Portland Winemakers Club

June 2021

"Bill's Meanderings"

Portland Winemakers Club

Monthly Events

January, 2021
Annual Gala CANCELLED

January 20th, 2021
Speaker, Mike Smolak,
ZOOM VIRTUAL MEETING

February 17th, 2021
Speaker, Syncline, James Mantone, Rhone varietals
ZOOM VIRTUAL MEETING

March, 17th
Speaker: Tyson Crowley from Crowley Winery, Pinot & Chardonnay
ZOOM VIRTUAL MEETING

April 21st, 2021
Speaker: Bobby Rowett winemaker for Mellen Meyer Sparkling Winery
ZOOM VIRTUAL MEETING

May 19th, 2021
To be determined
ZOOM VIRTUAL MEETING

June 16th, 2021
To be determined
ZOOM VIRTUAL MEETING

July, Annual Picnic
CANCELLED?

July 21st, 2021
To be determined

August 18th, 2021
To be determined

September, 15th, 2021
To be determined

October 20th, 2021
To be determined

November 17th, 2021
Crush Talk

December 15th, 2021
Elections, Planning for Next Year, More Crush Talk

Crikey, it's a blooming cluster!

Probably the most critical time of the year for farming grapes, the bloom. There's an important spray that needs to go on the vines at about 10% bloom that is significant along with warm but mild weather with hopefully little or no rain. It's all about fruit set and getting those berries to grow to have a decent crop.

Our last zoom meeting covered the most talked about subject, meetings and a picnic. I'm not quite sure we can set any dates, but I think the Club is looking forward to getting together in person again. We've inquired the Grange about what it would entail to have meetings and maybe look at having a picnic later this summer. A couple of things need to happen for that to go forward. We need to make sure everyone is vaccinated, and we need to set our own protocols for eating and drinking together. We are working on these details and hopefully will have some good news soon.

The next meeting short of have a presentation will cover best practices. So, if you have something to share with the club that helps you and maybe others get their wine made think about showing it off at our next zoom meeting on June 16th.

Drink Responsibly.
Drive **Responsibly**.

Upcoming events / Save the date

Club Meeting: The next meeting is scheduled for June 16th. "Zoom" sign in will be at 6:45 pm. This will be available on any device that can connect to the internet and has a camera and speaker capability such as a computer, iPad or smart phone etc. Jon Kahrs will again be the moderator. We will provide further sign in information and other details by e-mail prior to the meeting. **Agenda: To be determined**

Website: http://portlandwinemakersclub.com/

Comments from the May Meeting

Attendance: 18

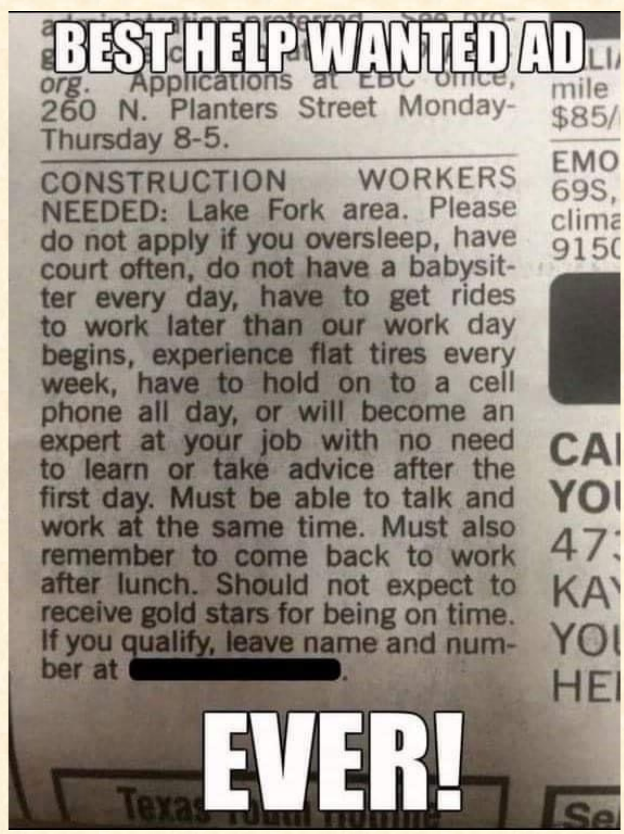
• Has anyone had experience using encapsulated yeast for the second ferment when making sparkling using the traditional method? Mentioned by one of our speakers.

• Also related to sparkling wine, our speaker mentioned using a Glycol" solution to freeze the riddled yeast lees in bottle necks before the disgorge step. Maybe someone can explain how to prepare a "Glycol" solution?

• The Secretary will send everyone a copy of the grape purchase rules.

• Bill Brown and Bob Hatt will put together an e-mail survey to the membership concerning the possibility of re-starting contact meetings at the Grange in July or August.

• The secretary will contact Debra Welch at the Aloha Grange about the possibility of re-starting meetings at the Grange.



Bench Trials and Tribulations

Written by Thomas Warriner

In late August 2018, I picked 350 pounds (160 kg) of Sauvignon Blanc grapes from my favorite vineyard in the foothills of the Sierra Nevada in California. I had made very good Sauv Blanc from this vineyard three times previously. The grapes are always fully ripe with good acid and wonderful flavors. This time was different. The Brix was OK at 22, maybe a bit lower than usual, the pH was 3.2, also a bit low, and the titratable acidity (TA) was 10 g/L or 1 g/100 mL, a bit high. It's OK, I told myself; it will straighten out through fermentation and with a bit of aging.

The fermentation proceeded smoothly. Two weeks later when I racked the wine off the lees, I rechecked the numbers. The TA was still 10, and the pH had dropped to 3.14. Ok, I told myself, just leave it alone, and recheck it in a few months. So I adjusted the free sulfite level to 45 ppm and cellared the wine at 60 °F (16 °C) in glass carboys. When I checked it the following April the pH had fallen to 3.08 and the TA was 8.4. The low pH made the wine taste very tart and unpleasant to drink. With 24 gallons (91 L) of wine in carboys, I needed to figure out what to do. The options were to fix it or dump it. With dumping not being an option, I wanted to pursue, I began brainstorming ways to fix this wine. In an effort to make it as good as it could be, I decided to try four treatments:

- Deacidify the wine using potassium carbonate
- Dilute the wine with water
- Blend the wine with a wine of higher pH
- Malolactic fermentation (MLF)

Conducting bench trials

The challenge is to determine the right amount of treatment to achieve the desired result. I used bench trials with graphical analysis of the trial results to guide the final adjustments. For acid adjustments, tracking the pH while incrementally making the adjustment and plotting the result can be used to interpolate the TA. This article provides examples of the graphic technique.

Bench trials are extremely useful when dealing with irreversible adjustments to your wine (ever try to un-blend a wine?). The rules of thumb are not exact. Every wine will react to an adjustment differently. The common advice is to use the rules of thumb to calculate the addition then add half of the amount, wait, check the wine, and repeat. Plotting the results of the bench trial results makes it possible to dial in the exact addition required to achieve the intended results. See the final section of this web page for additional information on how to conduct a bench trial for acid adjustment.

The typical target range for white wine pH is 3.2–3.5, and TA is 6.0–9.0 g/L. The TA for this Sauv Blanc falls into the high end of this range, but the pH is well below. When adjusting the acidity of a wine, pH and TA are inversely related. The pH usually goes up when the TA goes down. Also, the flavor profile of the wine changes with the pH having a stronger effect on the perception of the wine. Low pH brings out the freshness and fruit character of the wine. As the pH increases, the wine gets rounder and softer, but less vibrant and may become flat or flabby.

In establishing a target for the finished wine, I chose pH of 3.2 and TA of 7.2 g/L, remembering the first rule of wine adjustments: Smaller adjustments are always better. Of course, sensory evaluation of the wine is the most important criteria. Just "dialing in the numbers" will not guarantee a good wine. So, the bench trials were conducted in two parts: First titrate in the adjustment while tracking the pH, then picking two or three representative levels of adjustments that approach the desired numbers, and re-blending small samples of the wine to that parameter for tasting and TA analysis.

So, on to the trials.

Trial 1: Potassium Carbonate

For reducing acid in wine, the rule of thumb is that 0.6 g/L of potassium carbonate (K_2CO_3) will reduce the TA by 1.0 g/L and raise the pH by approximately 0.25 units. For the titration, I prepared a solution that contained 0.0134 grams of K_2CO_3 per mL of solution by dissolving 6.7 grams of K_2CO_3 into 500 mL of wine and filled a 20 mL syringe. Of the added

K_2CO_3 ,2.52 grams was consumed to neutralize the acid in the solution, leaving 4.18 grams active to react with the wine.

I measured 100 mL of the wine into a beaker and placed it on a magnetic stir plate. I calibrated the pH meter, placed the probe into the wine and recorded the pH. I added the K_2CO_3 solution in 2-mL increments and recorded the pH after each addition, allowing time for the reading to stabilize (see Table 1). The pH increased from 3.08 with no addition to 3.49 at 10.7 mL addition. I did not continue because the wine was well past the intended adjustment. Table 1 shows the effect on the pH and TA

For sensory evaluation, I chose additions of 3.6 mL, 7.2 mL, and 10.7 mL to 100 mL samples of the wine. This corresponds to additions of 0.29 g/L, 0.56 g/L and 0.81 g/L K_2CO_3 (as shown in Table 1). The smallest addition tasted the best, the medium addition really dulled the wine, and the largest addition obliterated the Sauvignon Blanc character.

The titration results are shown on Chart 1, below. An addition of 0.25 g/L of K_2CO_3 increased the pH to 3.18 and the TA to 7.8, very close to the target values. I believe this resulted in the best sensory evaluation. At a wine club tasting, this adjustment was also the highest rated of all of the adjusted wines.

TABLE 1: K_2CO_3 Addition Bench Trial

ML ADDED	K_2CO_3 ADDITION (g/L)	pH	THEORETICAL TA (g/L)	MEASURED TA (g/L)
0	0.00	3.08	8.4	8.4
2	0.16	3.16	8.0	
3.6	0.29	3.23	7.6	7.2
4	0.32	3.25	7.6	
6	0.47	3.32	7.2	
7.2	0.56	3.37	7.0	6.4
8	0.62	3.39	6.8	
10	0.76	3.46	6.5	
10.7	0.81	3.49	6.4	6.0

Table 1: The effect of titrating potassium carbonate solution into the Sauvignon Blanc. The pH was recorded during the titration. Theoretical TA was calculated based on the rule of thumb 1.0 g/L TA reduction per 0.6g K_2CO_3 addition.

CHART 1: K_2CO_3 Addition Bench Trial

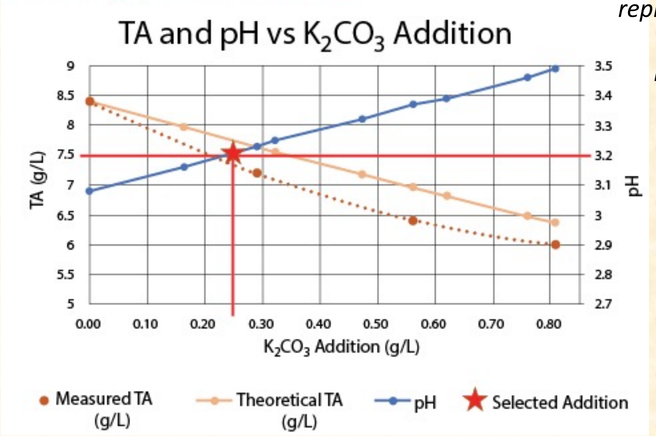


Chart 1: *Graphical representation of the results of Bench Trial 1, K_2CO_3 deacidification.*

A few observations from Trial 1:

- Increase in pH is roughly proportional to the K_2CO_3 addition. However, the rule of thumb addition of 0.60 g/L raised the pH 0.31 units instead of the expected 0.25 units.
- Decrease in TA is not linear. The rule of thumb addition of 0.60 g/L lowered the TA by about 2 g/L; twice the rule of thumb change of 1.0 g/L.
- Using K_2CO_3 can be useful if the goal is to both reduce TA and increase pH. In this case a small addition brought TA and PH into the recommended range and improved the wine immensely. The treated wine was tart but balanced and enjoyable to drink. The Sauvignon Blanc character was enhanced with more fruit flavors as well as a much better mouthfeel.

Trial 2: Dilution with Water

For the water dilution bench trial, I titrated 20 mL of distilled water into 50 mL of Sauv Blanc while tracking the pH. The theoretical drop in TA is easy to calculate, since it should be proportional to the amount of water added. The TA actually dropped 0.6 g/L more than expected, to 5.4 g/L.

The pH however did not change over the entire titration. This surprising result is correct. pH is measured on a logarithmic scale. It would take a 10 times dilution to move the pH just 1 point, for example from 3.0 to 4.0. Adding 20 mL of water was not enough to move the pH noticeably.

Table 2 shows the effect of the water dilution on the pH and TA.

For sensory evaluation, I chose to evaluate the wine at the theoretical TA of 7.5 g/L and at the endpoint, TA of 6.0 g/L. The diluted wine at TA 7.5 g/L was not improved. The flavors were diminished while the effect of the still low pH was amplified. At a TA of 6.0, the wine was thin and un-drinkable thin, still acidic, and just yucky.

Titration results are shown in Chart 2. An addition of 120 mL of water to 1 liter of wine produced a TA of 7.5, with no measurable effect on the pH. While the water dilution did drop the TA, it did not improve the taste at all.

TABLE 2: Water Addition Bench Trial

WATER ADDITION (mL)	pH	THEORETICAL TA (g/L)	MEASURED TA (g/L)
0	3.08	8.4	8.4
2	3.08	8.1	
4	3.08	7.8	
6	3.08	7.6	7.5
8	3.08	7.5	
10	3.08	7.2	
12	3.08	6.8	
14	3.08	6.6	
16	3.08	6.4	
18	3.08	6.2	
20	3.08	6.0	5.4

Table 2: Dilution of the wine with water did not measurably change the pH. It did reduce the TA.

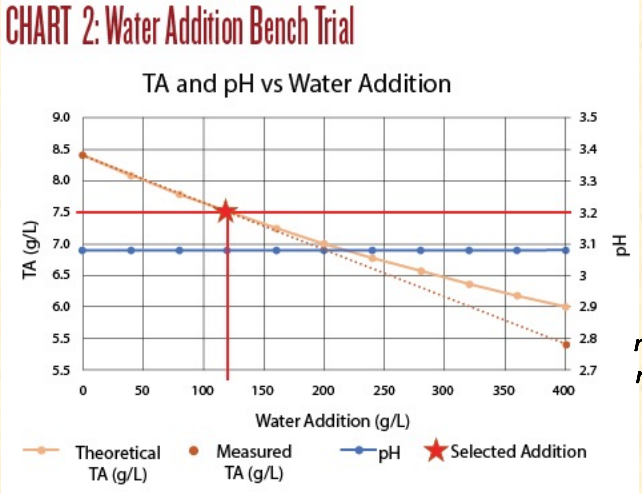


Chart 2: Graphical representation of the results of Bench Trial 2, Dilution with Water

A few observations from Trial 2:

- Small dilutions with water do not measurably change the pH but do decrease TA.
- The TA dropped more than calculated.
- Dilution with water was far less effective than neutralizing with potassium carbonate.

Trial 3: Blending with high-pH wine

For blending, the only high-pH wine I had on hand was a barrel-fermented Marsanne/Roussanne (M/R) field blend with a pH of 3.99 and a TA of 5.4 g/L. The M/R had undergone malolactic fermentation. The blending did move the pH and TA towards the desired range, but the M/R flavors overwhelmed the Sauv Blanc character, even at fairly low percentage additions. The wines were too stylistically different to make a harmonious blend. However, in low concentrations, the addition of the M/R rounded the acidity of the Sauv Blanc and made a drinkable wine — just one with no identifiable varietal character. It was just a white blend.

For this trial, up to 20 mL of M/R was titrated into 50 mL of Sauv Blanc, and the pH and TA were recorded after every 2 mL addition. Table 3 below shows the effect of the blend on the pH and the TA.

For sensory evaluation, I chose three points starting at the target pH of 3.22, corresponding to an addition of 6 mL, pH 3.27, corresponding to an addition of 10 mL, and 3.32, corresponding to an addition of 14 mL. The smallest addition was the best tasting, with the low pH acid bite rounded by the M/R. The Sauv Blanc character was prominent, but the wine was obviously a blend. At the 10 mL addition the blend was even more rounded, but the Sauv Blanc character was much more diminished, and the blend tasted like a jug wine with no distinguishable varietal character.

The titration results are shown in Chart 3. An addition of 100 mL M/R per liter of Sauv Blanc raised the pH to 3.2 but the TA remained high at 8.1 g/L. The taste was still tart, but the wine was more balanced. The oak and ML character of the M/R breaks through even at this low percentage addition and disrupted the Sauv Blanc character of the wine. Even though this wine was drinkable, it was not the intended Sauvignon Blanc.

TABLE 3: Blending with High-pH Wine Bench Trial

HIGH-pH WINE ADDITION (mL)	pH	THEORETICAL TA (g/L)	MEASURED TA (g/L)
0	3.11	8.4	8.4
2	3.14	8.3	
4	3.18	8.2	
6	3.22	8.1	8.1
8	3.24	8.0	
10	3.27	7.9	7.6
12	3.29	7.8	
14	3.32	7.7	7.2
16	3.34	7.7	
18	3.36	7.6	
20	3.39	7.5	6.8

Table 3: Blending with high pH wine did adjust both the pH and TA towards the intended target values.

A few observations from Trial 3:

- First, make sure the blend will achieve your flavor goals. These two wines clashed stylistically, and the end result, while drinkable, was quite unremarkable, even at only 10% Marsanne/Roussanne.
- More traditional blends like Sémillon and Chardonnay might work better together.
- Large additions of blending wine are required to appreciably move the TA and PH because the blending wine also has these components.

• Interactions between two wines are more complex and can be harder to predict because of the unknown acids and buffering capacity of each constituent wine. TA decreased dramatically more than the theoretical amount as greater amounts of wine were added.
• When blending, the sensory evaluation is more important than the numbers. While the goal of raising the pH to 3.2 was achieved, the wine was still mediocre.

Trial 4: Malolactic Fermentation

Every year, I make some of my Sauvignon Blanc as a "Fume Blanc" by putting it through MLF and aging it with some oak. I evaluated the effect that MLF had on the TA and pH of the wine.
It is commonly stated in winemaking circles that malolactic fermentation reduces the acidity of the wine. In this case, the TA did drop from 8.4 to 7.6, a change of 0.8 g/L. However, the pH was unchanged at 3.08 and the wine tasted as sour as ever.
Because there are no additions to be made to this wine, there was no titration and no charts.

A few observations from Trial 4:

• The pH of the wine was unchanged by ML.
• The TA decreased 0.8 g/L.
Conclusions
Of the four wine adjustments, only Trial 1 (the addition of potassium carbonate to deacidify the wine) brought both the TA and pH into the desired range of TA 7.5 and pH 3.2. Trial 3 (blending with wine) brought the pH into the right range, but the TA remained quite high. Trial 2 (blending with water) and Trial 4 (putting the wine through MLF) both brought the TA in line, but the low pH was not improved.
Any one of these approaches may help correct a wine depending on the changes desired. The particular wine that needs improvement will play a role in the decision a winemaker will make. An overview of these four trials is illustrated in Chart 4.

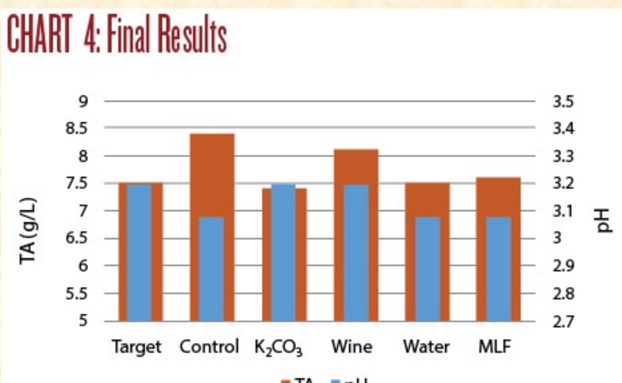
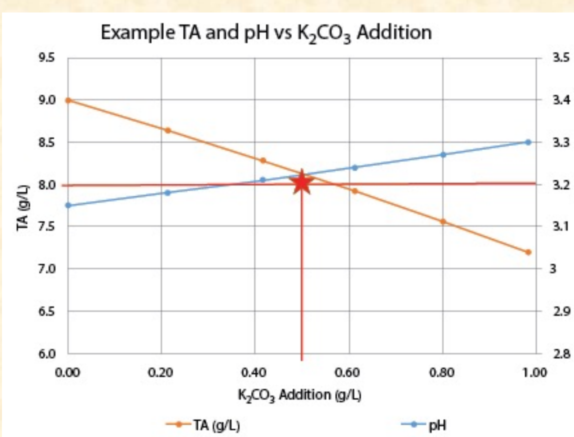


Chart 4: The target pH and TA and the pH and TA of the initial wine and adjusted wines.



Sample graphical representation of the data. An addition of 0.5 g/L of K2CO3 will achieve the objective of TA = 8.0 and pH = 3

None of the adjusted wines measures up to the previous Sauvignon Blanc wines I have made from this same vineyard. The quality of the grapes is the biggest determinant in the potential quality of the wine. While these approaches may still salvage this batch, it is much preferable to start with fruit that can be gently guided through the winemaking process.
However, sometimes the fruit is less than perfect, and you don't have control over it. Using bench trials to understand the effects of an adjustment on the wine chemistry and on the sensory perception of the wine can help guide the winemaker's decisions in helping bring the wine back to its highest potential.

How to Conduct a Bench Trial for Acid Reduction with Potassium Carbonate

Because changes in TA and pH are related and relatively linear over the range of 2 or 3 g/L change, pH can be used as a proxy to estimate the TA, reducing the number of iterations required to dial in the acid adjustment. This technique can be used for acid additions as well as acid reductions. The end result is data that shows how the wine will respond to the entire range of additions and allows the winemaker to pick the most promising adjustments for further sensory evaluation.
For a wine with a known TA and pH, the adjustment is incrementally titrated and the pH is recorded after each incremental addition. The TA of the wine at the end of the titration is also measured and can be interpolated to show how the wine responded after each addition. For each incremental addition, the results show the amount of chemical added, the pH of the wine, and the TA of the wine. This data allows the winemaker to select the most promising additions for further sensory evaluation.

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Example:

This is a sample laboratory procedure for running an acid reduction bench trial. Assume a white wine with a TA of 9.2 and pH of 3.15. The desired TA is 8 and pH of 3.2. For ease of calculation, use a 100 mL wine sample and 10 mL of titrant containing the desired chemical addition.

Desired Reduction in TA:

9.2 g/L – 8.0 g/L = 1.2 g/L reduction

The titration should overrun the desired endpoint TA to account for deviations in the "rule of thumb." I use a multiplier of 1.5.

Target Change in TA:

1.2 g/L x 1.5 = 1.8 g/L target reduction

Rule of thumb acid reduction for potassium carbonate (K_2CO_3) is 0.6 g/L addition reduces TA by 1 g/L and raises pH by 0.25 units.

K_2CO_3 addition for 1.8 g/L TA reduction:

1.8 g/L x 0.6 g/L K_2CO_3= 1.08 g/L K_2CO_3 addition

So, with a 10-mL titration, we want to reduce the TA of 100 mL of wine by 1.08 g/L. We must reduce the K_2CO_3 added to match our sample size of 100 mL.

Adjust to the bench trial sample size of 100 mL:

100 mL / 1,000 mL x 1.08 = 0.108 g K_2CO_3

Now make the titrant containing 0.108 g of K_2CO_3 in 10 mL of wine. I suggest making 100 mL of solution so that the same solution can be used for the follow-on sensory evaluations. When making acid adjustments, always dissolve the chemicals in wine, not water. To deliver the desired 0.108 g/10 mL in the titrant, an additional 0.108 g must be added to account for the acid reduction in this wine.

For 100 mL of titrant:

0.108 g / 10 mL wine x (10 mL / 100 mL) = 1.08 g K_2CO_3

To adjust the titrant wine:

1.08 g/L x (100 mL / 1,000 mL) = 0.108 g K_2CO_3

Total addition to 100 mL of wine for titrant:

1.188 g K_2CO_3

To conduct the bench trial, pour 100 mL of wine into a beaker and place it on a stir plate. Calibrate the pH meter and position the probe in the wine. Draw up 10 mL of the titrant in a syringe. Add the titrant 2 mL at a time. Allow the pH to stabilize and record it after each addition. After the 10 mL have been added, test and record the TA of the adjusted wine. The change in TA can be interpolated to approximate the TA at each step of the titration. The results show how the wine responded to each step of the titration. I find that plotting the results shows the desired characteristics very clearly. Use the data to select the TA and pH that are closest to your desired objectives for the wine and re-blend samples for sensory evaluation.

EXPLORE / THE ROAD LESS TRAVELLED

Sweet Wines And The Mystery Of Noble Rot

Scientist and Master of Wine, Caroline Gilby discovers the role of fungus in making some of the world's best sweet wines.

Like the Victorian doctor in Robert Louis Stevenson's horror tale, Jekyll and Hyde, Botrytis cinerea is a fungus with two very different faces. It's a ubiquitous presence in vineyards (and other fruit crops) across the world and in its grey rot form is estimated to cause anything from 15 to 40% crop losses, depending on the weather, each year (these are data for France).

Sweet success: the positive effects of fungi

However, exactly the same fungus is responsible for the phenomenon of 'noble rot' which is an essential ingredient in some of the most famous sweet wines: Tokaji Aszú, Sauternes, Trockenbeerenauslese, Coteaux du Layon and Alsace Sélection des Grains Nobles to name just a few.

But there are other ways of making sweet wines: by freezing to make eiswein; by drying grapes to make passito style wines like Vin Santo or recioto; and by stopping fermentation before all the sugar has been fermented (filtration, chilling or fortification are the techniques used here). However, no other method makes unfortified sweet wines that reach the ethereal heights of wines made with the help of noble rot.

Making eiswein, an even more costly business

Mysterious mold

Less is known about this fungus than perhaps should be, though it has recently been sequenced in the hope of understanding better how to control it - both for good and bad. It seems that to become noble rot, it needs ripe or nearly ripe grapes that have made it through the season undamaged by insects and without split skins due to rain. Then you need weather that alternates between humid periods to allow the fungal spores to grow, followed by drier days that prevent the fungus from going too 'rogue'.

Spores of *Botrytis cinerea* will be all over the vineyard and if there's enough moisture around, they can start to germinate, infecting the grape through tiny, microscopic-scale fissures in the skin or via tiny pores called stomata that allow air exchange. Once under the skin, the fungus grows a mycelium (a network of tiny threads called hyphae), turning the grape skin brown and secreting enzymes that break down cell walls, and feeding itself from the sugars inside the grape itself.

Finally, the fungus bursts back out of the grape skin, and as the surface (epidermal) cells are dead, they are no longer under control of the vine to stay hydrated, and they start to shrivel up.

Changes within the grape too

Alongside all this, there are significant changes within the grape - sugar gets used up by the fungus, (which prefers glucose, leaving more of the sweeter-tasting fructose behind) and grape acids (especially tartaric acid) get broken down too, but these losses are made up for by the water evaporation and concentration of berry pulp.

At the same time, the fungus breaks down compounds that give varietal character to some grapes like muscat and produces new compounds of its own. These include higher levels of glycerol, which gives smooth texture to so many sweet wines and Sotolon, a compound that gives notes of honey, sweetness and caramel. And there are at least 20 more that haven't been analyzed fully. Some grapes like riesling and Sémillon gain more complexity from noble rot than they lose in the breakdown of the esters that give their simple fruity varietal characters.

Some grapes more prone to rot than others

It seems that some grapes are more prone to infection by *botrytis than* others. This may be due to factors such as thickness of skins, number of stomata (those tiny breathing pores on the surface of plant tissues) and the plant's ability to produce antifungal compounds (the famous Resveratrol that is claimed by some researchers to give health benefits to wine is one such).

Who were the first to make wines from nobly rotted grapes?

Historically speaking, *botrytis cinerea* would have been a widespread challenge to winemakers ever since wine was first made. But evidence suggests it may have been the Hungarians who first documented deliberate use of noble rot in winemaking in Tokaj in the 16th century. The Germans were also early adopters with the first records at the famous Schloss Johannisberg around 1750 while it was well established in Sauternes by 1830.

Picking berry by berry

Each of these regions has developed subtly different styles of wine and winemaking though a common feature is the need to pick individual nobly rotted berries separately by hand, often requiring several trips through the vineyard as the fungus develops.

This makes sweet winemaking expensive and extremely labor intensive as well as giving tiny yields after all that shriveling (10-15 hectoliters per hectare would not be unusual compared to anything from 40 hectoliters upwards for dry wines). As an example, a good picker in Tokaj for instance may bring in just 10 kg a day.
Extracting juice from shriveled grapes: each region has its own technique.

The next problem is getting the thick juice out of shriveled berries, requiring long and quite firm pressing, typically using basket presses in regions like Sauternes, but in Tokaj, the climate is such that the region has its own special winemaking method.

Humid foggy mornings followed by bright, windy autumn afternoons are typical in a good vintage in Tokaj, giving both noble rot and extreme shriveling to form the so-called Aszú berries, which are too dry to give anything more than a trickle of syrup when pressed (this part is the legendary Eszencia, claimed to have miraculous medicinal properties). These Aszú berries instead get soaked in fermenting juice or young wine to dissolve their contents - and of course the quantity of Aszú grapes helps determine quite how sweet the wine is.

Whatever the details of the winemaking method, if winemakers are able to harness the magical power of noble rot, and avoid the scourge of its grey alter ego, the result can be utterly sublime and give luscious wines that can age beautifully for decades too.

Brooklyn Bridge Vaults

New York City, due to its vast size and age, is home to more than a few architectural surprises and secrets. The iconic Brooklyn Bridge, linking Manhattan and Brooklyn across the East River, is no exception. Deep beneath the bridge's anchorages on both shores, you'll find numerous passageways and vaults.

Why build passageways and vaults into a bridge? Constructed over fourteen years (beginning in 1869), the bridge cost 15.5 million dollars (approximately $396,614,851 when adjusted to today's dollars) with the architects and city of New York creatively putting the bridge to use to help offset the cost (the vaults were opened for use in 1876).

The vaults, thanks to their depth and stone construction, maintained a perfect 60 °F (16 °C). Wine importers and upscale restaurants around the city were more than happy to pay a premium to rent the vaults in order to protect their expensive wine and champagne collections. In the days before electric refrigeration and air conditioning, the vaults were a perfect way to protect wine against temperature fluctuations and spoilage.

Today, the vaults are no longer used for wine storage, either sitting vacant or housing far less glamorous things like piles of maintenance supplies for the crews that maintain the bridge.

References

Here is a list of hobby winemaking manuals and other materials in the Secretary's digital file. They are available for downloading by e-mail or via an internet transfer service. All are PDF format E-mail Ken Stinger at kbstinger@frontier.com

Scott Labs 2020 Winemaking Handbook - 21 mb - 59 pages
Scott Labs 2018 Cider Handbook - 24 mb - 49 pages
Scott Labs 2018-2019 Sparkling Handbook - 8 mb - 58 pages
A guide to Fining Wine, WA State University - 314 kb - 10 pages
Barrel Care Procedures - 100 kb - 2 pages
Enartis Handbook - 4.8 mb - 108 pages
A Review Of Méthode Champenoise Production - 570 kb – 69 pages
Sacramento Winemakers Winemaking Manual - 300 kb - 34 pages
Sparkling Wine brief instructions - 20 kb - 3 pages
The Home Winemakers Manual - Lum Eisenman - 14 mb - 178 pages
MoreWine Guide to red winemaking - 1 mb - 74 pages
MoreWine Guide to white Winemaking - 985 kb - 92 pages
MoreWine Yeast and grape pairing - 258 kb - 9 pages
Wine Flavors, Faults & Taints – 600 kb, 11 pages

Portland Winemakers Club
Leadership Team – 2021

President: **Bill Brown** bbgoldieguy@gmail.com
- Establish leadership team
- Assure that objectives for the year are met
- Set up agenda and run meetings

Treasurer: **Barb Thomson / Jim Ourada** bt.grapevine@frontier.com
jmourada57@gmail.com
- Collect dues and fees, update membership list with secretary.
- Pay bills

Secretary: **Ken Stinger** kbstinger@frontier.com
- Communicate regularly about club activities and issues
- Monthly newsletter
- Keep updated list of members, name tags and other data

Chair of Education / Speakers: **Rufus Knapp** Rufus.Knapp@fei.com
- Arrange for speakers & educational content for our meetings

Chair for Tastings: **Paul Sowray / Barb Stinger** davids1898@aol.com
kbstinger@frontier.com
- Conduct club tastings
- Review and improve club tasting procedures

Chair of Winery / Vineyard Tours: **Damon Lopez.** dlopez5011@yahoo.com
- Select wineries, vineyards etc. to visit
- Arrange tours
- Cover logistics (food and money)

Chair of Group Purchases: **Bob Hatt / Al Glasby.** bobhatt2000@yahoo.com
alglasby@gmail.com
- Makes the arrangements to purchase, collect, and distribute
- Grape purchases
- Supplies – These should be passed to the President for distribution.

Chair of Competitions: **Paul Boyechko / Michael Harvey** labmanpaul@hotmail.com
mharvey767@gmail.com
- Encourage club participation in all amateur competitions available. Make information known through Newsletter, e-mail and Facebook.

Chairs for Social Events **: Marilyn Brown & Mindy Bush** brown.marilynjean@gmail.com
mindybush@hotmail.com
* Gala / Picnic / parties

Web Design Editor: **Alice Bonham** alice@alicedesigns.org

Zoom Moderator: Jon Kahrs. jekahrs@aol.com