

Powdery mildew in grapevines

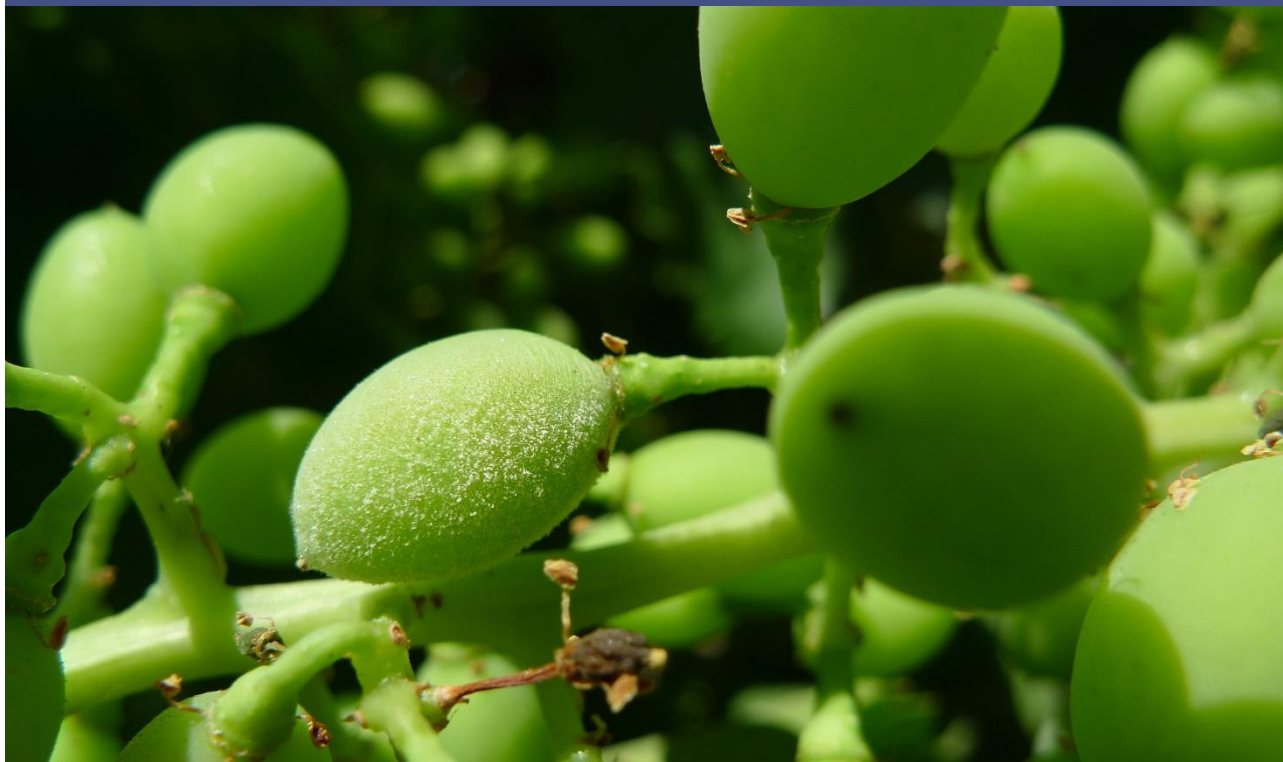


Image source: Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

What is powdery mildew?

Powdery mildew is a fungal grapevine disease caused by *Erysiphe necator*. It spreads rapidly under favourable conditions and affects green tissue – leaves, shoots, and berries. After berry softening, infection risk to berries drops, but the bunch rachis remains vulnerable. Infections may reduce yield and fruit quality.

Key points to powdery mildew management

1. Start monitoring early.
2. Prevention is key. No spray product offers post infection control. Stopping the disease from becoming established early in the season is critical in reducing the disease load later in the season.
3. Prioritise controls in high-risk sites and susceptible varieties.
4. Combine canopy management with timely and targeted fungicide use.
5. Maintain good seasonal records to guide future management decisions.

Disease cycle

The powdery mildew disease cycle is shown in Figure 1 below.

Erysiphe necator survives over winter in two main forms:

- In **infected buds** that produce characteristic 'flag shoots' in spring [see 1A below].
- As **resting spores** (chasmothecia) that appear as small black specks on bark or old bunches [see 1B below].

Spores are dispersed by wind throughout the season, infecting green tissue and continuing the disease cycle [see 2 below]. New infections produce more spores throughout the season, completing the cycle.

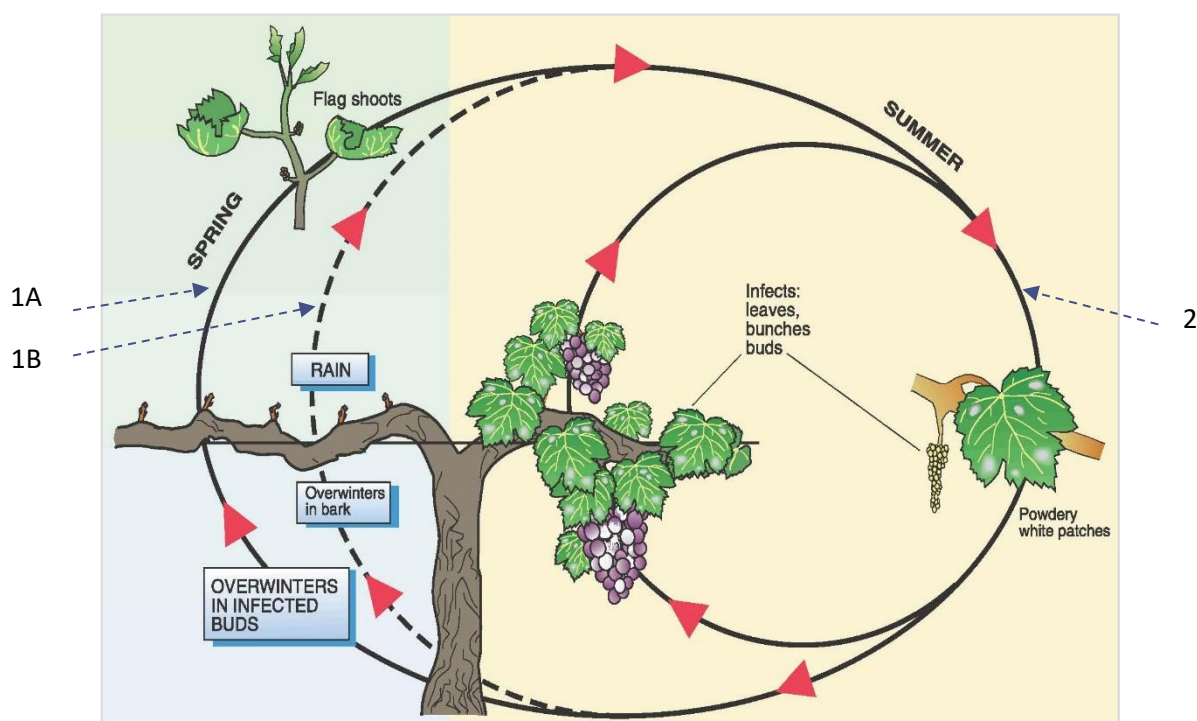


Figure 1 The lifecycle of powdery mildew. (© Primary Industries, South Australia, 1994. Used with permission).

Periods of risk

Powdery mildew is most likely to develop when the following set of conditions arise:

Favourable condition	Description
Temperature	Optimal range between 20–30 °C
Humidity	High (above 40%) promotes spore germination
Light	Cloudy or overcast weather favours infection
Canopy	Dense or shaded canopies with limited airflow increase risk
Site factors	Sheltered vineyard sites retain humidity
Sensitive varieties	Chardonnay, Semillon, Verdelho, Riesling, Shiraz, Grenache

Symptom identification

Leaves

- Yellow-green spots (2–10 mm) (Figure 2)
- Grey-white powdery growth on the surfaces (Figures 3, 4)
- Distorted or crinkled young leaves
- Brown veins on the underside leaves
- Severe cases: blackened leaves, musty odour, or early leaf drop
- Dark web-like necrotic patterns may where spores have rubbed off



Figure 2. Early powdery mildew leaf infection. Image source: Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org



Figure 3. Powdery mildew leaf infection.



Figure 4. Severe late season powdery mildew leaf infection. Image courtesy Richard Hamilton, Hamilton Viticulture.

Shoots

- Flag shoots in spring: stunted, distorted, curled leaves, and powder-covered (Figure 5)
- Oily grey blotches developing into white spore patches
- Severe infections can kill shoots
- Older infections appear as red-brown patches (Figures 6, 9)



*Figure 5. Powdery mildew flag shoot.
Image courtesy James Hook, DJs Growers.*



Figure 6. Powdery mildew shoot infection. Image courtesy Richard Hamilton, Hamilton Viticulture.

Bunches

- Grey-white 'powder' on berries and stalks (Figure 7)
- Berries scarred, distorted, split, mouldy, or shrivelled (Figures 8, 9, 10)
- Uneven colouring in dark skinned varieties
- Web-like dead patterns on berry skins after veraison



*Figure 7. Powdery mildew infection on green berries.
Image source: Gerald Holmes, Strawberry Center, Cal Poly
San Luis Obispo, Bugwood.org*



Figure 8. Late season powdery mildew berry scarring.



Figure 9. Late season powdery mildew infection on berries and canes.



Figure 10. Severe late season powdery mildew infection showing shrivelled berries, cane markings and uneven cane lignification.

Canes

- Poor or uneven lignification (Figure 10)
- Red-brown to black web-like markings visible on lignified canes (Figure 10)
- Tip dieback in severe infections

Monitoring and detection

Regular monitoring is essential for early detection and effective control.

Growth stage	Frequency	Focus
From budburst	Every 2 weeks	Look for flag shoots and early leaf spots
Flowering to fruit set	Weekly	Critical period – inspect bunches closely
Late season / post-harvest	Every 2–3 weeks	Flag residual 'hot spots' for next season

Tips for inspection:

- Train vineyard staff to recognise symptoms;
- Inspect multiple locations per block, focusing on previous 'hot spot' areas;
- Check both inner canopy and exposed leaves;
- Use a hand lens for early infection; and
- Mark and record infected sites.

Management strategies

Integrated management combines good vineyard practices with timely fungicide use.

Vineyard Practices

- Plan row orientation for airflow and light penetration.
- Maintain open canopies through pruning, shoot thinning or positioning.
- Manage irrigation and nutrition to avoid dense canopies.

Chemical Control

- Plan to apply protectant fungicides to blocks with a history of powdery mildew infection, starting at 5–10cm shoot growth.
- Maintain 7–10 days spray intervals under high pressure.
- **Sulphur sprays** are cheap and effective. As a contact fungicide, sulphur is commonly used early in a spray program (in the first few sprays) when good coverage can be most easily achieved. Coverage is key, especially when sulphur is applied at temperatures below which vapour activity occurs (15°C and below) to ‘fumigate’ the foliage and bunches.
- **Synthetic fungicides** can be most effective when applied before and during flowering in a spray program. Some have translaminar activity meaning they can be absorbed by the vine, and move through the leaves or berries to give a greater length of protection; particularly important for high disease pressure situations and/or under cool conditions.
- Change spraying patterns in a block across the season to improve overall spray coverage.
- Effective late-season control relies on canopy management and good spray coverage.
- Post-harvest sprays may be useful in young or heavily infected vineyards to prolong leaf retention.

Always refer to the *Agrochemicals registered for use in Australian viticulture*, commonly known as the ‘[Dog book](#)’ for available options.

Resistance Management

Fungicide resistance is a problem for winegrape growers because it can lead to fewer effective tools to manage disease; the need for more frequent or varied fungicide applications; environmental issues; negative public opinion; higher production costs; greater crop losses; and possible fruit rejection.

Follow the three actions below to minimise the occurrence of fungicide resistance in the field.

1	2	3
		
Follow chemical label directions	Rotate chemical groups to limit resistance	Test if you suspect chemical failure in the vineyard

Refer to the [Fungicide Resistance factsheet](#) for further information on how resistance occurs and how to avoid it.

Current research

Current research focused on non-chemical control options for powdery mildew in grapevines includes:

- Ultraviolet light technology (<https://www.wineaustralia.com/news/articles/bringing-robots-and-a-chemical-free-disease-solution-together-to-control-powdery-mildew>)
- Breeding for resistance (<https://www.csiro.au/en/research/plants/crops/horticulture/grapevine-mildew>)

Contact

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