VINTAGE REPORT
Sonoma 2016

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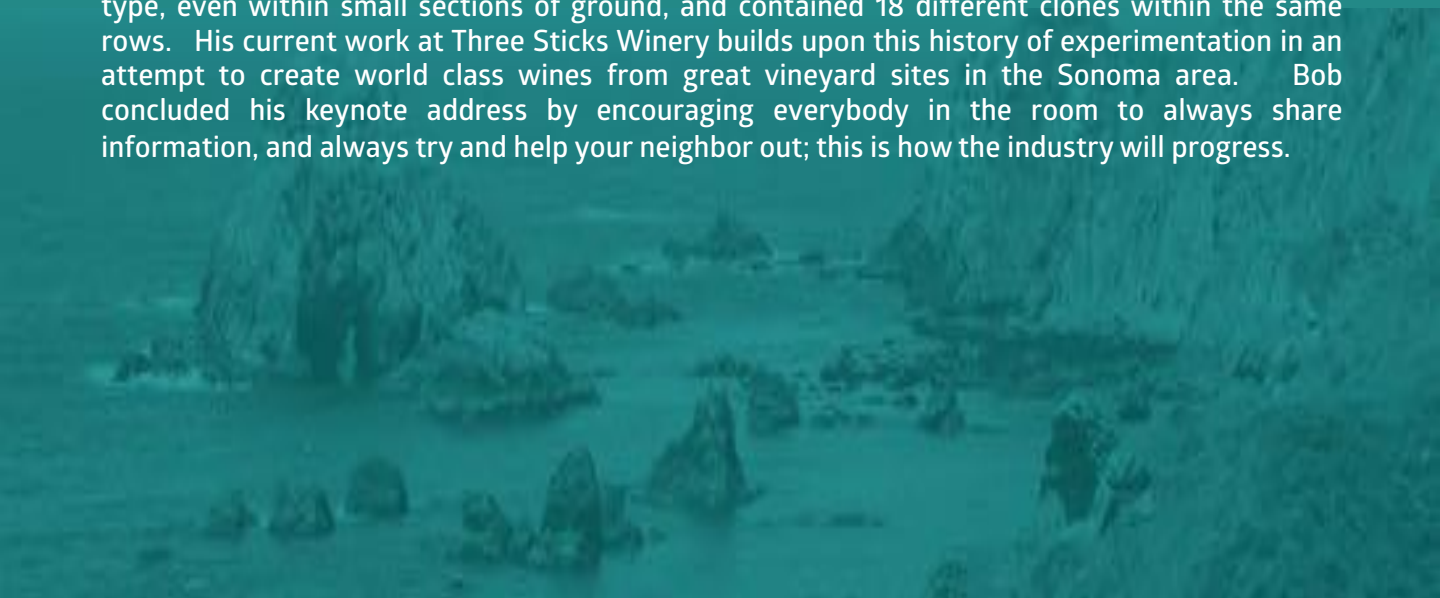
The 2016 Sonoma Vintage Report took place on March 8th, 2017, at The Barlow Event Center in Sebastopol, CA.

The first Vintage Report conferences began in Napa, CA and France in 2010, but today's event was the first annual Vintage Report gathering for the Sonoma growing region. The event aimed to provide an engaging environment for winemakers and grape growers to share their experiences with the 2016 Sonoma vintage, and learn about new scientific research and technology at the forefront of vineyard management and winemaking practices. The Sonoma Vintage Report took place for a half-day, starting in the afternoon, and conference content was arranged to follow the plant calendar growing year, proceeding from winter/spring to fall harvest.

Keynote: Bob Cabral

As the keynote speaker for the Vintage Report, Bob Cabral, Director of Winemaking for Three Sticks Winery, began by sharing his path to winemaking in the Sonoma area. Before diving into his path through the wine industry, Bob offered that the sharing of information and technological advances is the responsibility of the industry as a whole. Bob has almost 50 years of experience in the wine industry, which all started at the age of eight while growing up on a 70 acre farm in the San Joaquin Valley. His dad farmed a variety of red grapes on the property to sell to nearby wineries. At the age of 14 Bob began delivering the grapes to the wineries, where he fell in love with the smell of fermentation, and the hustle and bustle of the winery. He studied winemaking at Fresno State, and worked with many Central Valley vineyards after graduating. When he moved to Sonoma after his time in the Central Valley, he was exposed to a new world of trellising, disease, low tonnage, and tracking vineyard health and quality. Eventually Bob landed the job as winemaker for Hartford Court Winery, where he was able to dive into experimentation, implementing technology in the winery, and designing many trials for making a better wine and a better brand. In 2003 he was able to plan a vineyard planting that matched rootstock to soil type, even within small sections of ground, and contained 18 different clones within the same rows. His current work at Three Sticks Winery builds upon this history of experimentation in an attempt to create world class wines from great vineyard sites in the Sonoma area. Bob concluded his keynote address by encouraging everybody in the room to always share information, and always try and help your neighbor out; this is how the industry will progress.



Vintage Summary: Part 1

Throughout the Sonoma Vintage Report, Thibaut Scholasch, PhD, co-Founder and VP of Research and Development at Fruition Sciences, provided his insights into the 2016 vintage based on data collected in the region. For the first section of his vintage summary, Thibaut focused on the winters before the 2016 and 2017 growing seasons, from November 1st to March 1st each winter. This is the time of year when the microbial life is active in the soil, and root reservoirs are replenished by rain before the coming growing season. Both in 2016 and 2017 there is a constant water supply from January to March, and a slower heat accumulation (thermal time accumulation) when compared to 2014 and 2015. The thermal time accumulation in 2017 is the slowest of all four years. In 2016 this resulted in a slightly delayed bud break, a large amount of nitrogen mineralization, and therefore a high plant nitrogen uptake. For 2017 we expect to see an even greater delay in bud break, and the high nitrogen uptake in 2016 could result in more flowers per inflorescence/vine and a higher yield potential in 2017. In order to truly map the footprint of a vintage we must look to new technology that allows us to scan a vineyard after leaf fall in order to measure shoot diameter and shoot number. These measured parameters allow us to map the wood index for a vineyard, and determine how topography is affecting plant carbohydrate storage. Using this data we can attempt to maximize vineyard real estate by watching seasonal wood index fluctuations impacted by vineyard management practices. If wood index rises, we expect a higher yield potential.

Approach to Adopting Vineyard Optimization Techniques - A Closer Look at Physiocap in Sauvignon Blanc and Pinot Noir Vineyards

The next speaker of the afternoon, Erin Miller, Winemaker at Twomey Cellars, built on Thibaut's discussion of using dry wood biomass as the footprint of the vintage and vineyard optimization. Erin is focusing her current work on figuring out how to use the large range of vineyard metrics in order to improve wine quality and vineyard sustainability. The Physiocap scanning method, as implemented by Twomey and Fruition Sciences, allows us to see both the human vineyard footprint (shoots/vine) and the vine footprint (shoot diameter). Erin studied and shared the results of the Physiocap studies at both the Merino and Last Stop vineyards, managed by Twomey. The Merino Vineyard sits on a loam soil, with 0-2% slope. It is the cornerstone of Twomey's white wine portfolio. At Merino block 1 the Physiocap wood index seems to reveal wide variation within the block, and that the yield capacity for the vineyard has potentially been reached. However, this begs the question: what practices can we implement that might allows for improved uniformity? Block 3 at Merino contains even more dry biomass variation, and the next step is figuring out how to best unify the block in order to get a consistent "green", slightly vigorous vine (the vine type that makes the best wine at this site, in Erin's opinion). The second vineyard of Erin's comparisons, Last Stop, is another loam-planted vineyard, with very little slope. Last Stop shows a large variation in wood index, and selective harvesting was implemented to separate the different wine potentials once in the cellar. Erin concluded her talk by highlighting the importance of continuing to analyze how to best apply precision viticulture techniques. Connecting data to the vintage is key in the pursuit to grow better fruit, and the right use of technology can ultimately give us a greater sense of vineyard reality.

Vintage Summary: Part 2

During the second part of his vintage summary, Thibaut Scholasch focused on two time periods: the period from bud break to bloom (0 to 400 GDD), and from bloom to veraison (400 to 1,000 GDD). During the period of grand growth at the beginning of the season, the three coldest weather stations in Sonoma revealed similar coldness to weather stations in Napa Valley. However, when the three warmest weather stations in Sonoma are compared to Napa, the Sonoma sites reveal significantly lower heat accumulation, and are less prone to heat waves. Even though the heat accumulation in Sonoma is lower than Napa, there is no deficiency in heat accumulation. This means that if a slow growth rate is observed, there are likely other factors at play: disease, nitrogen deficit, or water deficit. A moderate water deficit can improve flavonoid concentrations and reduce peak berry weight, while severe water deficit will cause poor leaf area development and poor nutrient uptake. This begs the question: if water is not limiting, such as a year like 2016 or 2017, should we help water deficit kick-in by delaying hedging, leaving more laterals, or using other management techniques? Additionally, if the high nitrogen assimilation in 2016 is confirmed, will any fertilization be needed, and what is the best timing for its application in 2017? In the Sonoma region, even more useful information can be gained by comparing site variation rather than only comparing vintage to vintage variation. This is the result of vast differences in climate within the Sonoma region, driven by spatial variability. While the thermal time in the dry creek valley may reach 1,900 GDD, Bennett Valley may only see 1,400 GDD. In other words, vintage effect is modulated by local variation. In a case study of Russian River pinot noir, Thibaut compared the dry biomass of two blocks to their respective nitrogen biological index (NBI) profiles, measured using a fluorescence technique. The two blocks, A & B for this purpose, are in the same climate, are the same age, have the same spacing, and are not prone to water deficit. Although block B revealed a lower biomass than block A, by a factor of 50%, their NBI profiles were almost identical. Thibaut concluded by challenging the room to think outside the box: identifying weak and strong areas in a vineyard does not necessarily translate to a difference in nitrogen use/uptake.

Assessing variability in grape phenolic composition at the field scale through a selective-harvest approach based on plant water status mapping. A case study in Sonoma

The day's next presenter, Luca Brillante, PhD a Postdoctoral Researcher at UC Davis, dove further into common Sonoma vineyard-specific variability. In vineyard management, variability is a cost; this is why Luca and his colleagues are working to use field measurements, laboratory analysis, and geostatistical modeling to analyze the many factors impacting spatial variation. The site for his case study in Sonoma is located near Healdsburg, and is cabernet sauvignon planted at 6 x 11 feet. A grid of 35 data collection points was applied across the studied vineyard block, and the vineyard was modeled based on terrain and soil wetness. By using regular measurements of leaf water potential at the 35 data collection sites, Luca determined that there were two different zones of water status in the vineyard, high and low, that he could try and use to separate harvest zones. He modeled the vineyard water status, and this model had a good relationship with the soil and topography models. The two zones were harvested separately in order to see any differences between the two zones. It was found that there was no significant correlation between yield and water status. Additionally, primary metabolism was consistent between the high and low water status zones up until the time just before harvest, when brix varied slightly due to dehydration differences. Anthocyanins actually decreased from high to low water status, which is likely due to the extreme water stress seen in the low water status zone. In conclusion, selective harvesting can be a useful technique to address vineyard variability, and vine water status measurement and modeling does in fact allow you to discriminate successfully between harvest zones.

Vintage Summary: Part 3

Moving further into the growing season, Thibaut Scholasch focused the next section of this vintage summary on the period from veraison to the end of sugar loading (1,000 to 1,300 GDD). During the sugar loading period, temperature, light exposure, and vapor pressure deficit all play key roles. When it comes to heat waves, Sonoma sites can display anywhere from 3 to 50 heat wave instances where the vapor pressure deficit rises above 5 kPa. At the previously-discussed pinot noir case study site in the Russian River Valley, there were only three days above 5 kPa, only four days above 35 degrees Celsius, and no light or water deficit. When comparing block A to block B, there is no difference between nitrogen content and aerial views; the only difference noticed was in the lower wood index measurement (dry biomass) in block B compared to block A. When berry maturation was analyzed for the two blocks, berry weight for block B was consistently 20% lower than block A, block B showed a greater susceptibility to shriveling, and sugar content for block B was consistently 20% lower than block A. The lower yields in block B, and the berry maturation profiles, suggest that block B is perhaps slightly more susceptible to water deficit than block A. In practice for this site, this information could be used to try and increase the wood index for block B in order to reduce its susceptibility to water stress, using techniques such as cover crop management, shoot number adjustments at pruning, or more irrigation before harvest.

Berry Sugar Loading: Concepts, Applications, Results

To build on the discussion of fruit maturation profiles, Cecilia Cunningham, Consultant for Vivelys, discussed the Vivelys grape maturation measurement tools, the sugar loading period, and California data compilation results. The active sugar loading period in grapes is the period from veraison to physiological ripeness, when sugar is no longer actively added to the berry. One of the most important factors to check at this physiological ripeness, or sugar loading stop, is the brix level. The brix level at sugar loading stop is an indicator of the quality of the ripening. The sugar loading period depends both on photosynthetic activity (climate, vine water status, and nutrition) and vine equilibrium (yield and leaf area). Plotting brix at sugar loading stop versus vine water stress reveals that a moderate water restriction (stress) leads to good sugar loading (high brix at sugar loading stop). In California in 2016, the average sugar loading stop occurred on the 24th of August at 21.1 brix. This showed good potential due to the early and high (brix) stop. Compared to the last eight years the average physiological ripeness in 2016 occurred early, paired with relatively average brix levels. In Sonoma, the average sugar loading stop was the same as in Napa Valley, around the 23rd of August, but Sonoma sites showed slightly lower brix levels than Napa sites. Interestingly, physiological ripeness in Monterey was almost 10 days later than Sonoma, on the 4th of September. Vivelys works to model grape profile evolution based on the varietal and site location. With all of the compiled data so far, the model for cabernet sauvignon in California shows that fresh aromas will be displayed in fruit 25 to 30 days after physiological ripeness is reached, while ripe aromas will be displayed 45 to 50 days after this sugar loading stop. In conclusion, keeping track of physiological ripeness in the vineyard allows for detailed block diagnosis and harvest forecasting.

Vintage Summary: Part 4

To wrap up his vintage summary, Thibaut Scholasch once again returned to the case study of pinot noir in the Russian River Valley. This time, color accumulation was analyzed between the two studied blocks, A & B. When analyzed both spatially and temporally, block B showed a slightly higher and faster color accumulation than block B. This is likely a result of the same susceptibility to slight water deficit that caused a reduction in berry weight and sugar content in block B. In conclusion, the case study revealed that the lower wood index (dry biomass) in block B correlated with a lower yield (less berry weight), but higher color. Could this increase in color be due to higher light penetration in the area with less biomass? This is a topic for future study and discussion.

ETS Grape Phenolics

To wrap up the day's presentations, Eric Herve, PhD and Research Scientist at ETS Laboratories, shared his insights on using ETS grape phenolic panels to compare vintages, sites, and vineyard experiments. In order to run phenolic panels, ETS uses a wine-like 15% ethanol solution to conducts its measurements. Compared to wine, the extraction takes place at a higher temperature, and over a much shorter period of time. ETS phenolic panels use ultra-fast high performance liquid chromatography (HPLC) to provide measurements of catechin, tannin, polymeric anthocyanin, total anthocyanin, and quercetin glycosides. Eric provided common phenolic trend examples from samples of both highly vigorous and normal vineyard sites, highlighting tannin potential variation from vintage to vintage. Additionally, he outlined studies on cluster thinning and cluster trimming in a pinot noir vineyard in the Willamette Valley, OR. The study analyzed the impact of leaving full crop, cluster thinning to one cluster per shoot, and cutting clusters (bottom ⅓ of the cluster) on grape phenolic content. For total anthocyanin, there was no difference between the full crop and the thinned crop. However, cut clusters showed an increase in total anthocyanin content. In the end, the vineyard study showed that there is just as much difference in phenolic content within the same row than between thinning/trimming treatments. This means that vine location parameters, such as soil and water drainage, can have more impact than cluster treatments on grape phenolics. In conclusion, laboratory phenolic panels can be utilized to study vintage variation, site variation, maturation trends, and personal vineyard experiments.

In conclusion

The 2016 Sonoma Vintage Report unfolded during the day and followed the 2016 vintage from budbreak to harvest, with discussion topics covering dry biomass impact on yield and wine quality, vineyard spatial variation and modeling for selective harvest, sugar loading and grape physiological ripeness, and laboratory phenolic compound analysis. Overall the 2016 vintage started with steady rainfall compared to 2014 and 2015, and saw plenty of heat accumulation across the Sonoma region. The large amount of rainfall in this recent winter leading up to the 2017 season could cause back-to-back years of high soil nitrogen assimilation; it will be interesting to analyze the plant response to this water and nitrogen during this coming growing season. We look forward to seeing you again next year to discuss this topic, and many others, at the 2017 Sonoma Vintage Report!

What is the Vintage Report?

The Vintage Report brings together scientists, winemakers and industry leaders from all over the world to produce a one-day seminar that engages open minds within the industry to discuss the previous harvest in light of the most recent scientific findings and newly available data.

www.vintagereport.com