Managing downy and powdery mildew and bunch rots post-harvest 2010-11

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Season 2010–11

In most parts of south-eastern Australia, season 2010–11 was the wettest since 1973–74 and 1974–75, surpassing the difficult seasons of 1992–93 and 1983–84.

The wet conditions brought three waves of assault on vineyards by diseases: first downy mildew, then powdery and finally the bunch rots. Let's look at these three, ask what, if anything, can be done about them now and briefly look forward in readiness for the best controls in 2011–12.

Downy mildew

This year, the regular succession of rain events suitable for primary and secondary infection led to a severe test of control practices in the vineyard.

Figure 1: Downy mildew bunch infection, despite spray applications. Spray timing is critical to achieving effective control of weather-driven diseases like downy mildew and careful monitoring of weather data helped to achieve this in the very wet season 2010–11.

What do I do now?

Post-harvest Little can be done for downy. The high number of oilspots in many vineyards means that many oospores, the overwintering form of downy, will have formed. These will fall with the leaves and can survive in the soil for many years. No treatment of the vine or the soil is effective against oospores.

Early next season The renewed levels of downy inoculum (the oospores) will increase infection potential significantly. Like bunch rots, the level of disease will depend on the prevailing weather.

For good control, careful assessment of vineyard conditions will be required. Accurate timing of sprays will be critical to success in wet conditions

Synchronising spray timing with infection periods will be needed and this will require accurate processing/ interpretation of weather data from stations within vineyards.

Powdery mildew

Powdery mildew develops mostly from buds infected in the previous season. These produce flagshoots that spread disease when spores develop on the infected parts of those shoots. These spores develop in dry weather over a range of temperatures but develop 2–3 times more in number when the relative humidity is high (RH >40%).

As a result, the amount of powdery mildew that carries over winter has a large influence on the initial levels of disease next season. The more infected buds, the more the disease spreads in early season. This determines the ease or difficulty in controlling disease that season.

Figures 2 and 3: Powdery mildew produces ash-grey to white fungal growth over both surfaces of leaves (left & lower right). Fungicide sprays provided excellent control of powdery mildew if applied with effective coverage (top right)

What do I do now?

Post-harvest After a season with high levels of powdery, it is too late to control the disease. Buds have already been infected for next season – this occurred early in 2010–11. A second form of the fungus, the cleistothecia, also has already formed. Once formed, there is no fungicide control for these resistant structures in either the foliage or on the vine cordons and trunk where they survive the winter.

If powdery levels were low until harvest, few if any cleistothecia may have developed. In this instance, a post-harvest fungicide to keep powdery levels low might be worthwhile, especially in varieties with a long post-harvest period before leaf fall. To be effective, this spray is needed **before** the disease levels reach high severity i.e. before the disease covers leaf surfaces.

Early next season A high level of vigilance will be needed to ensure that early-season sprays are applied with excellent timing and thorough spray coverage. If so, good control of infection from infected buds (flagshoots) and ascospores (from cleistothecia) can be expected.

Bunch rotting agents

The agents that rot berries comprise a range of organisms. The most well known is the widespread fungus *Botrytis cinerea*. Other agents include the fungi *Aspergillus, Alternaria, Cladosporium, Penicillium* and *Rhizopus spp*, while various yeasts and bacteria ferment berries and cause the sour rots. In combination, the lesser-known rots are often more damaging than Botrytis bunch rot alone.

These agents activate in warm, humid conditions. They survive in plant residues of all kinds and in the soil, in so many different places that they cannot be eradicated. Spores from the bunch rots are spread by wind, rain and insects

What do I do now?

Post-harvest Little can be done for the bunch rots. However, because inoculum on the vineyard floor offers lesser infection potential for next season's young canopy than does inoculum that over-winters on the vine, consider removing unpicked fruit.

Note: The cost of this operation means that, if done at all, it is probably best achieved during pruning but your particular vineyard circumstance will vary the decision for different patches.

There is small gain in cultivating-in the bunches once they are on the soil surface. The expense would offer questionable advantage in reducing inoculum loads in the vineyard. The main factor influencing early-season bunch rot is the occurrence of favourable conditions at flowering.

Early next season Assess the prevailing weather (especially rainfall) to determine the risk of bunch infection by Botrytis in particular. Sprays during flowering may be warranted but because the bunch rot organisms need warmth and moisture for infection, they will not be a major problem next season if the weather stays dry.

Figures 4 and 5: Botrytis bunch rot on Ruby Cabernet (left) and with other rots, including sour rot, on Riesling (right). Extended leaf wetness in warm, humid conditions during 2010–11 triggered growth of the buff-coloured fungal spores that spread bunch rot and favoured other bunch rotting organisms.

Summary

In many parts of Australia, controlling the three main vineyard diseases in 2010–11 was extremely difficult. Contributing factors include:

- The need to target different types of diseases at different times during the season. For example, because downy mildew and botrytis are weather-driven diseases, the timing of their controls was dependant on synchronising sprays with weather events. In contrast, powdery mildew, which grows throughout the season, required more or less constant control from just after budburst.
- The need to target different parts of the vine for different disease. Control of the bunch rots requires spray application primarily to the bunches, whereas control of the mildew diseases on bunches requires minimising the inoculums build-up on the foliage. This requires good spray application over the entire canopy.
- The wet and occasionally windy conditions made it hard, and at times impossible, to achieve good spray coverage and to maintain effective coverage on rapidly developing shoot growth, which is necessary for effective control.
- Poor timing of metalaxyl sprays in some instances compromised the control of downy mildew. A better understanding of the disease life cycle and/or more precise information would be expected to give a better result.

Seasonal weather outlook

The weather events in 2010–11 were strongly influenced by the *La Niña* effect, a meteorological system that is controlled by the temperature on either side of the Pacific Ocean. These temperatures fluctuate like an overgrown see-saw. When the sea temperature is up on the western Pacific (near Australia), we get wet seasons, like the 2010–11 one. When the temperatures are down, we tend to have drier summers.

At present, the *La Niña* effect is neutralising, meaning we are likely to have 'more-like average' rainfall over winter. For a good description on these, and similar systems in the Indian Ocean that influence our weather patterns, and for useful information on seasonal outlooks for temperature and rainfall, visit the Bureau of Meteorology website: http://www.bom.gov.au/climate/

Conclusion

Next season, pay careful attention to early-season weather events and to the application of sprays with good coverage and timed in close alignment with:

- infection events, especially from early-season (for downy mildew),
- budburst (for powdery), and
- flowering, if needed in wet conditions (for bunch rots).

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