

# Smoke flavour: linking chemical composition and sensory properties in smoke-affected wines

# AWRI

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## Can smoke exposure markers predict 'smoke' flavour in wine?

Volatile phenols and phenolic glycosides can be used to identify smoke exposure in grapes and wine. But which of these markers best predicts 'smoke' flavour in wine?



A koala joins a CFS volunteer who was fighting the bushfire at a Lobethal vineyard. Picture by Dale Adams from Eden Hills CFS used with permission

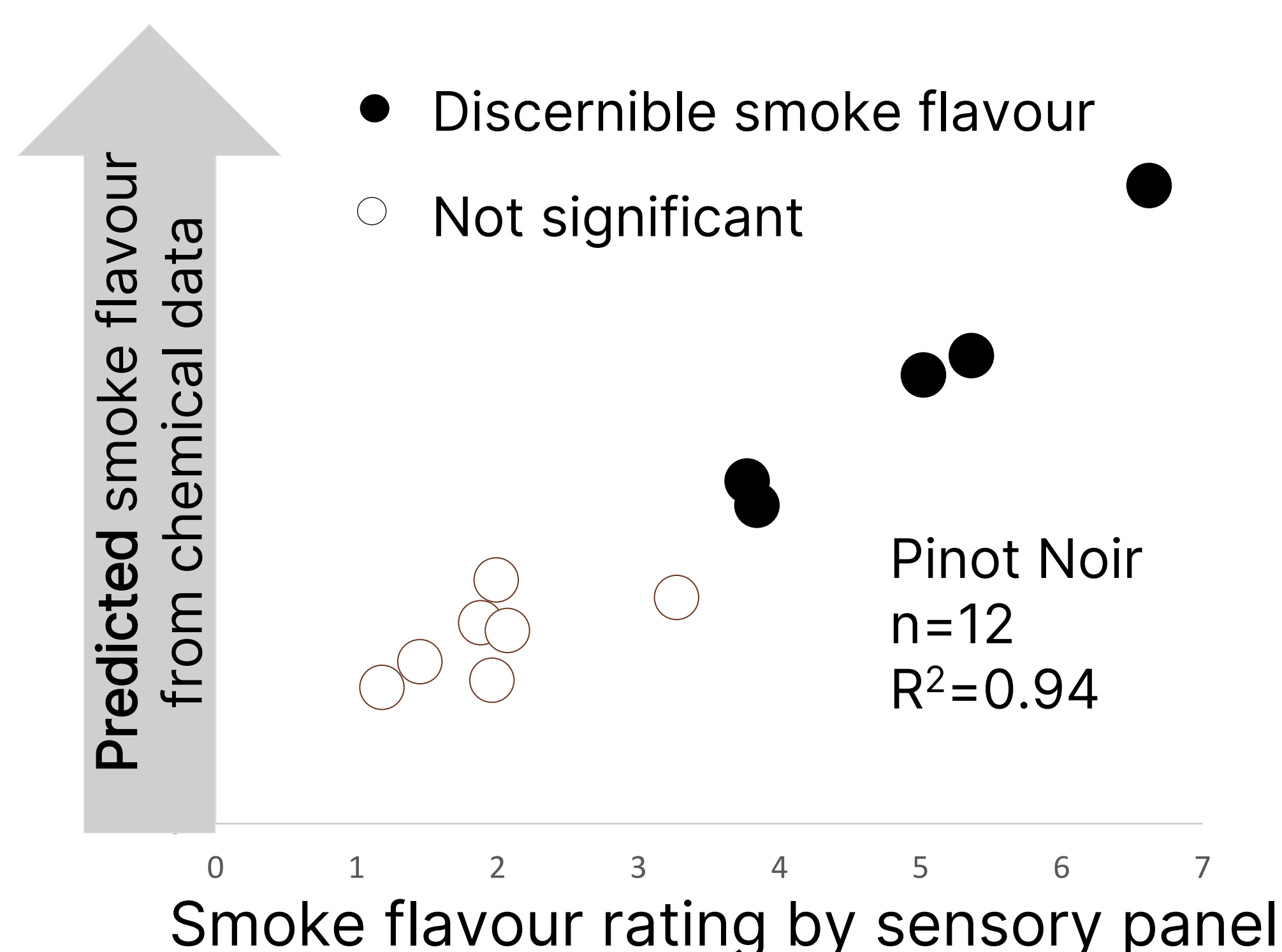
### Grapes with a range of smoke exposure

- Six sets, vintage 2020, n=65
- Chardonnay, Pinot Noir and Shiraz
- From smoke-affected regions in New South Wales, ACT, South Australia and Victoria
- Unaffected samples included as controls

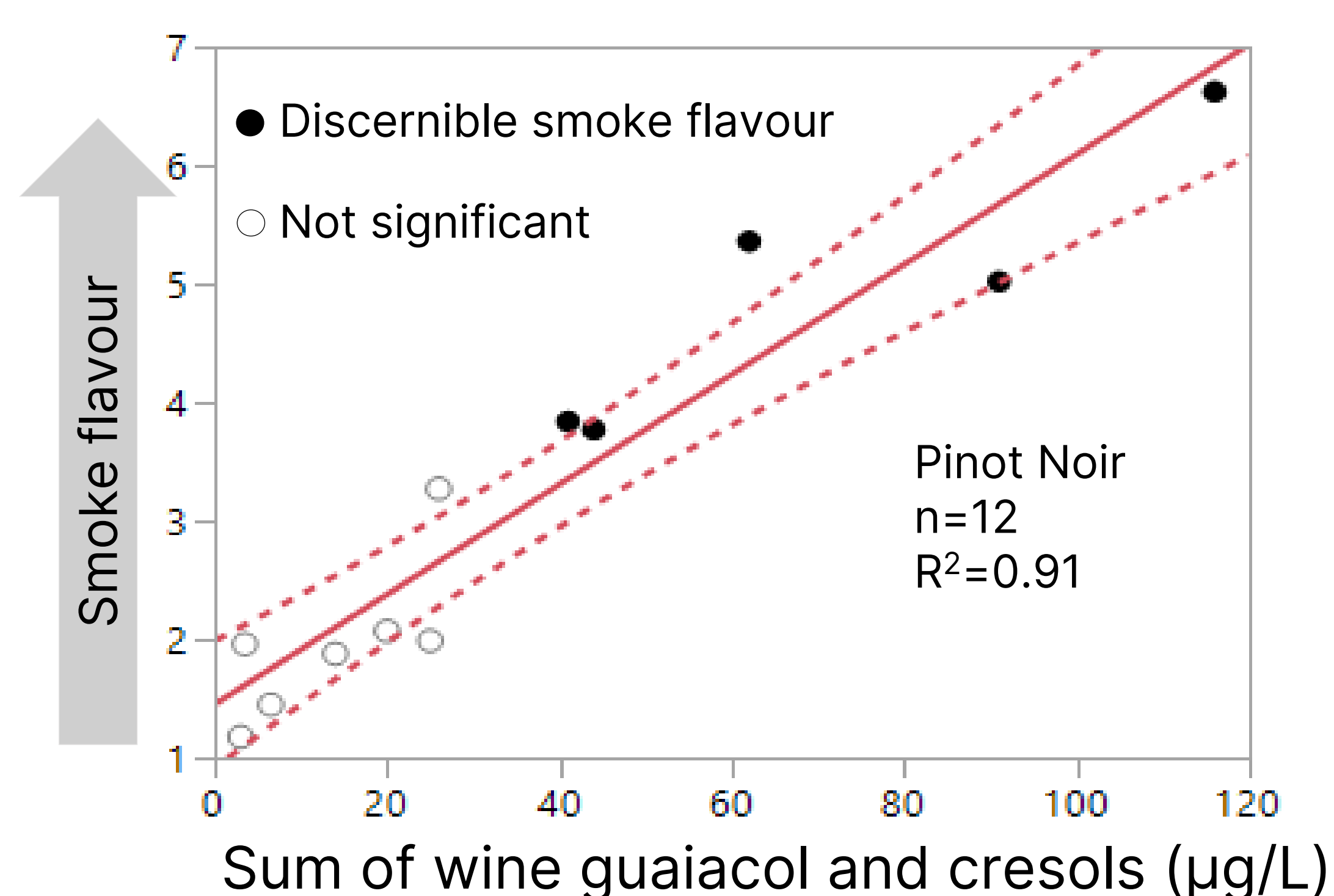
### Wines produced

- Ferments 50 kg scale, unoaked
- Chardonnays from clarified juice
- Six days of skin contact for reds
- No remediation treatments applied
- Sensory assessment of 'smoke' flavour by AWRI panel

### Predicting smoke flavour from **grape** markers (guaiacol, cresols, guaiacol rutinoside and cresol rutinoside)



### Predicting smoke flavour from **wine** guaiacol and cresols



### Linking grape compounds, wine compounds and smoke flavour

- Guaiacol, cresols, guaiacol rutinoside and cresol rutinosides **in grapes** were strongly related to the concentrations of key phenols in Chardonnay and Pinot Noir wine, and the associations were weaker in Shiraz wine
- Good PLS regression models for smoke flavour were developed for each variety (R<sup>2</sup>>0.86)
- *m*-Cresol and guaiacol were most important to all models
- Also important to most models were *o*-cresol, guaiacol rutinoside, *p*-cresol and cresol rutinoside
- Syringol or syringol gentiobioside were not important to predict smoke flavour in wine yet are reliable to detect smoke exposure of grapes

### Linking wine compounds to smoke flavour

- Good PLS regression models were developed for each variety (R<sup>2</sup>>0.93)
- Guaiacol and *m*-cresol were most important predictors to all sets
- *o*-Cresol, *p*-cresol, guaiacol rutinoside and cresol rutinoside were important for some sets
- Syringol or syringol gentiobioside were not important
- 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

A subset of the current smoke exposure markers can predict 'smoke' flavour in wine

