

Strobilurin resistance to powdery mildew in a vineyard

The strobilurin group of fungicides has been registered for control of powdery and downy mildews for over a decade. However, the recent occurrence of strobilurin-resistant strains of powdery mildew is a matter of concern and necessitates a change in disease management.

How does strobilurin resistance come about?

POWDERY MILDEW STRAINS with a gene mutation known as G143A are not controlled by strobilurin fungicides (Group 11). This gene conveys resistance to the pathogen because the chemical is not able to act as it was designed. Resistant strains are naturally present in a population, but are low in number compared with the susceptible strain. This proportion increases after strobilurin use because the susceptible strains are controlled. Repeated use of Group 11 fungicides selects for those with resistance until they dominate the population and powdery mildew causes crop loss, often without any warning.

When low levels of resistance are present in the population, strobilurins appear to be working normally until the balance suddenly tips in favour of the resistant population and control is not achieved. The way to avoid crop loss from this tipping point is to tank mix with another chemical group. The strobilurin group will be effective against the non-resistant population and the alternative active will control the resistant strain. Together, the fungicides will provide a robust powdery mildew treatment unless the frequency of Group 11 resistance has progressed to a very high level.

How has the resistance management strategy changed?

Until the 2010-11 season, CropLife Australia's resistance management program allowed three Group 11 sprays per season. After that, it was restricted to two sprays only. The new restrictions on Group 11 fungicides for powdery mildew control are:

- apply Group 11 and other systemic fungicides preventatively
- do not apply more than two sprays per season of Group 11 fungicides
- where Group 11 products have been routinely used for many seasons, field research indicates there is an increased risk of powdery mildew resistance to Group 11 fungicides occurring. To ensure continued protection against powdery mildew



Severe downy mildew infection on Chardonnay clusters, Lenswood, South Australia

in these circumstances, mix Group 11 fungicides with a registered rate of a compound from an alternative chemical group for the control of powdery mildew in grapes

- alternatively, if applied alone, Group 11 fungicides should be used in strict alternation with fungicides from an alternative chemical group for the control of powdery mildew.

How do I know if I'm near tipping point?

The likelihood of strobilurin resistance to powdery mildew in a vineyard depends largely on the manner and frequency of use of the chemical group in the past. Because spores are known to 'travel', past use patterns within a region should also be considered. Where Group 11 fungicides have been used routinely, that is, over the past five to seven seasons, they should not be relied on for powdery mildew control alone, but mixed with another registered fungicide group.

Resistance in the US developed quickly because Group 11 fungicides were applied frequently in the same season – a situation that promoted the resistant population. In Australia, this chemical group has been used effectively for more

than 10 years through tighter restrictions on the number of applications, effectively extending the length of time required for the resistant population to build up.

Can downy mildew strains also become resistant?

Yes, the same mechanism for resistance can occur in downy mildew and is present in overseas vineyards, but no resistance has been detected in Australia. This is because Australian weather conditions tend to be unfavourable to downy mildew on an annual basis and it is less likely that this pathogen has had sufficient levels of exposure to the chemical for resistance to be a factor.

Where to from here?

Group 11 fungicides continue to play a role in disease control in Australian vineyards but where they have been routinely used for a number of seasons (five plus) for powdery mildew control, to ensure continued protection, mix with a registered rate of a compound from an alternative chemical group.

Acknowledgement

Trevor Wicks (SARDI); Doug Wilson (Nufarm).

