Screwcaps and reduction in wine

14 Dec 2004 by JR

15 Dec *Two interesting comments on this defence of screwcaps have already been received and appear below....*

We all know that the subject of corks v screwcaps is a horribly political one. There are now factions, especially in New Zealand where screwcaps are already so prevalent, which either do or do not claim that using screwcaps can lead to reduction and therefore hydrogen sulfide, in wine (look it up in The Oxford Companion to Wine!).

In response to the screwcaps-lead-to-reduction argument, Alistair Maling MW, Group Winemaker at Villa Maria in NZ which has gone entirely over to screwcap for reds as well as whites, chips in with the following explanation for the occurrence of hydrogen sulfide in some screwcapped wines:

Hydrogen sulfide has been present since the first wine has ever been produced. It is typically a by-product of a lack of nitrogen in the vineyard which then appears during fermentation when yeast which utilise nitrogen for energy become stressed through perhaps a cold or hot fermentation temperature and release hydrogen sulfide. The cure during fermentation is to make small additions of nitrogen in the form of diamonium phosphate (DAP). In essence the aim is to feed the yeast to stop them becoming stressed.

If a winemaker does not remove the hydrogen sulfide the risk is that the wine will form the more serious mercaptans and in essence be unusable. Hydrogen sulfide gives the wine a sulfurous rotten egg smell which overpowers the wine and prevents the true aromas of the wine being expressed. The addition of small amounts of copper sulfate has been proven to remove the hydrogen sulfide from wine if acted upon early enough in the process. Traditionally the French used copper pipes and fittings which they passed wine through and so removed any hydrogen sulfide. Similarly, if you have a glass of wine showing some of these rotten egg, sulfurous characteristics, putting a copper coin in the glass will remove the hydrogen sulfide and display the true characters of the wine. With the progression and development of winemaking most wineries now use stainless steel for transferring wine so have to consider other means of cleaning a wine up.

So, hydrogen sulfide is not a new phenomenon now that screw caps are being adopted as a closure. All wines are prone to reductive smells and flavours and need to be carefully checked before bottling by the winemaker. Often under cork these characters are absorbed by the cork whereas under Stelvin there is no chance or any flavour absorption so if the winemaker has not been vigilant then any reductive flavours will be more apparent. This, I believe, is a more pertinent and crucial issue. Given that screwcaps enable the wine to be expressed in its truest form, there is no hiding of any winemaking faults so the issue surrounding hydrogen sulfide is all about winemaking and not the closure.

It is also important to clarify the misplaced association of sulfurousness with excessive use of sulfur dioxide. Sulfur dioxide is a preservative to prevent wine from oxidising. If the winemaker adds excessive amounts of sulfur dioxide to a wine, the result is a wine that has a burning, sulfur character that will make people sneeze or cough and inhibits the expression of fruit in the bottle. This issue of excessive use of sulfur dioxide is not as widespread as it was in the past as winemaking practices have improved dramatically and most winemakers will attempt to add the lowest possible amount. Reductive flavours and smells however are not associated with inappropriate use of sulfur dioxide.

Gaston Leyack, Educational Director, Eberle Winery, Paso Robles, CA adds:

In reading your note on reductive aromas and Stelvin-type closures, I noticed both you and Mr. Maling forgot to mention altogether the effects of the lack of air contact for the wine in the bottle and the link that has with reductive aromas. So corks were not that bad, it seems...

The liner in the screwcap is the key here. There's a liner called Saranex that is permeable to oxygen thus reducing reductive (couldn't help that) characteristics in the wine as it ages in the bottle.

Saranex might become a compromise that allows those who prefer to use screwcaps for every wine they bottle, to use them for wines that might stay in the bottle more than a year. The alternative, cheaper liner works well for wines that will

be consumed very early.

Just thought that might add something of colour to the issue.

David Schildknecht, wine importer, OH and frequent contributor to the your turn forum reacts:

I hate having to start off yet another posting "I am not a chemist (or winemaker), but ..." But ...

I cannot recall having read elsewhere, nor frankly am I inclined to believe Alastair Maling's claim that "Often under cork [H2S] character[istic]s are absorbed by the cork whereas under Stelvin there is no chance for any flavour absorption so if the winemaker has not been vigilant then any reductive flavours will be more apparent. Given that screwcaps enable the wine to be expressed in its truest form, there is no hiding of any winemaking faults ..."

I have frequently heard it asserted that because a properly applied Stelvin totally seals out oxygen whereas a cork permits some to pass, reductive characteristics are diminished in cork-finished wines through the same chemical mechanism one would most naturally employ in the winery, i.e. aeration. That explanation makes sense, assuming (which I gather from discussing this topic with a couple of chemists is itself still controversial) that air indeed passes across a cork barrier.

I have heard some serious-sounding talk about adsorption - which I am even less scientifically competent to assess - in connection with the use of synthetic stoppers. But even my scientifically naive mind finds it difficult to imagine that the cork itself sucks up and somehow disposes of H2S. Like one of those "odor eaters" Americans hang behind their car windshields? Perhaps Maling - or any chemists out there - could clarify.

As to due diligence on the part of winemakers, I have often heard about a wine going into reduction at the time of bottling. I have myself attempted with vintners several miscarried unfiltered, unpumped bottlings of blends that were high in reduction-prone Syrah. Although you could argue ex post facto that they should have been given a good airing (if not by pumping through filter pores then in some less violent manner), the fact is that they tasted great going into bottle and reduced thereafter.

And speaking of Syrah, if one considers the most serious of Syrahs such as Côte Rôtie, Cornas and Hermitage, I am struck by the number of these which seem to be routinely plagued by reduction problems in the course of their bottle evolution. I remember a 1991 Cornas from Lemencier in which I kept faith. After a decade, it emerged from its funk. But in its youth I bought up this wine from the importer for a song and employed it in what seemed to my customers a parlour trick. Even if you poured only an ounce of the stuff and coated the inside of the glass, it still reeked of rotten eggs. But if you then shook that glass hard a couple of times, the tiny film of wine that remained began exuding its intense typicity of cherries, violets and chopped liver.

That all wines swing back and forth between oxidation and reduction is enshrined in the paradoxical-sounding term "redox potential" so beloved of oenologists. If this conveys any accurate message to the lay person, I would think it is that Stelvin closure - like so many techniques of modern winemaking - favours the reductive side of things. But to maintain with Maling that such favouritism is designed to "enable the wine to be expressed in its truest form" is merely tendentious. This would be like saying that after two hours in a decanter, my 1990 Ch Latour was no longer in "true form"!

Regarding what Maling claims is the "misplaced association" between reductive smells and the routine dosing of wines with sulfur dioxide, many winemakers have suggested that the answer to ameliorating the reduction in screwcapped wines is lowering the level of sulfur dioxide added at bottling. Certainly whether the grape variety in question is more prone in the course of winemaking to oxidation (like Grenache and Pinot) or to reduction (like Syrah and Sauvignon) is taken into consideration by winemakers in determining the right dosage of sulfur dioxide.

Finally, with respect to copper treatments mentioned by Maling, one should point out that many serious winemakers consider this a far too radical measure tending to strip the wine of more than merely H2S. I try never to travel without a few copper (pre-Euro!) *Gröschen* in my pocket, but my olfactors and taste buds have always told me that more was happening in the glass on those occasions when I was forced to use them than just the elimination of reduction off

odours.

Incidentally, some of the above issues are interestingly discussed by Paul White in the most recent (second) issue of *The World of Fine Wine*. White is as sceptical of Stelvin as Maling is supportive. [Paul White, an American based in NZ, has been the most vocal proponent of the "Stelvin causes reduction" scare. JR]