

Preparing for Smoke taint and where to access support activities

Presented by Con Simos
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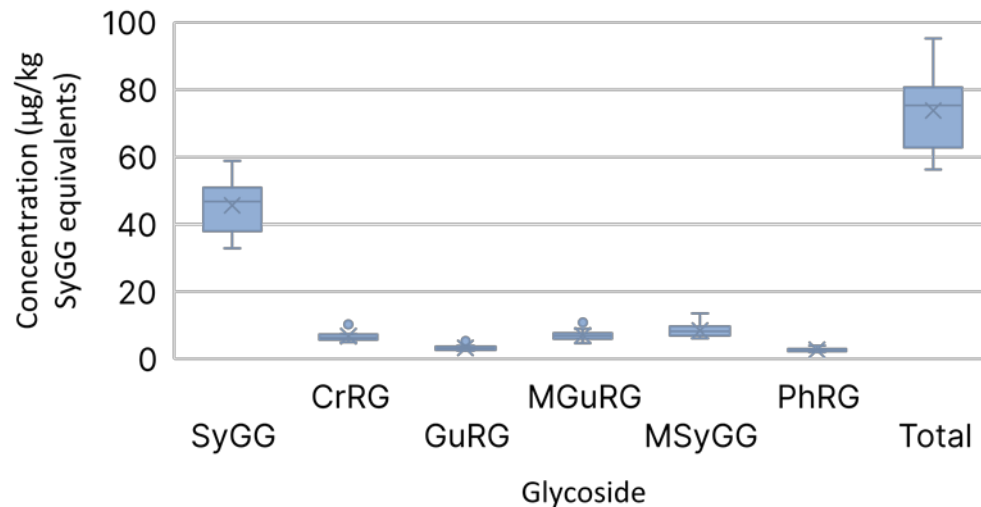
Vineyard variability

Smoke taint, highly variable.

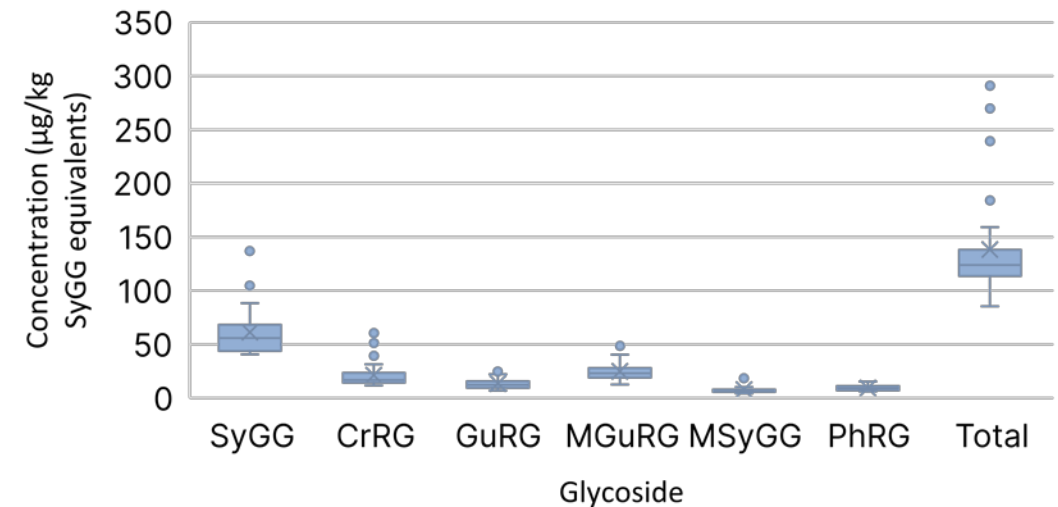
Every fire event is different, (timing, location, intensity, duration, weather conditions).

Do not assume you have a problem because your neighbour does?

Determine level of risk specific to your location.



smoke glycosides in Chardonnay I10V1 grapes (n=17) from a block (1 ha) exposed to smoke from a bushfire



smoke glycosides in Pinot Noir MV6 grapes (n=30) from a block (20 rows, 57 x 207m) exposed to smoke from a bushfire

What to test

Should I test every block (& variety) in the same vineyard?

Depends on the topography.

Start with the earliest ripening variety first.



What to test

Best to test grapes only

Juice – How the juice is extracted will have a big impact on the resultant analysis.

Wine – If it is from a micro-ferment then it would be ideal although not always practical.

Take a representative sample (min 30 bunches)

Field variability of volatile phenols and smoke glycosides is typically within 20%

<https://www.awri.com.au/wp-content/uploads/2019/12/grape-sampling-smoke-taint-fact-sheet.pdf>

Take bunch sample (5-10kgs), subsample 500 g berry sample for analysis, the balance to micro-ferment.

Record date/ variety/ level of ripeness / GPS location

Good practice to freeze a sample for future reference (legal, access state govt support).

What to test

It's your choice which lab to use!

Different labs will provide different results. – Report of cross-validation of smoke taint analysis offered by WineChek (Vintessentials) and the AWRI Affinity lab.

Measure different marker compounds and using different techniques.

Your lab should provide not only provide the analysis but also interpret the results.

Copy is available from the AWRI website

<https://www.awri.com.au/wp-content/uploads/2020/12/Smoke-analysis-cross-validation-report-FINAL-30-Nov-2020.pdf>



Wine Victoria

Bushfire technical package of programs

Program activity: cross-validation of 2020 grape and wine smoke analytical data between Vintessential and AWRI Commercial Services laboratories

Report prepared by Eric Wilkes (AWRI Commercial Services) and Greg Howell (Vintessential Laboratories)

For more information about the Wine Victoria Bushfire Technical Response Program, please contact Richard Howden, Project Manager, 0448 568 158 or richard@hallhowden.com.au.

Wine Victoria has received funding from the State Government of Victoria to facilitate this activity.

When to test

Ideally 2-3 weeks before harvest window,
(this may not always be possible).

Allow sufficient time to send samples to your lab and
conduct a micro-ferment

Is early exposure an issue?

2020 smoke events showed that exposure to smoke at
pea size has a greater effect than previously believed.

Shuttle service organised by the state
associations and departments of
Agriculture

Allow sufficient time to organise grape movement
permits



How to conduct micro-ferments

<https://www.awri.com.au/wp-content/uploads/2019/12/grape-sampling-smoke-taint-fact-sheet.pdf>



The Australian Wine
Research Institute

Fact Sheet
WINEMAKING

Small-lot fermentation method for smoke-exposed grapes



Assessing the potential for grapes to produce smoke-affected wine

When vineyards and grapes are exposed to

made from grapes that have been exposed to smoke.

The AWRI recommends that grapes are also



<https://www.youtube.com/watch?v=GaM3wXt7AgI>



Small-lot fermentation method for smoke-exposed grapes

The AWRI



Micro-ferments

The micro-ferment is intended to replicate the conditions of a large scale ferment.

We recommend fermentation on skins for whites.

Why? Because this gives the max level of risk exposure. Although it is your choice.

It is complicated to undertake if you don't have the facilities and the right equipment

Most regions will set up a centralised location for growers to access this capability.

Make an assessment based on sensory and analytical results



Sensory - Building a regional capability

Sensory procedure for assessing wine or small-lot fermentations for smoke taint

based on the principles of
sensory science and
quality control

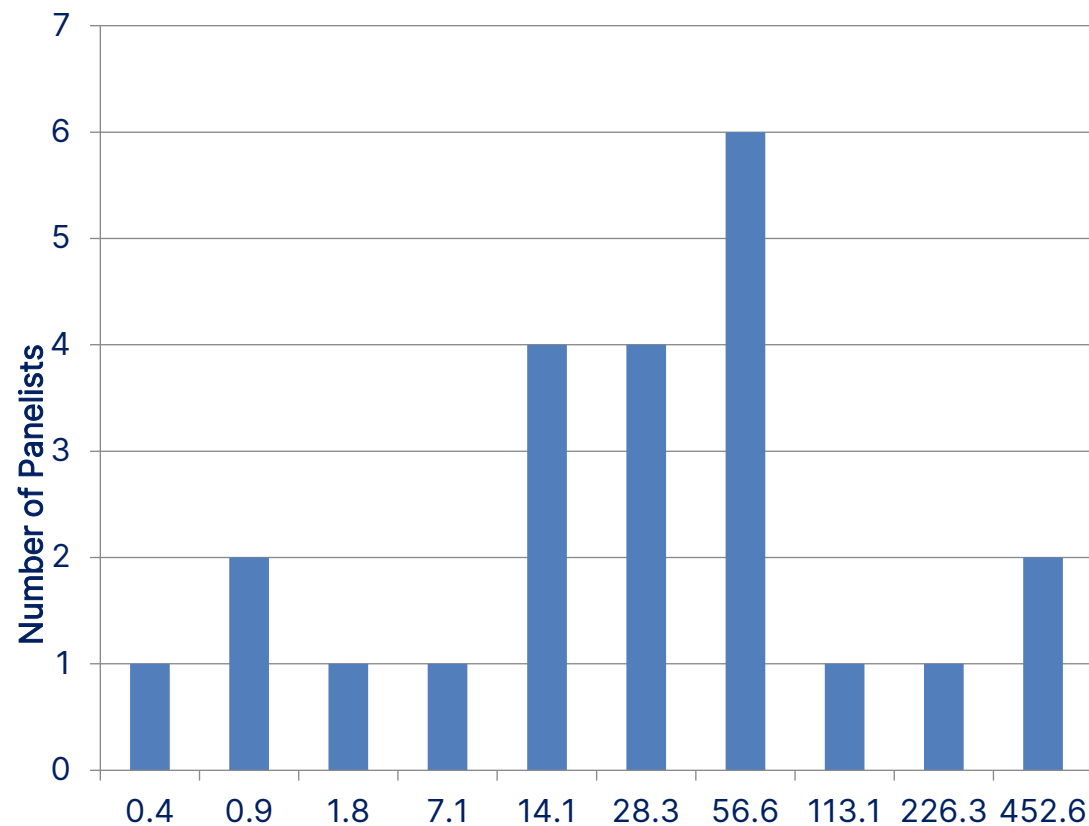
adapted from method
used for the AWRI smoke
taint evaluations

sensory rigor to perform
evaluations objectively

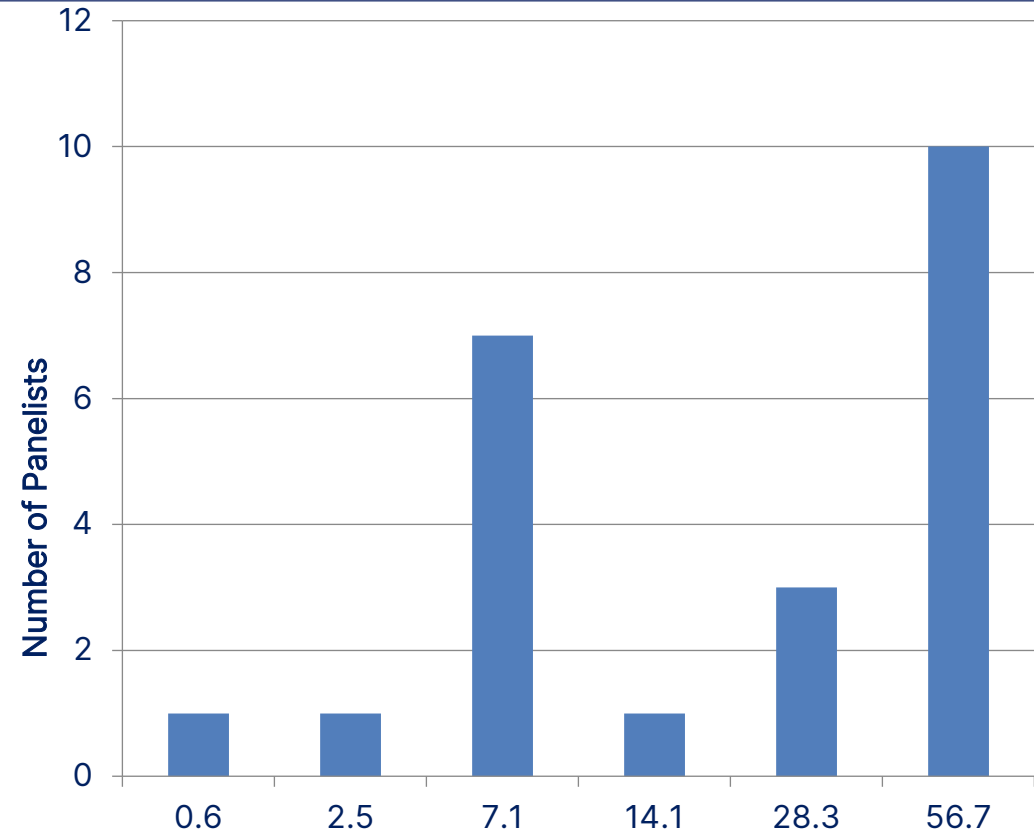
samples can be assessed
for potential smoke taint
by trained tasters within
your own region



50% of people have a lower threshold than the average



Best Estimate Threshold (µg/L)
guaiacol - Aroma
Merlot base



Best Estimate Threshold (µg/L)
m-cresol - Aroma
Merlot base

The compounds have an additive effect

Sensory - Building a regional capability



Sensory - Building a regional capability

The objective is to build a producer and regional capability to effectively assess smoke taint.

Wide variation in sensitivity to smoke taint.

Very difficult exercise.

The AWRI sensory team developed a methodology to assess tainted wines.

- Propensity for false positives.
- Include controls and duplicates.
- Mandatory 2 mins between tasting.
- No more than 12 wines per session.
- >8 member panel if possible.
- 0-9 rating.



Sensory - Building a regional capability

Browser address bar: <https://www.youtube.com/watch?v=dISlqCrZa0g&t=239s>

YouTube AU Search [Microphone] [Share] [Like] [Subscribe]



<https://www.youtube.com/watch?v=GaM3wXt7Agl>

North East Victoria Sensory Panel

The workshop was conducted in Feb 2021 at Brown Brothers, Milawa.

19 candidates, of which 16 were sensitive to smoke

The AWRI can offer more training if the region requests it.

It will be up to the region if you wish to incorporate sensory into a regional response

AWRI will provide technical support, including the use of software to conduct tastings and advise how to perform the stats



Regional panel sensory procedure

blind sample coding - 3 digit codes

standardised sample presentation

proper rinsing and resting intervals

balanced random evaluation order across judges

minimisation of sensory fatigue and carryover

inclusion of a negative, clean control

blind replicate included or all wines repeated

avoidance of sensory and other distractions

use of a structured evaluation form



The Australian Wine
Research Institute

Regional panel smoke taint sensory evaluation procedure

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Background levels data base

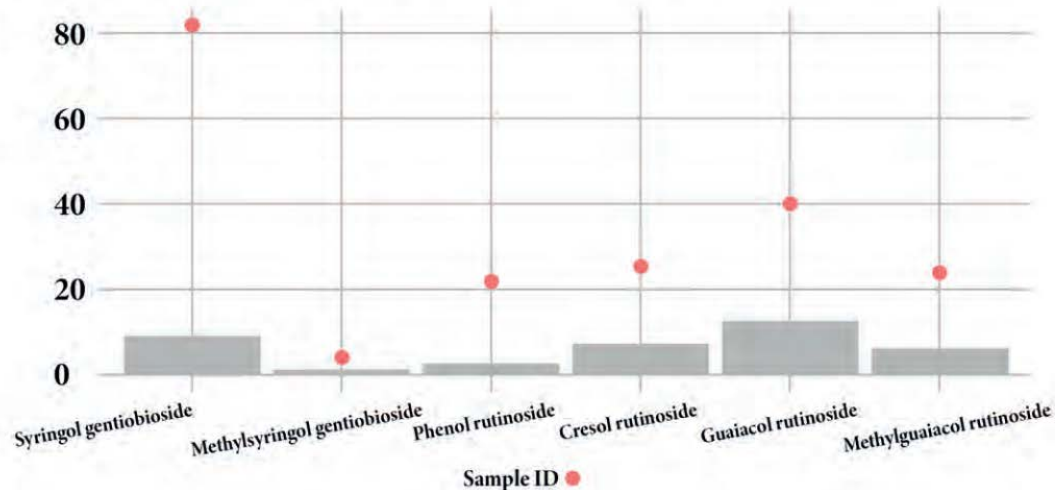
Database has expanded significantly

21 varieties

765 grape samples

732 wine samples

Wine glycoside levels (ug/L) in Shiraz



Check for updates

Coulter et al.

Baseline concentration of smoke marker compounds 459

Concentration of smoke marker compounds in non-smoke-exposed grapes and wine in Australia

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Abstract

Background and Aims: An elevated concentration of several volatile phenols and their glycosides in grapes and wines is associated with exposure of grapes to forest fire smoke. Interpretation of phenol compositional data from grapes or wines, however, is complicated by the fact that traces of these compounds can be detected in non-smoke-exposed samples. Hence, the concentration of smoke marker compounds was investigated with the aim of providing a reference data set to help determine smoke exposure.

Methods and Results: Thirteen phenolic compounds were measured in non-smoke-exposed grape berries and unoaked wines made from 12 cultivars collected from multiple regions across Australia over four vintages. The grapes and wines contained a low concentration of several volatile phenols and their glycosides. These varied in concentration between cultivars but showed little variation between regions and vintages. The maximum concentration observed for any analyte was below 15 µg/kg in grapes and approximately 15 µg/L in wine.

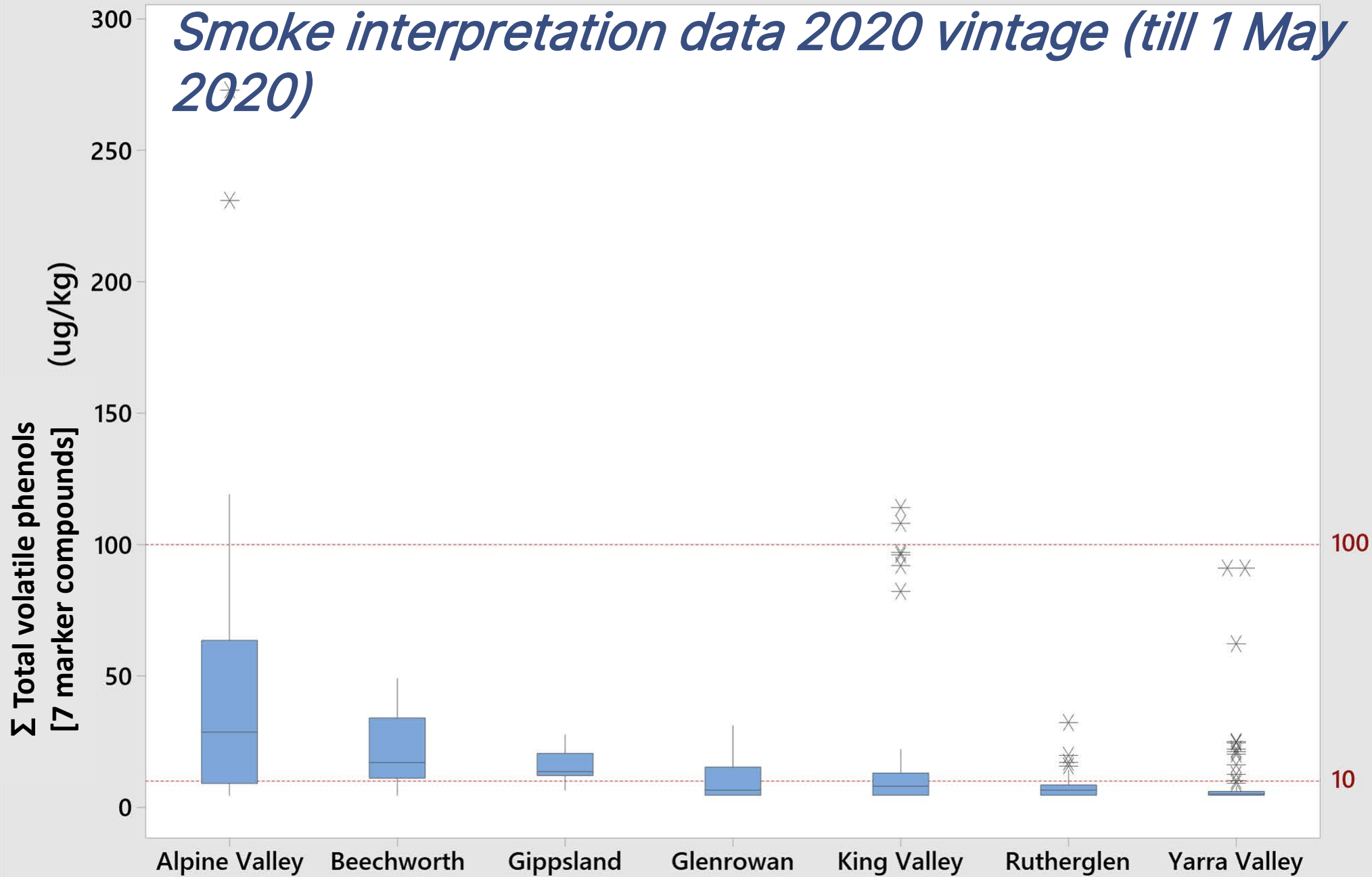
Conclusions: The results for smoke marker compounds should be considered on a per-cultivar basis when determining smoke exposure. Interpretation of results for a potentially smoke-exposed sample can be achieved based on comparison with the 99th percentile values reported here. Use of the interpretation system described should be limited to determining smoke exposure and not smoke taint.

Significance of the Study: This study provides a comprehensive set of data that defines the upper limits of smoke marker compounds expected in Australian grapes and wines from non-smoke-exposed vineyards that can be used for determining the likelihood of smoke exposure.

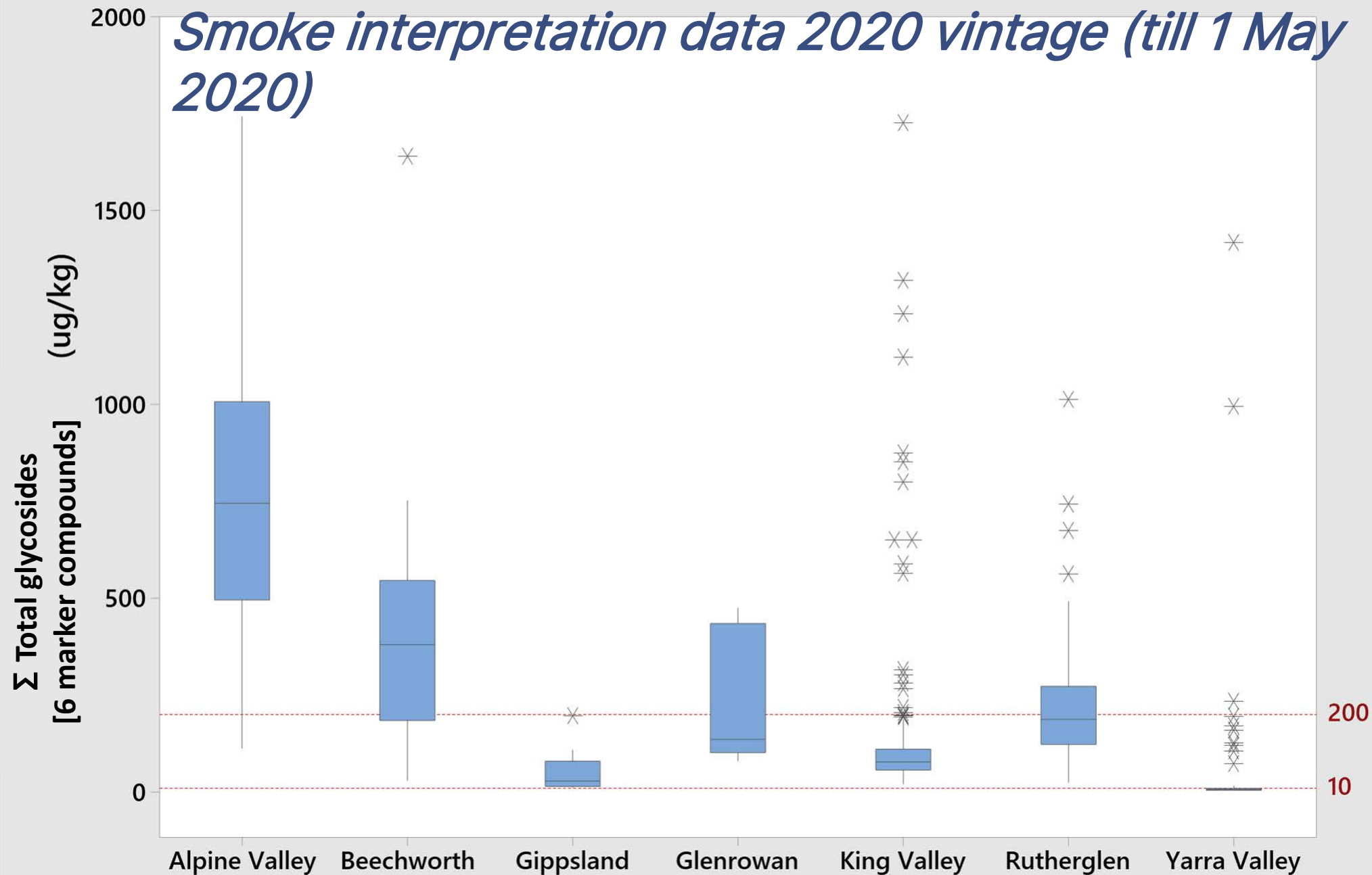
Keywords: glycosides, grapes, percentiles, smoke exposure, volatile phenols

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/ajgw.12543>

Smoke interpretation data 2020 vintage (till 1 May 2020)



Smoke interpretation data 2020 vintage (till 1 May 2020)



Winemaking trial – Pinot Noir 2020 (single treatments)

Treatment	Volatile phenol (guaiacol)	Volatile phenol (4-methylguaiacol)	Σ Total glycosides
Grape sample	4	0.5	38
Rose Control	4	0.5	10.5
Rose +1g/L CASPF Carbon	2	0.5	8.5
Hand Pick 5 day press 15°C	11	3	47.5
Hand Pick 5 day press 25°C	10	2	66
Hand Pick 12 day press 15°C	11	2	46.5
Hand Pick 12 day press 25°C	10	2	68
Hand Pick Carbonique maceration 18 days	14	4	33.5
Machine Pick 12 Days Press 15°C	12	3	75

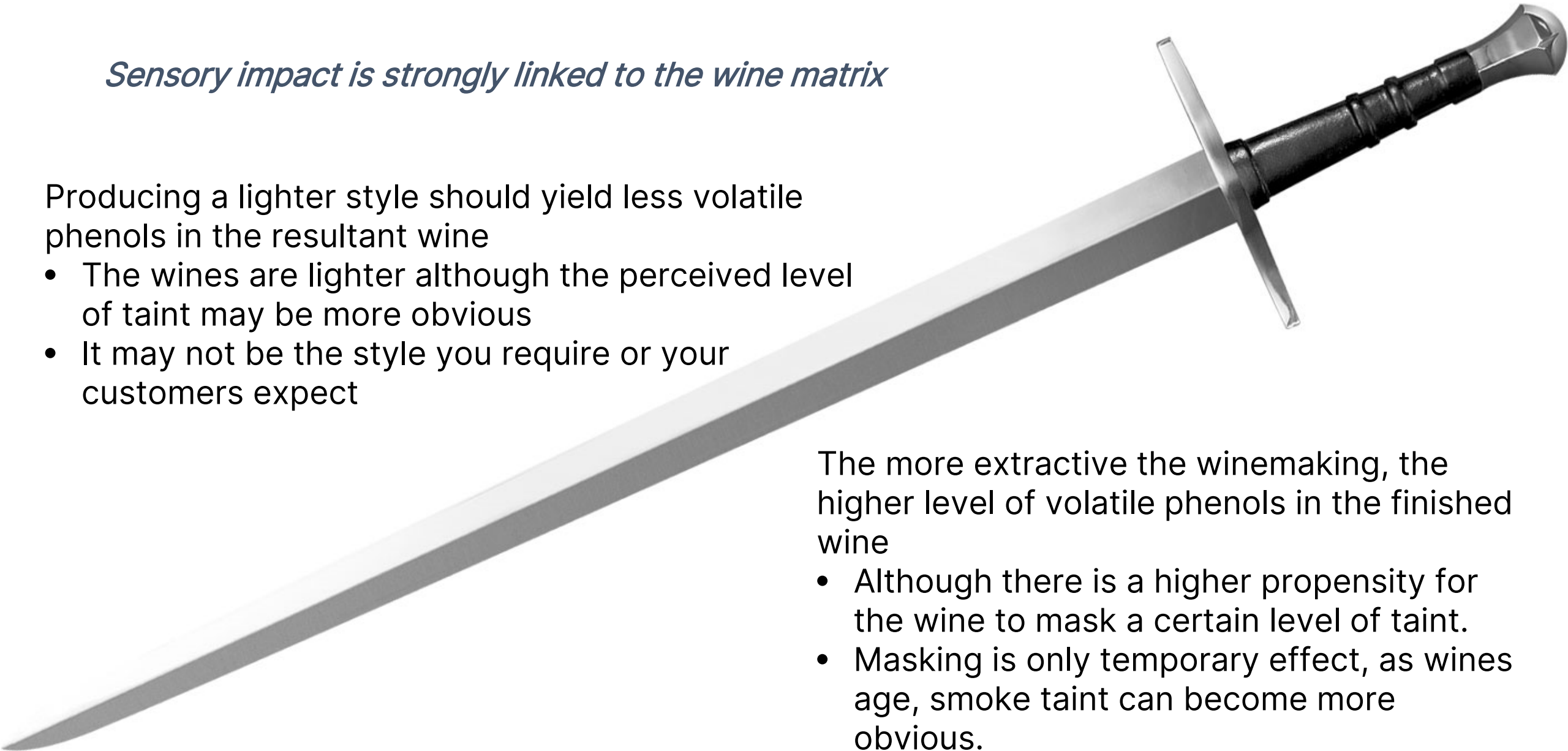
Sensory impact is strongly linked to the wine matrix

Producing a lighter style should yield less volatile phenols in the resultant wine

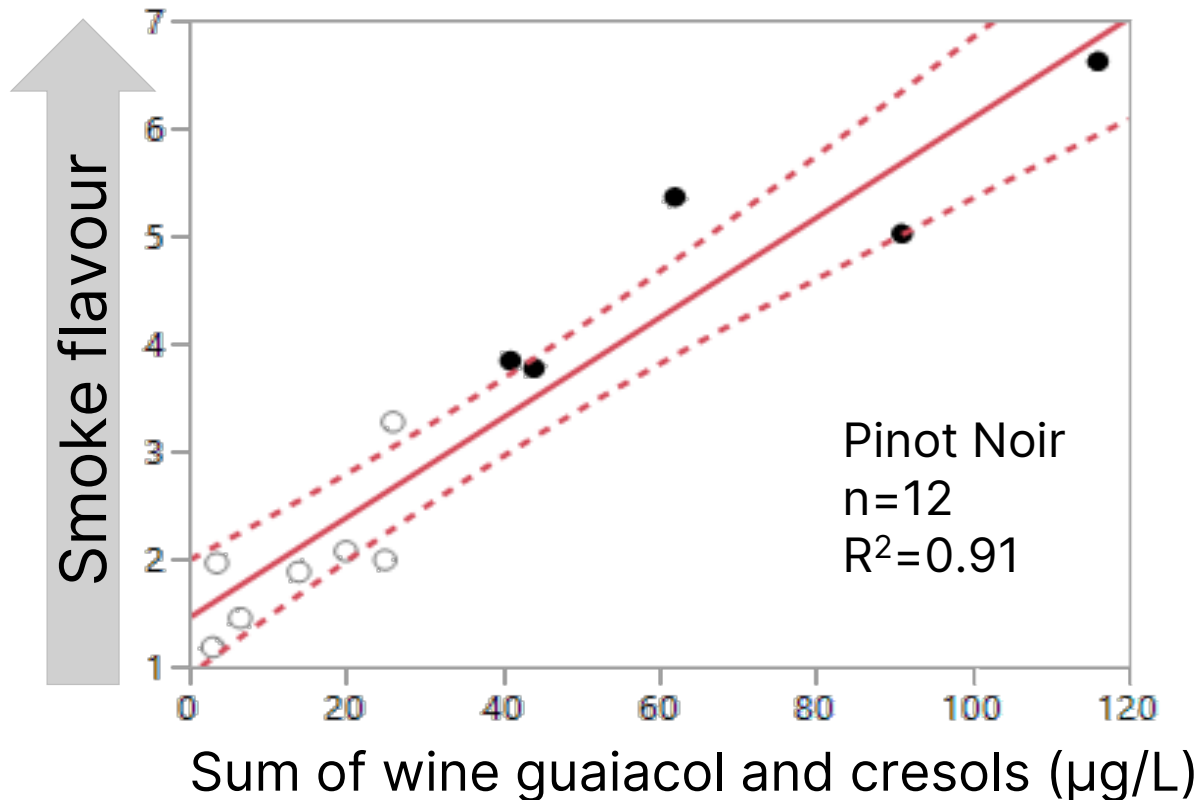
- The wines are lighter although the perceived level of taint may be more obvious
- It may not be the style you require or your customers expect

The more extractive the winemaking, the higher level of volatile phenols in the finished wine

- Although there is a higher propensity for the wine to mask a certain level of taint.
- Masking is only temporary effect, as wines age, smoke taint can become more obvious.



Linking wine compounds to smoke flavour



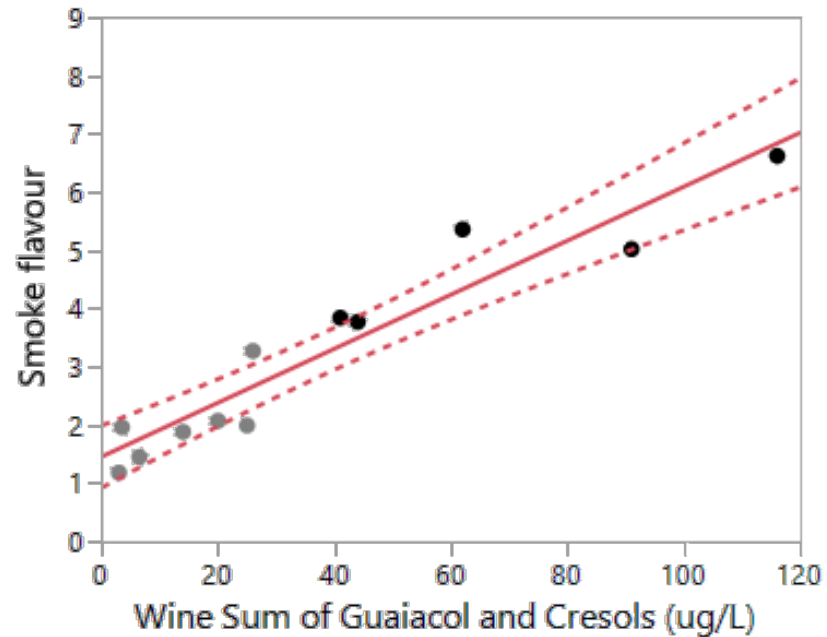
The sum of (guaiacol + *m*-cresol + *o*-cresol + *p*-cresol) in wine

enabled very good prediction of **smoke flavour** intensity

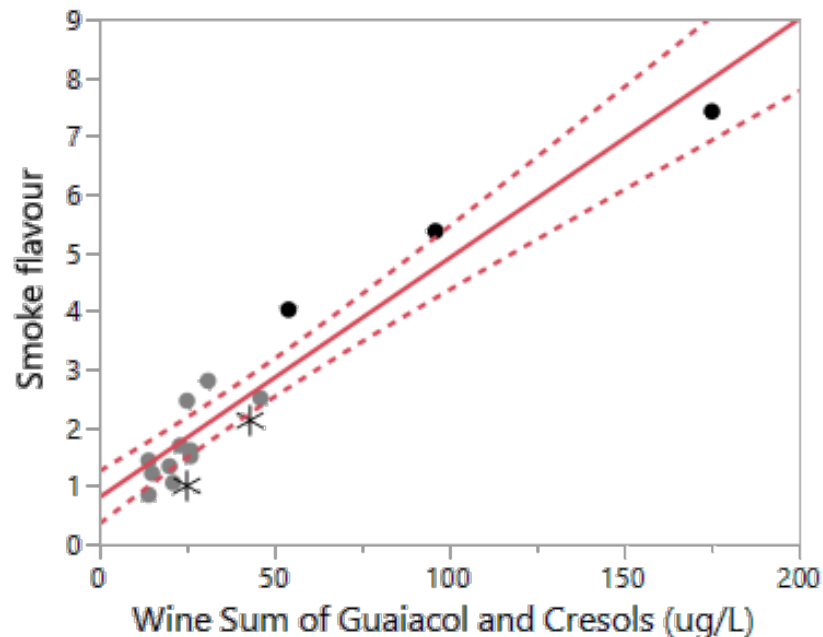
even when compounds were below individual thresholds

- Discernible smoke flavour
- Not significant

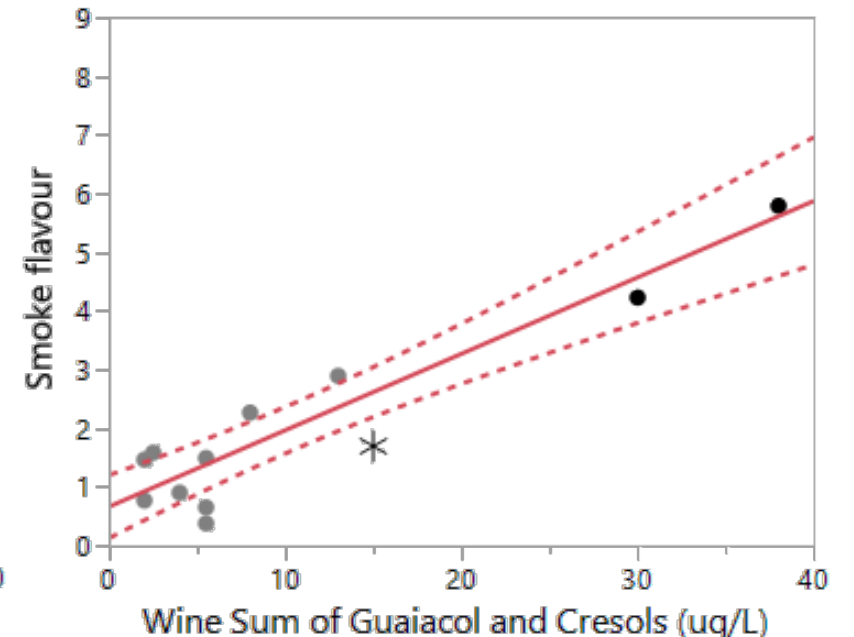
Linking wine compounds to smoke flavour



Pinot Noir $R^2=0.91$
n=12



Shiraz $R^2=0.91$
n=16



Chardonnay $R^2=0.89$
n=12

- Discernible smoke flavour
- Not significant

Acknowledgements

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Wine Australia

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Jobs,
Precincts
and Regions



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