Centre for Expertise in Smoke Taint Research

Dr Mark Downey, Director
Overview

- Background
- Current knowledge
- Knowledge gaps
- Centre for Expertise in Smoke Taint Research
- Aims & Objectives
Fire in the landscape

• Co-evolution of ecosystems with fire
  – Germination
  – Establishment
  – Reproduction
  – Nutrient cycling
  – Biodiversity

• Fire ecology
Destructive force

- Australia’s deadliest bushfires
  - Black Saturday 2009 Victoria
  - Ash Wednesday 1983 South Australia
  - Black Friday 1939 Victoria
  - Black Tuesday 1967 Tasmania
  - Black Sunday 1926 Victoria
Impact on viticulture

• Awareness raised
  – 2003 Alpine Fires in Victoria
  – WA fires in 2003 and 2004

• Large scale viticulture relatively recent
  – Tobacco in NE Vic.
  – Apples in Mt Barker, WA
  – Forestry & dairy in Margaret River
Impact on viticulture

- A lot of work done by AWRI
  - Analytical methods for routine analysis

- Previous research from other industries
  - Smoke composition research, human health
  - Food technology, eg. smoked meats

- DAFWA
  - Field trials, sensitivity during development

- 2006 bushfires cost Victorian producers $100 million
What is smoke taint?

• Smoke taint descriptors are many and varied
  – smoky, woody, leather, coffee, chocolate, truffle

• A little bit adds complexity

• But too much .....  
  – smoked salmon, salami, bacon, smoky bacon, roast meat, gamey, earthy, burnt toast, cigar box, cigarette, ash, cold ash, charcoal, ashtray, tar, bitter, acrid
What is smoke taint?

• 2 key markers:
  – guaiacol & 4-methyl guaiacol

• Other compounds include:
  – 4-ethylguaiacol, 4-propylguaiacol, 4-vinyl guaiacol, vanillin, eugenol, isoeugenol, phenol, 4-ethylphenol, 2,4-dimethylphenol, 4-propylphenol, cineole, o-cresol, syringol, methylsyringol, syringaldehyde

• Dose response
What is smoke taint?

• Some varieties produce these compounds naturally
• Aging in oak barrels
  – Toasted barrels
  – Staves, chips, some tannin additives
• Higher in smoke exposed grapes
• Higher in wines made from smoked grapes
What is smoke taint?

- Increases in wine over time
- Free compounds are volatile
- Bound compounds
  - Non-volatile
  - Attached to a sugar, eg. glucose
  - Sugar is cleaved off during winemaking and aging
What don’t we know

• How smoke taint compounds get into the grapes
• How to stop smoke compounds getting into grapes
• How to stop smoke compounds getting into wine
• What to do after it gets in
• How much smoke is enough (or too much)
Centre for Expertise in Smoke Taint Research

- Election commitment by Minister Peter Walsh
- $4 Million over 4 years (2011 - 2015)
- Announced May 2011
- Formally launched May 2012
Centre for Expertise in Smoke Taint Research

- Virtual Centre based in Mildura
  - Supported by a recently opened experimental winery

- Major collaborators:
  - AWRI
  - DAFWA
  - Curtin University
  - University of Adelaide
Centre for Expertise in Smoke Taint Research

**Staff**

**Mildura**
- Dr Mark Downey, Director
- Dr Nicole Cain, Research Scientist
- Mr Peter Rogers, Experimental Winemaker
- Mr Fred Hancock, Senior Viticultural Technical Officer
- Mr Joel Beloy, Laboratory Technician

**Melbourne**
- Dr Craige Trenerry, Senior Research Scientist
- Dr David Allen, Senior Analytical Chemist
- Mr Tim Plozza, Analytical Chemist
- Ms Kristen Pitt, Project Support Officer
- Mr Subhash Sharma, Spatial Information Scientist

**Rutherglen**
- Mr Ricky James, Extension Specialist
Objectives

- Increase understanding of how smoke affects wine composition by:
  - Identifying smoke taint compounds and their mode of entry
  - Identifying the impact of different fuel types
  - Determining the relative impacts of controlled burning
  - Predicting the shelf-life of exposed wines
Objectives

• Explore strategies to reduce uptake of smoke
• Measure and manage risk
• Facilitate evidence based communication between industry and fire & land managers
Outcomes

- Remove the fear and uncertainty
- Tools to measure & manage risk
- Dialogue and decision-making informed by science
- A viable wine sector in bushfire prone regions
Questions?