

A close-up photograph of a bunch of green grapes. Many of the grapes are covered in a white, powdery substance, which is powdery mildew. The grapes are clustered together, and the background is dark.

# Powdery Mildew on Grapes

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# Powdery Mildew

- Is the most serious and widespread disease in California vineyards.
- Susceptibility among varieties exists:
  - Cabernet Sauvignon, Carignane, Chardonnay, Chenin blanc, & Ruby Seedless very sensitive.
  - Riesling, Semillon, Zinfandel and Thomson seedless are less affected.

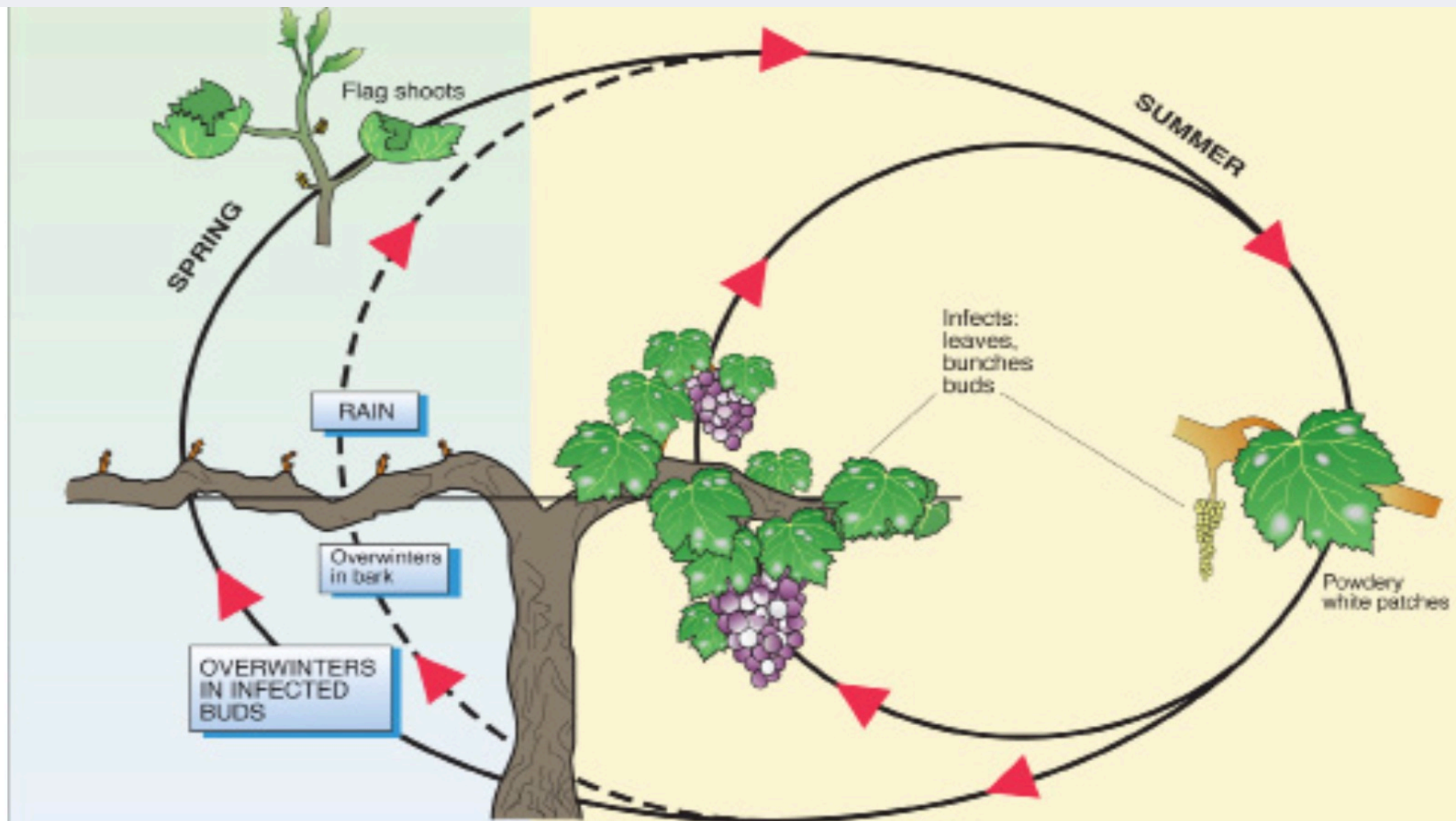


Figure 1. Life cycle of powdery mildew  
(Diagram courtesy of Nicholas, Magarey and Wachel, 1994, *Grape Production Series Number 1: Diseases and Pests*, Winetitles)



ascospores



*Photo D. W. Gubler*









# Powdery Mildew Index

## Based on Canopy Temperature

- Start - Post bud break and after rainfall
  - 3 contiguous days with 6 continuous hours
    - 70 to 85 F
    - Kicks of epidemic
- Add 20 index points per day
  - 6 continuous hours of 70 to 85 F
- Subtract 10 per day
  - Less than 6 hours between 70 and 85 F
  - 95 F or greater for 15 min. or more
- Index never less than zero or more than 100



# What does Mildew Index mean?

- Index = 0 - 30
  - Stop applications
  - Lengthen interval
- Index = 40 - 50
  - Normal application interval
- Index = 60 +
  - Shorten application interval

# Disease Management

- Season-long control is dependent upon reducing early-season inoculum and subsequent infection.
- Timing of the first treatment depends on the fungicide used, vine growth stage, and the potential for disease infection.
- After budbreak apply a contact material as soon as possible to eradicate ascospores.
- Research has shown that a micronized sprayable sulfur application or oil should be applied before other fungicides.

## Disease Management cont...

- Monitor and use the UC Davis powdery mildew risk index model to determine the spray intervals and the material choice.
- On wine grapes treatments may be discontinued when fruit reaches 12 Brix.
- **Discontinue** the use of soft chemistry products (sulfurs, biologicals, systemic acquired resistant products, and contact materials) when disease pressure is high because **by themselves will not provide adequate control.**



# Fungicide Groups Based on the Mode of Action

1. Demethylation Inhibitors (DMIs)
2. Strobilurins (Quinone Outside Inhibitors)
3. Multiple Active Ingredient Formulations
4. Elemental Sulfur (dust, wettable, flowable, or micronized)
5. Biologicals (Sonata, Serenade Max)
6. Contact Materials (Stylet oil, fungicide soap)

# Spray intervals based on disease pressure

**Table 21.2.** Spray intervals based on disease pressure using the UC Davis powdery mildew risk index model

Index	Disease pressure	Pathogen status	Suggested spray schedule			
			Biologicals* and SARs†	Sulfur	Demethylation inhibitors (DMI)*†	Strobilurins and quinolines*
0–30	low	present	7- to 14-day interval	14- to 21-day interval	21-day interval or label interval	21-day interval or label interval
40–50	moderate	reproduces every 15 days	7-day interval	10- to 17-day interval	21-day interval	21-day interval
60 or above	high	reproduces every 5 days	use not recommended	7-day interval	10- to 14-day interval	14-day interval

*Notes:*

\*Refer to the UC Grape Pest Management Guidelines for examples of currently registered products.

†SARs = Systemic acquired resistance products.

# Resistance Management

- Alternate fungicides with different mode of action to prevent the development of resistance.
- Be aware that some fungicides have two active ingredients, so two modes of action.
- Use mixes or alternate use of fungicides with different modes of action i.e. DMI' s and Strobilurin' s, Quinoxifen, etc.
- Make sure spray coverage is not an issue.



# Resistance Management

- Resistance increase is the result of use of other fungicides with the same mode of action.
- DMI fungicides can still be used effectively but rotation with fungicides of different mode of action is very important.
- Do not stretch intervals unless you know what the level of disease pressure is.

Visit: UC IPM Grape

- <http://ipm.ucanr.edu/PMG/r302100311.html>