The Australian Wine Research Institute

Fact Sheet

Minimising the impact of prescribed burns on wine-grape production

Background

The exposure of vineyards and grapes to smoke may result in wines with undesirable sensory characteristics, such as smoky, burnt, bacon, medicinal or ash, usually described as 'smoke tainted'. The compounds in smoke primarily responsible for the taint are the free volatile phenols such as guaiacol, 4-methylguaiacol, *o*-cresol, *p*-cresol and *m*-cresol. These compounds are produced and released into the atmosphere when plant material is burnt.

Why are grapegrowers and winemakers concerned about planned/prescribed burns?

Consumers and winemakers have been shown to respond negatively to smoke-tainted wines. There are no effective ways to reverse the effect of smoke on grapes or wines. Grapes that are tainted thus have no commercial value and are not likely to be harvested. This has significant financial impact for grapegrowers because no harvest means no income. There is also a reputational risk if smoke-tainted grapes are harvested and made into wine that is sold domestically or exported.

The key risk period for grapes

In the past it was believed that early-season smoke exposure posed a lower risk than exposure close to harvest; however, data from Australian smoke events in 2019/20 showed that there is a significant risk of smoke characters in wine even when smoke exposure occurs early in grape berry development.

As soon as grape berries are formed, they are susceptible to smoke taint. The risk period commences once green berries are present (from growth stage E-L 27) and extends until the grapes are harvested. A cooler season can delay flowering and harvest date, and warmer conditions can bring flowering and harvest on earlier.

The ideal times to conduct prescribed burns are either before flowering commences or after harvest. Flowering commences in some regions in October, and some varieties and regions are harvested as late as May. Autumn planned burns can potentially cause conflicts with grape producers, particularly for late-harvest varieties such as Mourvedre, Nebbiolo and Cabernet Sauvignon. Also, red wine-grape varieties can be more prone to smoke taint because the red winemaking process requires them to be fermented on skins.

Is there a difference between smoke from prescribed burns and smoke from bushfires?

Studies have shown that grapes only need to be exposed to a single smoke event, irrespective of the source, to become 'tainted'. Repeated exposure to smoke has an additive effect on the overall levels of smoke taint in grapes and wine. Bushfires, forest fires, planned burns, grass fires and agricultural burns can all cause smoke taint if smoke from those fires is present in a vineyard in at a high enough level for a period of time. Current research suggests fresh smoke presents the greatest risk for smoke taint, but smoke that has drifted hundreds of kilometres has also resulted in smoke taint. Smoke movement from fires varies depends on fire burning dynamics and weather patterns. It is important to understand local weather patterns and likelihood of smoke entering a vineyard at these sensitive times when making a decision to light a burn.

How can the impact of a burn/fire on vineyards be minimised?

Knowing where vineyards are situated in relation to fire management zones is important for both the industry and planned burn managers. This can help with planning and conducting planned burn activities more effectively.

Timing, weather (wind, temperature, atmospheric conditions), soil and vegetation moisture levels and burn material are all key factors in determining if a vineyard may be affected.

Efforts should be made to light fires where wind will direct smoke away from vineyards. Other factors that will affect smoke movement include atmospheric conditions (e.g. inversion layers), temperature and soil moisture.

The timing of burns should ideally be chosen so that they do not expose grapes to smoke. Understanding the likely timing of flowering and harvest across a region, through a two-way dialogue that continues through the year is the best way to optimise burn planning.

Communication is key

Maintaining good communication channels between planned burn managers and grape and wine associations is crucial in ensuring that decisions are made that take into account the interests of all parties involved.

If you plan to undertake a planned or prescribed burn in an area near vineyards, please contact the local grape and wine industry association and nearby wineries or vineyards to establish a dialogue and minimise risks of conflict.

Communication should ideally occur well ahead of time, to allow planning to occur prior to high risk times, which are also often when wineries are at their busiest.

Effective communication will minimise the risk of smoke taint and allow contingency plans (such as adjusting harvest dates) to be developed.

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