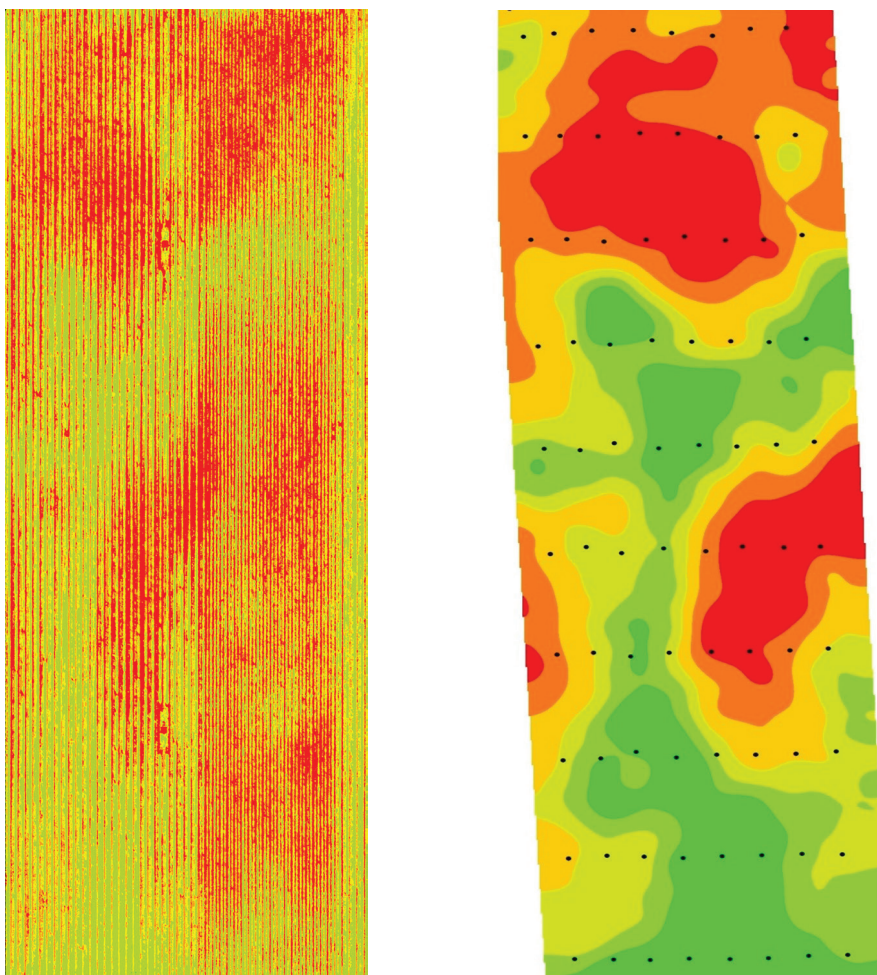


Figure 2a (left) is a normalized difference vegetative index (NDVI) map produced by mosaicking all the data points from a UAV flight. The NDVI map in Figure 2b (right) was produced by extracting UAV data from specific GPS locations adjacent to sentinel vines (indicated by the black dots) in the same vineyard.

resulting maps are more detailed and useful than those compiled using conventional aircraft. The sensors (cameras) can gather thermal, visible, hyperspectral and/or multispectral images for processing to obtain data on various canopy variables. A multi-camera array (MCA) is commonly used to obtain raw images needed to produce multispectral images.² Depending on the number of sensors, several specific light wavelength bands can be measured. An MCA is generally used to measure visible to NIR wavelengths, which allows for measurement of reflected light from the canopy in those spectral regions.⁶

With better resolution, the quality of the acquired data has improved due to the ease of determining the actual crop canopy data in the visible or multispectral image as well as the ease of removing the soil or cover crop data from the respective visible, thermal or multispectral image.

Image processing

Raw images taken by the thermal, multispectral, visible, or hyperspectral sensors require processing with help of computer software before being used for research or precision agriculture. Calibration is done first, and recovers focal distance, point coordinates and

The images acquired by different sensors (e.g., thermal, multispectral, visible, hyperspectral) commonly used with UAVs also must be calibrated to avoid possible errors in the data.

A hyperspectral sensor can measure a much broader range of wavelengths than the 3 to 6 wavelengths measurable with a standard MCA.³⁶ For example, a hyperspectral sensor could have a range of 260 bands between 400-885 nanometers (one-billionth of a meter).³⁷ Drones also can utilize thermal cameras to gather image data to be used to determine canopy variables such as water stress.²⁹ An example of thermal camera had spectral range of 7.5-13 micrometers (one-millionth of a meter) and a -45° to 120° C dynamic temperature range.⁴

As sensor technology has evolved, so has the sensor's resolution of images. The resolution depends on the elevation of the UAV over its respective target; therefore, resolution can range depending on the aims of the study or application. For example, the resolution of an MCA can be as low as 0.056 m/pixel at an elevation of 150 m above the study vineyard,²⁴ a thermal camera can have a resolution as low as 0.13 m/pixel at 100 m above the study vineyard²⁹ and the resolution of a hyperspectral camera is 0.4 m/pixel at 575 m above ground level.⁸

lens radial distortion of the camera.⁴ Several images are taken from different locations and orientations, which allow for the calculation of the variables of the camera and the exterior orientation.

Then the pictures are *orthorectified*, a process by which the effects of tilt and terrain of the image are removed. This can be done with a computer program and digital contour maps²⁴ or by a computer program using an inertial measuring unit installed on the UAV that is synchronized with the respective imager.³⁶ The raw images also require *georeferencing*, which can be accomplished by using Ground Control Points (GCP) that have been measured with a survey grade GPS device,³³ or by using the data acquired by the UAV's onboard GPS device. Errors in the accuracy of the data point locations are larger without use of GCPs. Once the images are orthorectified and georeferenced, the images can be mosaicked (stitched) together using georeferenced-based stitching software.³³ An example of a stitched image is shown in Figure 2a.

As UAV platform use is increasing, single computer programs are

GREEN GRAPE HOE

Basic Hoe comes with a Hillup and a Takeaway Blade. Additional attachments include .3 Tooth Cultivator, Undercutter Blade, Rotary head, "NEW" Rolling Cultivator and "Vine Auger".



THE GREEN HOE
COMPANY, INCORPORATED

The Green Hoe Company, Inc.
6645 West Main Road, Portland, NY 14769
PHONE (716) 792-9433 FAX (716) 792-9434
WWW.GREENHOECOMPANY.COM

EASTERN WINE LABS

Serving the
Analytical needs of
East Coast Wineries

WWW.EASTERNWINELABS.COM

Ph 609-859-4302 Cell 609-668-2854
chemist@easternwinelabs.com
AOAC Member



OAK ALTERNATIVES
HOSE

- BECOPAD - YEAST & ENZYMES -

APPLIED FILTRATION TECHNOLOGY, INC.

**Your Winery
Filtration Specialists**

1-800-240-5366

www.aftekfilters.com

Distributor for
Beco Filter Sheets, Della Toffola Winery Equipment, Enartis Vinquiry,
EvOAK Oak Alternatives, Parker-dh Membranes, Chillers,
N2 Generators, Tuder Technica Hose, Zander Air Products

WINERY
STERILE FILTRATION

CRUSH PAD EQUIPMENT

able to perform all calibration steps with minimal input by the user. These programs can take a set of images and automatically align them by feature identification, matching and bundle adjustment, which is refining a set of initial camera and structure parameter estimates to predict locations of observed points in a set of images. Previously, bundle adjustment, matching and feature identification were performed manually or semi-manually through a variety of computer programs.⁴

The images acquired by different sensors (e.g., thermal, multispectral, visible, hyperspectral) commonly used with UAVs also must be calibrated to avoid possible errors in the data.

In one example, two 2 x 2 m leveled dark and white targets were placed in a central location within the UAV flight pattern.² These targets were measured in the field with a calibrated field spectrometer at the same time as UAV image acquisition. Hyperspectral sensors can be calibrated using measurements made with a calibrated uniform light source at several levels of illumination and integration times.³⁶ All images, particularly hyperspectral, also require atmospheric correction. Aerosol optical depth was measured at 550 nm with a sun photometer in the study area during UAV flights.³⁶ The aerosol optical depth measurement simulates total

incoming irradiance at 1-nm increments, which is then used for the atmospheric correction of hyperspectral images.

Another important factor in the processing of UAV images is the removal of the cover crop data from the space between the rows of vines. The data normally of interest is exclusively the spectral reflectance and/or thermal data of the vineyard canopy. Errors in the spectral and thermal canopy data can be caused by the inclusion of the between-row soil data and/or cover-crop data. In most cases these data can be isolated by setting a threshold spectral reflectance value, below which no data are included in maps. An example of a common error would be the inclusion of thermal bare soil data, since the soil would be expected to have a higher temperature than the vineyard canopy. The high-resolution nature of the images acquired by UAVs allows for the targeting of pure canopy pixels.

Computer programs now can segregate the pure canopy pixels from other background pixels. Santesteban et al.²⁹ used Agisoft Photoscan Professional (Agisoft LLC, St. Petersburg, Russia) to produce a digital elevation model that differentiates the image into two terms, row (vine canopy) and inter-row. The two terms were differentiated by their respective height, since the vine canopy is of a greater

height than the ground or most inter-row cover crops. The extraction of pure vine vegetation pixels in the thermal, hyperspectral and multispectral high-resolution images allows for increased accuracy and precision in the data acquired by a UAV. After the images are appropriately processed, the data can be used to evaluate various canopy variables of interest. An example of a processed image is shown in Figure 2b. 

Andrew G. Reynolds is professor of biological sciences/viticulture at the Cool Climate Oenology and Viticulture Institute, Brock University, St. Catharines, Ontario, Canada; Elena Kotsaki, Hyun-Suk Lee and Patrick Kelly are also with the Cool Climate Oenology and Viticulture Institute, Brock University. Marilyne Jollineau is associate professor in the department of geography at Brock University. Ralph Brown is professor of engineering at the School of Engineering, University of Guelph, Guelph, Ontario. Mehdi Shabanian is research assistant in the department of molecular and cellular biology at the University of Guelph. Adam Shemrock is with Air-Tech Solutions, Inverary, Ontario.

To see references for this article, go to winesandvines.com and search under Magazine > Features > June 2018.

PIONEER INNOVATOR PARTNER



Natural Corks
Champagne Corks
Twinline Corks
Bartops
VISION Synthetic
Corks
G-Cap® Screw Caps

Sales Representatives:

Chris & Liz Stamp
info@lakewoodcork.com
lakewoodcork.com
4024 State Route 14
Watkins Glen, NY 14891
607-535-9252
607-535-6656 Fax

The Wine Industry's Leading Online Job Site

winejobs.com

More wineries
use **winejobs.com**
than any other
online job site

Post your classified listings on the
wine industry's most popular website

WINE BUSINESS.com
created & managed by WINE BUSINESS MONTHLY

Page	Company	Website
71	AFTEK Inc.	aftefilters.com
44	AgCode Inc.	agocode.com
31	American Vineyard Foundation (AVF)	avf.org
7, 19	ATPGroup	atpgroup.com
43	Avian Control Bird Repellent	aviancontrol.com
16	Barrels Unlimited Inc.	barrelsunlimited.com
59	Benchmark Consulting	benchmarkhr.com
52	Boswell Co.	boswellcompany.com
45	Brut Bottling	brutbottling.com
23	BSG Wine	bsgwine.com
47	Bucher Vaslin North America	bvnorthamerica.com
76	Creative Oak	creativeoak.com
9	Criveller Group	criveller.com
67	Dejabrew frmly Zenan USA	dejabrewusa.com
25	Della Toffola USA Ltd.	dellatoffola.us
75	Duarte Nursery Inc.	duartenursery.com
71	Eastern Wine Labs	easternwinelabs.com
57	Fermentis	fermentis.com
50	Food & Wine Trails	foodandwinetrails.com
21	GAI America Inc.	gai-america.com
63	Gomberg, Fredrikson & Associates	gfawine.com
65	Government Liaison Services Inc.	trademarkinfo.com
71	Green Hoe Co.	greenhoecompany.com
47	Guillaume Grapevine Nursery	guillaumenurseries.com
51	Gusmer Enterprises	gusmerwine.com
24	GW Kent Inc.	gwkent.com

Page	Company	Website
65	Hoyt Shepston Inc.	hoyt-shepston.com
22	Innerstave LLC	innerstave.com
63	Inoxpa USA Inc.	inoxpauusa.com
52	Kennedy/Jenks Consultants	kennedyjenks.com
17	La Garde (a division of SML Stainless Steel Group)	lagardeinox.com
72	Lakewood Cork	lakewoodcork.com
27	Lazer Star Lights	nightharvesting.com
50	Napa Fermentation Supplies	napafermentation.com
43	P&L Specialties	pnlspecialties.com
39	Pickering Winery Supply	winerystuff.com
39	Pro Refrigeration Inc.	prochiller.com
20	Prospero Equipment Corp.	prosperoequipment.com
18	Quality Stainless Tanks	qualitystainless.com
5	Rivercap USA	rivercap.com
44	Sacmi USA De Franceschi	sacmiusa.com
11	Saverglass Inc.	saverglass.com
45	Scott Laboratories Inc.	scottlab.com
65	Shelco Filters	shelco.com
53	Spec Trellising	spectrellising.com
52	Tonnellerie Sansaud USA	sansaud-usa.com
26	Trust Cooperage	barrelmakers.com
2, 3	Vinventions USA	vinventions.com
66	Waterloo Container Co.	waterloocontainer.com
72	Winejobs.com	winejobs.com
52	Winery Planning & Design	practicalwinery.com
32, 33	Wines & Vines Packaging Conference	wvpack.com

Page	Company	Website
26	Zenport Industries	zenportindustries.com
	Zinfandel Advocates & Producers (ZAP)	zinfandel.org



AARON equipment company inc.

**WE BUY & SELL
STAINLESS STEEL
TANKS & KETTLES**

Tell Us What You
Have For Sale

www.aaronequipment.com/sell
or call: **855-717-5619**

CLASSIFIEDS

ESTATE BOTTLING: Mobile bottling since 1983. Pressure-sensitive labeling & sterile bottling in a 45-foot van. 1,500 cases per day with 6 winery personnel in 375ml, 750ml and 1.5-liter formats. Call (707) 963-5705.

CENTRAL COAST WINE BUSINESS FOR SALE: brand and inventory. Established brand with robust wholesale business, wine club and tasting room. Santa Cruz Mountains AVA. Contact ccollison@globalwinebank.com.

WINES VINES ANALYTICS

Market Research for Wineries and Suppliers

MARKET
DATA AND
ANALYSIS

Wineries
DtC Shipments
Off-Premise Sales



WINES & VINES
winesandvines.com

Clean Plants

Tons and tons of reasons™

35"
Ubervine™

- Ultra clean rootstocks
- 100% containerized
- 291 certified virus free clones
- Mother vine to vine testing available
- 2010 protocol selections

24"
Magnum Vine™

12"
Big Pot Vine™

Stefan Daniels
North Coast
Central Coast
415 | 309-3930

Tia Russell
North Coast &
Southern Oregon
209 | 815-2399

Hilary Graves
Central Coast
805 | 674-1686

Clean Plants
For Your Future



Clean, Clonal, Containerized

1-800-GRAFTED

www.duartenursery.com • Hughson, CA

sales@duartenursery.com



FULLY ENGAGED FOR ANY FLAVOR



The Creative Oak team will work side-by-side with you to conjure up unique, distinctive flavor ideas, or guide your selection from our remarkable range of options. We make oak alternatives that create any flavor you envision, for every drop you craft.



CREATIVE OAK

FLAVOR FORWARD

creativeoak.com • creativeoakstore.com