Viti-Notes

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Cooperative Research Centre for Viticulture

Other topics in this Viti-Notes series include:
- Characteristics of powdery mildew
- Managing powdery mildew
- Symptoms of powdery mildew

Monitoring for powdery mildew

Without a careful vineyard monitoring program it is possible for several cycles of powdery mildew infection to occur before symptoms are 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 check the effectiveness of the spray program.

Conditions favouring infection

Determining where and when to monitor requires an understanding of the conditions that favour powdery mildew development. These include:

- Mild cloudy weather and low to moderate light. The optimum temperature for germination of spores and growth of the organism is 20 to 300C. Infection is possible between 60C and 330C, but disease development is less active at lower temperatures.
- 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.
- 'Flag shoots', which are characteristically distorted and stunted and may become covered in powdery spores. Later in the season, previously uninfected shoots may also become diseased, exhibiting oily grey blotches which develop spores. These blotches may eventually turn dark red-brown as canes mature.
- Powdery ash-grey spores can grow on berries and bunch stalks causing berries to become scarred and distorted, and to split, rot and shrivel.
- Diseased canes may 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 (eg. Verdelho, Chardonnay, Semillon)
- Parts of the vineyard with a history of the disease which may already be harbouring infected canes or resting spores
- Areas closest to sources of infection upwind (eg unsprayed blocks, vines on pergolas)
- Sheltered vineyard sites, hollows or shaded parts of vine canopies
- Closed vine canopies which shelter the organism and reduce spray penetration.

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).

When to Monitor

From budburst, survey at approximately two-weekly intervals for symptoms. Early in the season look for flag shoots and powdery mildew leaf spots which are most readily detected between 3 and 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 (eg infected canes where flag shoots may form).

How to monitor

- Inspect vines, briefly examining leaves and later bunches (if a more accurate assessment of infection levels is required then inspect both sides of 200 vines)
- 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 growth of the organism or resting spores
- 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 a good idea to train everyone working in the vineyard to recognise the symptoms of a range of pests and diseases, even if you have dedicated staff who are primarily responsible for monitoring. Remember to keep records of all monitoring results.

Further information

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

A useful reference with illustrations of the lifecycle and symptoms is

- Diseases & Pests, editors, Nicholas, P., Magarey, P.A. and Wachtel, M., 1994, Grape Production Series 1, Hyde Park Press, Adelaide, (available Winetitles, 08 8223 4700, or www.winetitles.com.au).

- See also the glove box edition of the above, Field Guide to Diseases and Pests.

PAM AusVit, which is a disease modelling program designed to assist in Australian vineyard management decision making through the recording, analysis and reporting of critical activities, events and conditions within the vineyard. The software assists growers and managers achieve their target levels of vineyard efficiency, yield and fruit quality, while reducing the risk of crop losses and minimising the use of chemicals. Details about PAM AusVit can be found at www.crcv.com.au/products/pamausvit/ or by phoning 1800 500 195

IPM Viticulture: Research to Practicé is a training program whose delivery can be fine-tuned to suit each region.

- Enquiries to Winetac on (08) 8373 7090 or visit www.crcv.com.au/education/rtp for more information.

Visit the web site at www.crcv.com.au/viticare/vitinotes/ for updates and more VitiNote titles.

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