viti-notes

[pests and diseases]

Research to Practice

Monitoring for powdery mildew

Viti-note Summary:

- Why monitor?
- When to monitor
- What to look for
- Where to monitor
- How to monitor
- Modelling disease development

Other topics in this Viti-Notes series include:

- Characteristics of powdery mildew
- Symptoms of powdery mildew
- *Monitoring for powdery mildew*
- Managing powdery mildew

Look for powdery mildew principally in blocks where the disease has previously been a problem, and in areas where vines may be dense or sheltered. This is especially important after mild cloudy weather with low to moderate light levels.

Disease progress early in the season may be slow depending on weather conditions, but is not usually impeded in most areas of Australia. Low levels of infection can be difficult to detect.

Why monitor?

Without a careful monitoring program in place in the vineyard, it is possible for several cycles of powdery mildew infection to occur before symptoms are first detected, as the life cycle from spore germination to spore production is short under optimum conditions (5 days). However, if no disease is found by careful monitoring, the need for spraying can be reduced or eliminated. Monitoring can also ensure that sprays are targeted more effectively at vulnerable stages of disease development. Post-treatment monitoring can also indicate the effectiveness of the spray program.

When to monitor

From budburst, survey at approximately 2 weekly intervals for symptoms. Early in the season look for flag shoots and powdery mildew leaf spots which are most readily detected between 3–8 weeks after budburst, before the canopy closes.

Flowering and fruit-set is a critical period in the management of powdery mildew so monitoring should occur on a weekly basis during these stages.

Late season/post-harvest monitoring is recommended to:

- Determine whether post-harvest sprays are needed on young vines;
- Establish the presence and maturity of resting spores;
- Identify any potential 'hot-spots' for monitoring the following season (e.g. infected canes where flag shoots may form).

When conditions that are favourable to powdery mildew development have been experienced, monitoring is essential. The conditions are:

- Mild cloudy weather and low to moderate light. The optimum temperature for spore germination and growth of the fungus is 20–30^{0}C. Infection is possible between 6^{0}C and 33^{0}C, but disease development is slow outside this optimum temperature range;
- Relative humidity above 40%. While humid conditions favour growth and sporulation, the presence of free water can interrupt spore germination.

What to look for

Symptoms of infection by powdery mildew include:

- Yellowish leaf spots which produce grey to white powdery spores. Severe infections might deform young leaves or turn leaves black;
- 'Flag shoots', which are characteristically distorted and stunted and may become covered in powdery spores. Later in the season, previously uninfected shoots might also become diseased, exhibiting oily grey blotches which develop spores. These blotches might eventually turn dark red-brown as canes mature;

Figure 1. Grapevine showing typical powdery mildew symptoms

- Powdery ash-grey spores on berries and bunch stalks causing mature berries to become scarred and distorted, and to split, rot and shrivel;
- Diseased canes might mature irregularly and in winter may die back from the tip, or exhibit a red-brown to black web-like pattern on their surfaces.

Where to monitor

Symptoms of powdery mildew infection are difficult to detect at low levels. This makes it particularly important to focus monitoring efforts on potential 'hot-spots', including:

- Blocks where susceptible varieties are planted (e.g. Verdelho, Chardonnay, Semillon);
- Parts of the vineyard with a history of the disease which might already be harbouring infected canes or resting spores;
- Areas closest to sources of infection upwind (e.g. unsprayed blocks, vines on pergolas);
- Sheltered vineyard sites, hollows or shaded parts of vine canopies;
- Closed vine canopies which shelter the fungus and where spray penetration is reduced.

As the season progresses, concentrate on dense parts of the canopy or sites where infection has previously occurred (these sites could be marked with flagging tape if canes are retained after pruning from the previous season).

How to monitor

- Inspect 200 vines for an accurate assessment of infection levels. Briefly examine as many leaves and later bunches as possible spending about 30 seconds per vine;
- Check outer leaves as well as inside the canopy where less light penetrates;
- Use a hand lens to check suspect patches on leaves for signs of fungal growth and resting spores (chasmothecia);
- Orientate leaves at an angle to the sun to make powdery mildew easier to identify on the surface of leaves;
- Mark infection sites to allow later assessments of disease spread and the effectiveness of control treatments.

It is good practice to train everyone working in the vineyard to recognise the symptoms of a range of pests and diseases, even if you have dedicated staff primarily responsible for monitoring. Remember to keep records of all monitoring results.

Modelling disease development

Disease prediction models are designed to give vineyard managers and monitoring staff a tool with which they can indicate higher risk periods for disease development and spread, to allow more targeted management programs to be put in place in the vineyard. Care should be taken in selecting a program. Overseas models might provide incorrect advice for Australian vineyards and be ineffective for disease management as they are not based on Australian conditions.

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Further information

Innovator network factsheets
Managing Powdery Mildew

http://www.gwrdc.com.au/webdata/resources/files/PowderyMildewFact_Sheet.pdf

Training

For regional specific training in pest and disease control, the AWRI is running Research to Practice: Integrated Pest Management for changing viticultural environments.

Contact

Marcel Essling: rtp@awri.com.au for more information.

Agrochemical information

Agrochemicals registered for use in Australian Viticulture - updated annually.

Visit www.awri.com.au for the latest version.

Useful references

Nicholas, P., Magarey, P.A. and Wachtel, M. (Eds.) 1994 Diseases and pests, Grape Production Series 1, Hyde Park Press, Adelaide (a glove box edition of this book is also available).

For images of grapevine symptoms visit www.winetitles.com/diagnosis/index.asp.

Product or service information is provided to inform the viticulture sector about available resources and should not be interpreted as an endorsement.

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