Regions, Wine Quality and Sensory Measures in Cabernet Sauvignon

Dr Sue Bastian
University of Adelaide
Grape quality parameters that influence wine flavour and aroma: identification, confirmation and application to industry

* Jan 2013 – June 2017
* Aims to define objective grape measures to predict wine quality
OUTLINE

* Background of Project
* Importance of Region
* Preliminary data
* Future work
Volatile and non-volatile compounds in wine majorly responsible for wine aroma and flavour

Flavour compounds have multiple origins

Grapes = major raw material in winemaking process
Significant evidence points to grape composition having significant impact on wine sensory properties.

- Varietal
- Vintage
- Vineyard Management
- Region
LINKING GRAPE MEASURES TO SENSORY PROPERTIES OF WINE

OBJECTIVE MEASURES OF GRAPE FLAVOUR POTENTIAL

PREDICTION OF WINE SENSORY ATTRIBUTES FROM GRAPE COMPOSITION

- BETTER HARVEST DECISIONS
- ASSESS QUALITY IN THE VINEYARD
- PRODUCE GRAPES WITH DESIRED CHEMICAL PROFILE TO PRODUCE WINE WITH A SPECIFIC FLAVOUR PROFILE
Earlier studies have identified:
1. Grape components as potential markers for red wine sensory attributes
2. Grape composition impacts fermentation derived volatiles

Research Aims

* Test & validate the effectiveness of potential grape markers of sensory properties in wine

  Broad range of commercial Cabernet Sauvignon grapes

* Also investigate other grape compounds, genes, proteins and physical measures

* Determine if these grape derived indicator compounds or characteristics can be adapted for use in in Chardonnay
COMMODITISATION of AUSTRALIAN WINE

Success of commercial brands and fear all wines stereotyped as such
Commercial Wine & High quality wine that display regional characteristics

Challenge for the Australian wine sector is to have both types of wine realised and accepted by those markets
THE CONCEPT OF REGION

* Region represents an important strategy for product differentiation

* Terroir = farming sites within a given geographical area will share soil composition, climatic and managerial practices

“Conformity is the jailer of freedom and the enemy of growth”  John F. Kennedy
WINE GROWING REGION IS A CHIEF COMPONENT OF WINE AROMA AND FLAVOUR

Influence of Yeast Strain, Canopy Management, and Site on the Volatile Composition and Sensory Attributes of Cabernet Sauvignon Wines from Western Australia

Anthony L. Robinson, Paul K. Boss, Hildegarde Heymann, Peter S. Solomon, and Robert D. Trengove

Authentication of different terroirs of German Riesling applying sensory and flavor analysis

Andrea Bauer, Sascha Wolz, Anette Schormann and Ulrich Fischer

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AUSTRALIAN WINE REGIONS & GEOGRAPHIC INDICATIONS (GIs)

The broadest region is South Eastern Australia

Then there are the individual States:
  e.g. Victoria, NSW, South Australia, Tasmania etc.

Then there are ZONES:
  e.g. Adelaide Super Zone, Murray Darling Zone etc.

Each ZONE can be divided into REGIONS:
  e.g. Barossa Valley, Clare Valley etc

Each REGION can be divided into SUB-REGIONS

* Label Integrity Program (LIP) late 1980s

* Lack of regional boundary definitions

* 1994 AWBC Act establishes a type of appellation system

www.apluswines.com
AUSTRALIA

The Oldest Wine Region in the World!
Australia’s land mass is much larger than Europe’s.
OLD & COMPLEX SOILS

* Has been a single continent for nearly 100 million years

* Ancient, eroded and most complex soils

Currently over 65 GI’s in Australia

No strict appellation regulations

Combination of grape variety and diverse regions offers large potential for new/unique wine styles

2013 CABERNET SAUVIGNON GRAPE & WINE MEASURES

* Bunch, berry mass, pH, TA, YAN, Brix
* Targeted & non-targeted grape volatiles
* Grape Anthocyanins, Flavonols, Tannins & Amino Acids
* Wines assessed for basic chemistry, volatile composition, MIR, sensory attributes & quality
* Analysis is underway of the combined datasets to look for predictive models
2013 CABERNET SAUVIGNON GRAPE SAMPLES

* 25 diverse vineyard sites from 8 different regions across South Australia
* Target TSS 23-25°Brix

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<td>BAROSSA VALLEY</td>
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<td>CLARE VALLEY</td>
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2013 CABERNET SAUVIGNON GRAPE SAMPLES

* 25 small scale wines (50kg)
Panel of assessors (n = 10) trained and generated a vocabulary for the wines

Samples were randomly presented blind and evaluated in triplicate in my 12 booth sensory laboratory
# Descriptive Analysis of Wines

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<th>COLOUR</th>
<th>AROMA</th>
<th>TASTE</th>
<th>PALATE FLAVOUR</th>
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<td>HUE</td>
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<td>SAVOURY</td>
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<td>EARTHY LEATHER</td>
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EXPERT WINE QUALITY PANEL
* **Quality Definitions**

* **A (premium quality)**
Wines that are complex with good structure and tannins, expression of varietal and regional characteristics, balanced and have good length.

* **B (high quality)**
Wines with some varietal expression, flavour intensity that is above average, with good tannin and body

* **C (moderate quality)**
Wines that are simple, soft and low to moderate in flavour intensity/varietal expression

* **D (low quality)**
Wines that either have no varietal expression, lack balance, or contain faults
Dark fruit, med-hi flavour intensity, varietal definition, balanced, complex excellent colour.

Green, lack varietal definition, confected, lack freshness, simple, dull, lack structure, poor colour.

Low-med flav' intensity light

Low-medi flav' intensity light
SENSORY ATTRIBUTES THAT DEFINE
CABERNET SAUVIGNON WINE QUALITY

Dark fruit, med-hi flavour intensity, varietal definition, balanced, complex excellent colour.

Green, lack varietal definition, confected, lack freshness, simple, dull, lack structure, poor colour.
2014 CABERNET SAUVIGNON GRAPE SAMPLES
Conclusion & Future Work

- The first vintage has shown
- Major driver of sensory differences in Cabernet Sauvignon is Region of Origin
- There is potential to develop models to predict wine style from grape measures
- Australian wine sector has the opportunity to produce many new and unique wine styles to meet consumer needs

- A third vintage will increase our sample size to 75
- Increased statistical power to test all data sets for grape berry predictors of wine sensory characters
- Will determine if grape indicator compounds can be adapted for use in Chardonnay
ACKNOWLEDGEMENTS

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