



Controlling Powdery Mildew in Winegrapes: 2025 Trial Results

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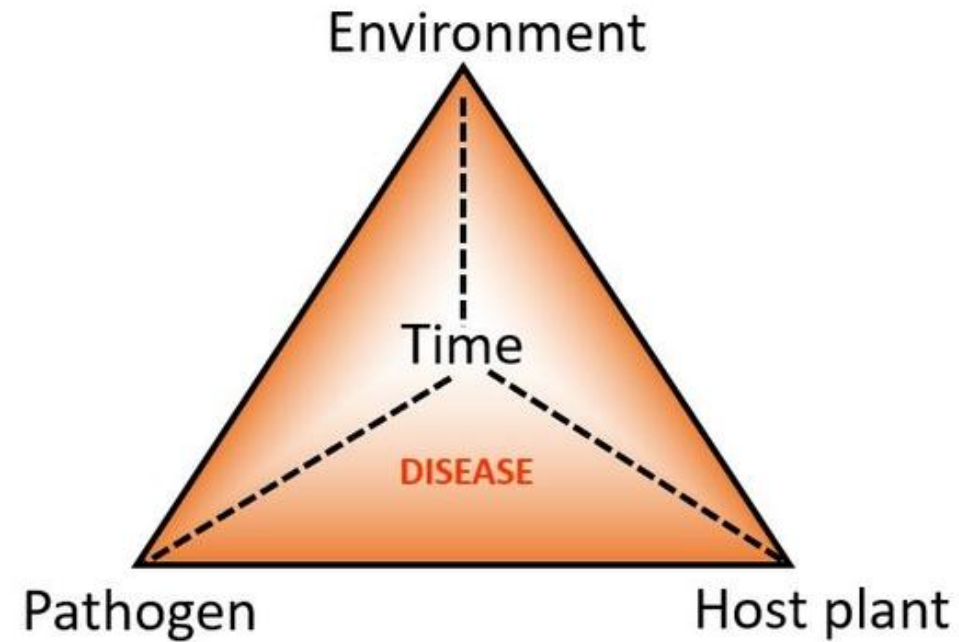
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UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

San Diego, November 5th, 2025

Disease Triangle



Plant disease is prevented when any one of these three components is eliminated!!

Symptoms



Chlorotic spots on the upper leaf surface



White, webby mycelium on the lower and upper leaf surface

White, powdery, or dusty appearance, also in the grapes



Symptoms



These white, powdery masses may colonize the entire berry surface



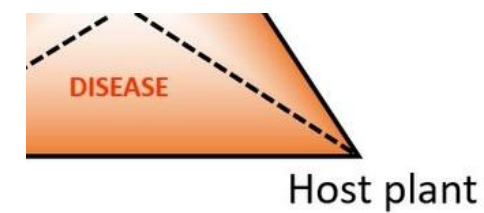
Black to brown web scarring can be seen on mature fruit



Red blotchy areas on dormant canes



Hosts vs. Powdery Mildew Species



Hosts	Fungus species
cucumbers, endive, lettuce, melons, potato, pumpkin, squash	<i>Erysiphe cichoracearum</i>
broccoli, Brussels sprouts, cauliflower, and other cole crops; radicchio, radishes, turnips	<i>Erysiphe cruciferarum</i>
tomatoes	<i>Erysiphe lycopersici</i>
peas	<i>Erysiphe pisi</i>
carrots, parsley, parsnips	<i>Erysiphe heraclei</i>
beets	<i>Erysiphe polygoni</i>
artichoke, eggplant, peppers, tomatillo, tomatoes	<i>Leveillula taurica</i>
beans, black-eyed peas, cucurbits, okra	<i>Sphaerotheca fuliginea</i>

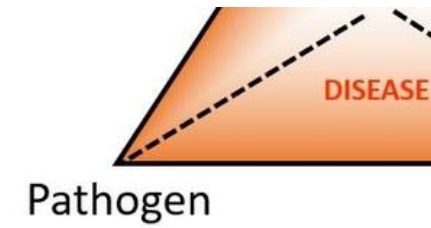
Fungus species	Hosts
<i>Golovinomyces cichoracearum</i>	begonia, Composite family (chrysanthemum, dahlia, phlox, sunflower, and zinnia)
<i>Erysiphe lagerstroemiae</i>	crape myrtle
<i>Sphaerotheca pannosa</i>	rose

Hosts	Fungus species
apple, nectarine, peach, quince	<i>Podosphaera leucotricha</i>
cherry	<i>Podosphaera clandestina</i>
apricot, plum, prune	<i>Podosphaera tridactyla</i>
strawberry (a different strain infects caneberries)	<i>Sphaerotheca macularis</i>
apricot, nectarine, peach, plum, roses	<i>Sphaerotheca pannosa</i>
grape	<i>Erysiphe necator</i>

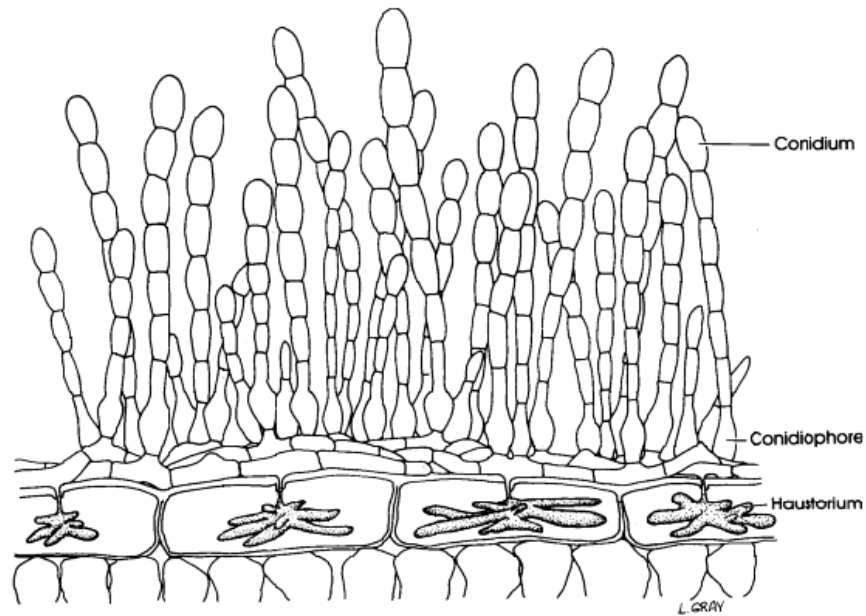
- ✓ 700 species of powdery mildew
- ✓ 15 genera
- ✓ >7600 plant species



The Pathogen

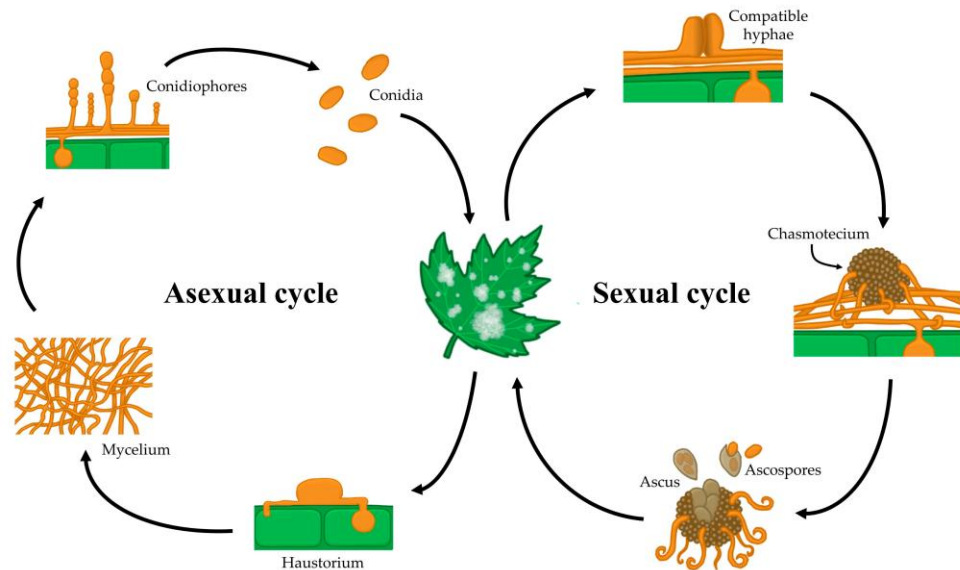


Asexual and Sexual cycles



Drawing by Lenore Gray

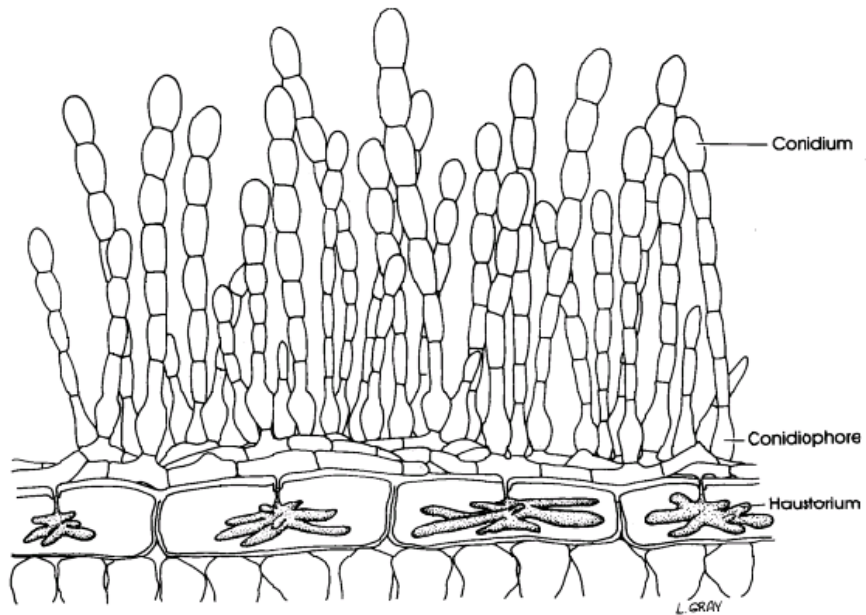
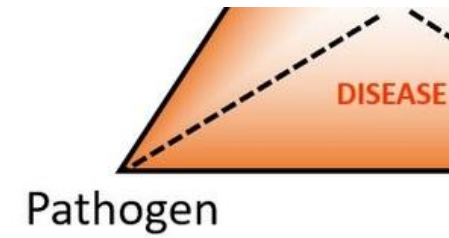
Obligate Parasitic Fungi



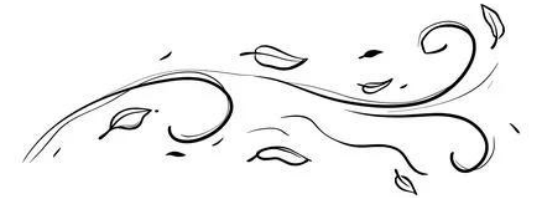
Microorganisms 2020, 8(9), 1431



Easy dispersal



Drawing by Lenore Gray

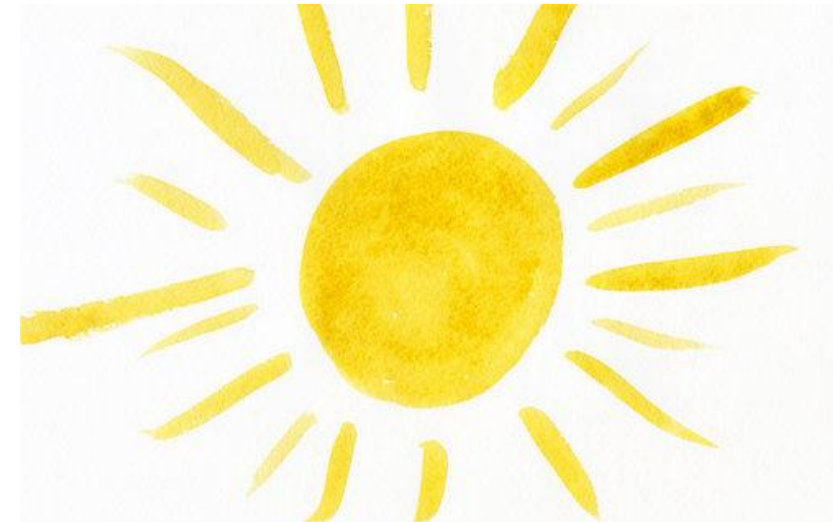
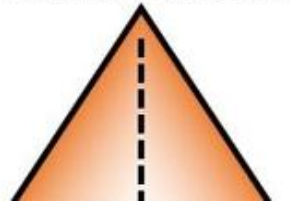


As low as 1–2 mph
Highly effective ~ 4,5-9 mph

Driving factors for infections / Cultural Control

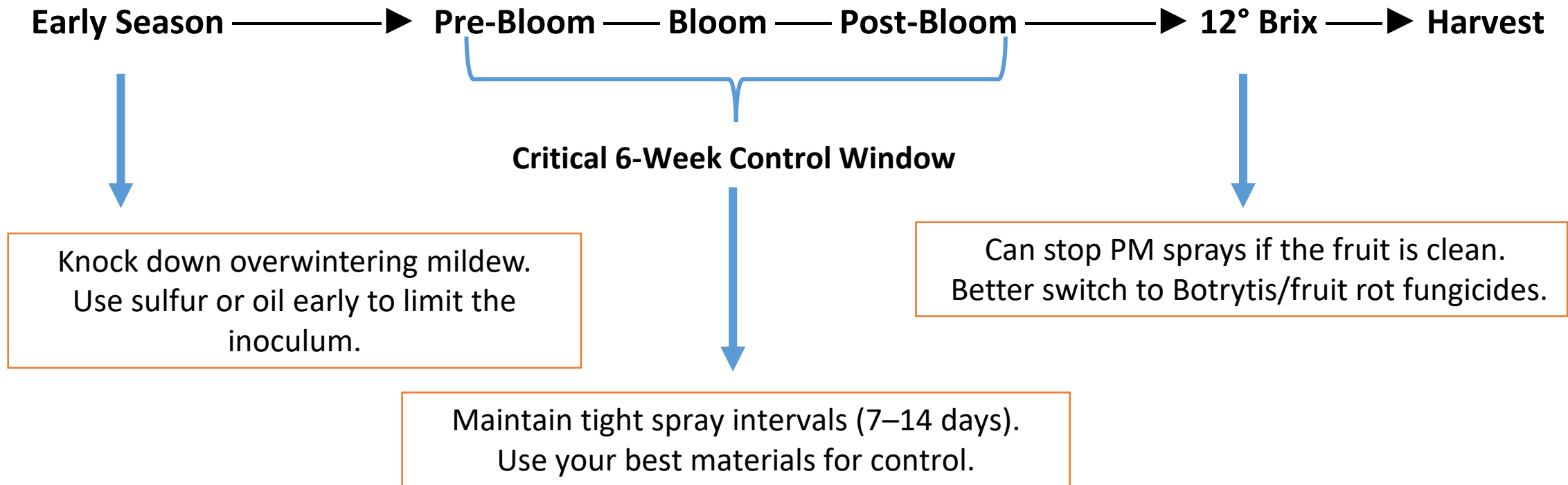
- The disease cycle begins with ascospore release when there is **>0.1 inch of rain and temperatures >50°F**.
- **Humidity and shade** both promote disease development because powdery mildew is **inhibited by sunlight**, specifically ultraviolet light.
- Maintaining an **open canopy** that allows sunlight to penetrate will reduce disease pressure.
- Additionally, **basal leaf removal** can also improve coverage of powdery mildew fungicides on clusters.

Environment



MANAGEMENT STRATEGIES

Timing and Prevention are Key!



More powdery mildew last season = more risk this season.

Good early control = easier late-season management.

Fungicide application

Protectant Fungicides

- ✓ Apply before the disease appears.
- ✓ Best suited for highly susceptible plants.
- ✓ Help prevent initial infection.

Eradicant Fungicides

- ✓ Use at the first signs of disease.
- ✓ Most effective early in the infection process.
- ✓ Once widespread, fungicide control is less effective.

Fungicide types

Systemic Fungicides

- ✓ Absorbed and translocated within the plant's tissues.
- ✓ Can protect new growth.
- ✓ Less dependent on coverage and less likely to be washed off by rain.

Contact Fungicides

- ✓ Stay on the surface; do not move inside the plant.
- ✓ Easily washed off or degraded.

Sulfurs

Wettable Sulfur - *Mixed with water and sprayed.*

- ✓ Easy to apply with a sprayer
- ✓ Good for prevention
- ⚠ Can burn plants if applied in hot weather (above 85°F)
- ⚠ Needs reapplication after rain

Micronized/Flowable Sulfur - *Fine particles in liquid form for better coverage.*

- ✓ Sticks well to leaves
- ✓ Less likely to burn/phytotoxicity than dust/wettable
- ⚠ More expensive
- ⚠ Still risky in hot weather

Sulfur Dust - *Dry powder applied directly to plants.*

- ✓ Inexpensive and effective
- ✓ No mixing needed
- ⚠ High risk of burning in heat (85–90°F)/humid
- ⚠ Can be irritating to eyes/lungs
- ⚠ Hard to control drift

Oils

Petroleum-based oils:

- JMS Stylet Oil
- Saf-T-Side Spray Oil
- Sunspray Ultra-Fine Spray Oil

Plant-based oils:

- Neem oils
- Jojoba oils



- × **Never apply oil sprays within 2 weeks of a sulfur spray – it may injure plants. Some varieties may be even more sensitive.**
- × **Do not apply oils when:**
 - ❖ Temperatures are above 90°F
 - ❖ Plants are water-stressed or drought-stressed → JMS Stylet Oil is the least likely to cause damage due to its high refinement, but it can still cause injury under these conditions

Other Organic Options

BIOLOGICAL FUNGICIDES



Beneficial microbes that compete with, inhibit, or parasitize the pathogen, or activate the plant's natural defenses.

BICARBONATES



Raise the pH on the leaf surface and create a hostile environment for the fungus.

BIOLOGICAL EXTRACTS



Some boost the plant's natural defenses (induced resistance); others have antifungal properties.

HYDROGEN PEROXIDE & PEROXYACETIC ACID PRODUCTS



Oxidize and destroy fungal structures on the leaf surface.

SILICON-BASED PRODUCTS



Strengthen plant cell walls and create a physical barrier.

Considerations when using Organic Products

- ✓ For fungicides with **contact** activity, be sure to also cover the undersides.



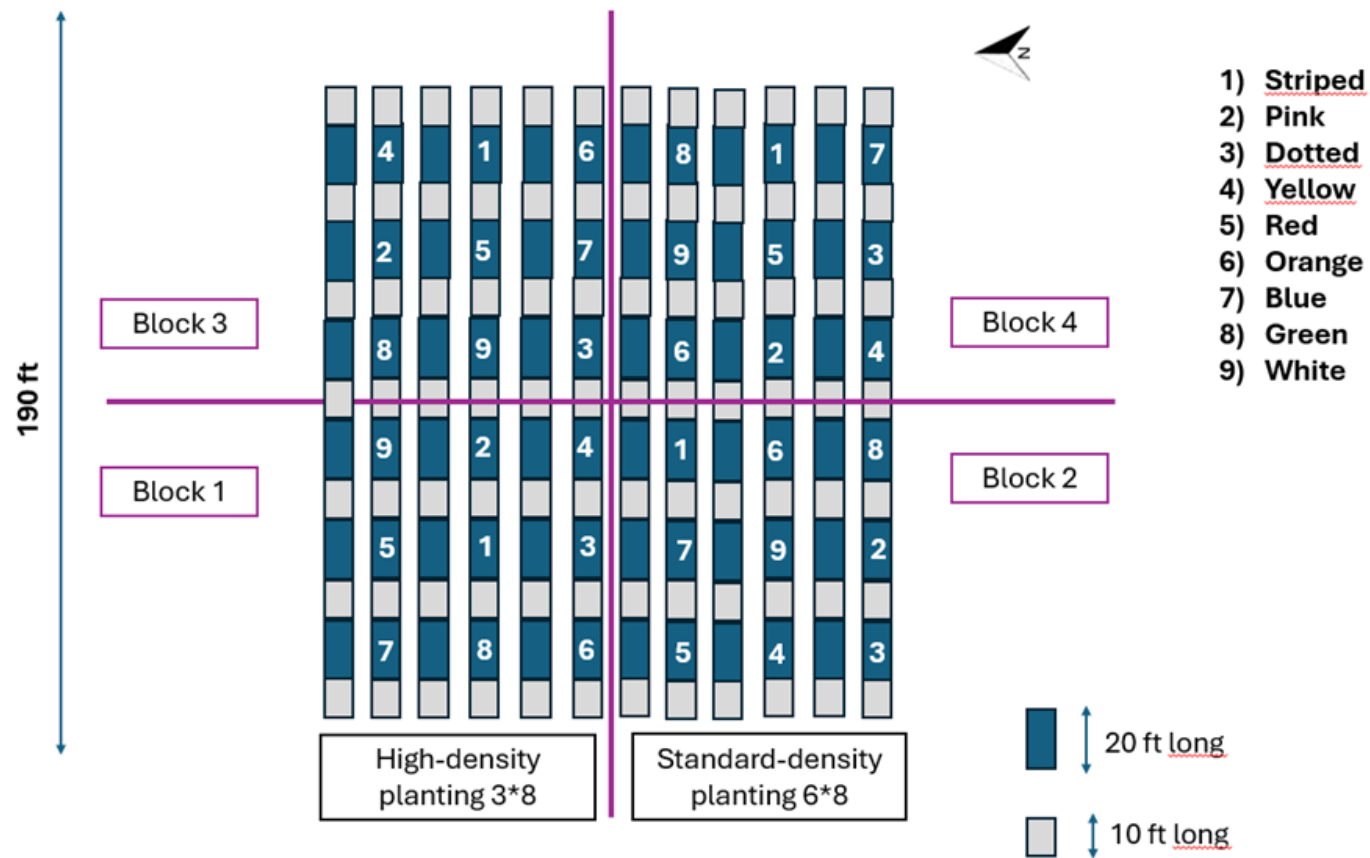
- ✓ **Rotate** at least two different products with **different modes of action** for best results.
- ✓ Evaluate your results → Within a week of your **last spray**, check how severe powdery mildew is to see how well your program worked.

Conventional Fungicides

- Powdery mildew adapts **quickly**. Many fungicides that worked in the past are now less effective or don't work at all.
- Use fungicides with different FRAC codes in **rotation**. Never apply the same fungicide more than twice in a row.
- Fungicide resistance is **dynamic**. Expect this pathogen to develop resistance to additional fungicides and thus, fungicide recommendations to continue to change.



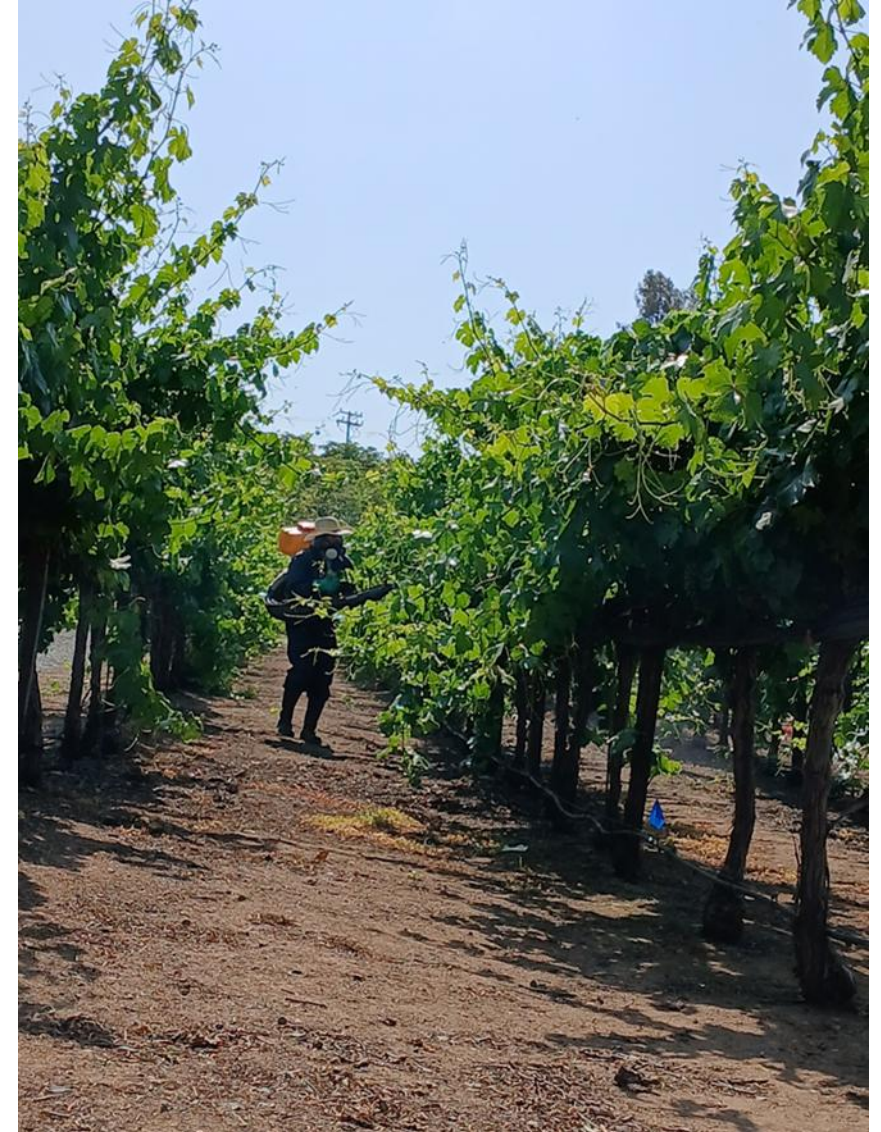
2025 Valley Center Field Trial



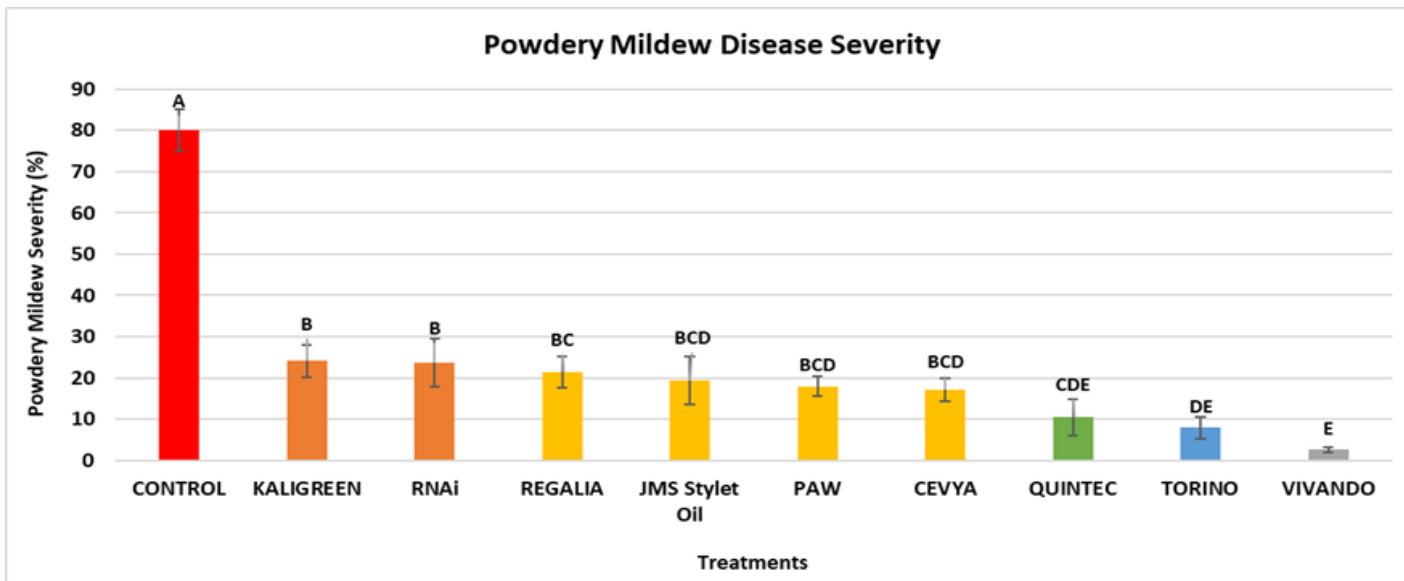
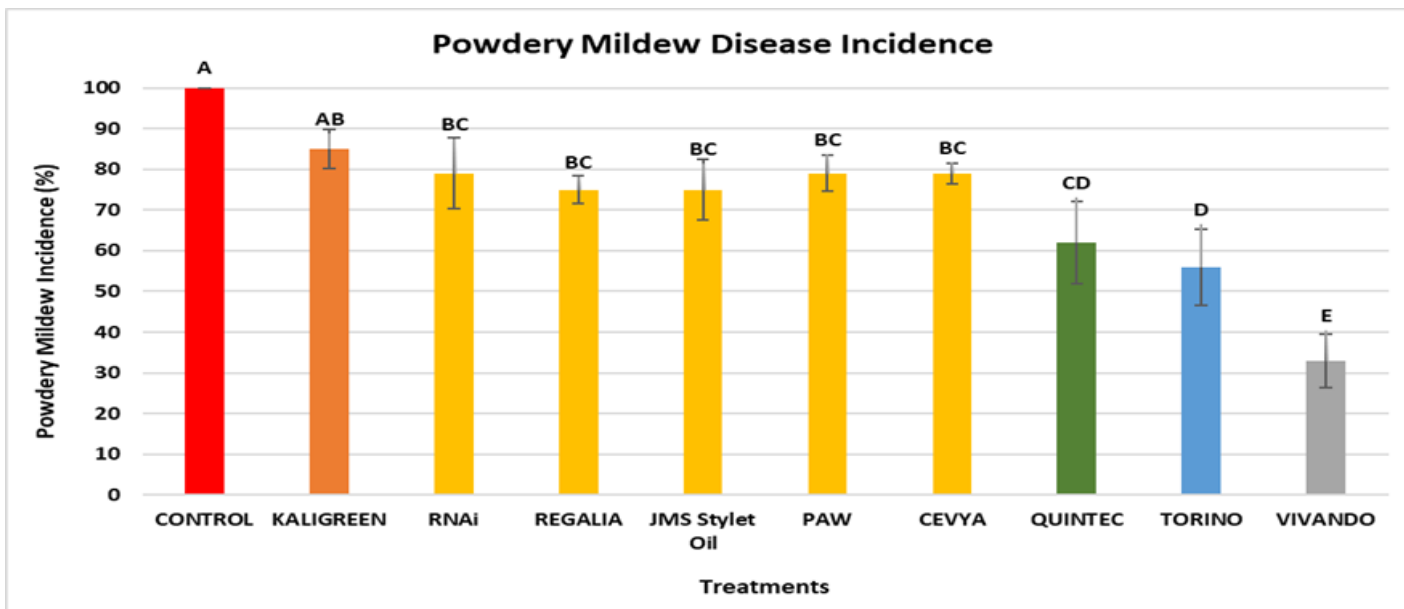
2025 Valley Center Field Trial

Commercial name (Manufacturer)	Rate used	FRAC group	Active ingredient
Cevya (BASF)	4 fl oz/acre	3 (DMI)	Mefentrifluconazole
RNAi + Silwet	27.4 fl oz/acre + 12.8 fl oz/acre	Not classified	RNAi construct + Organosilicone surfactant
Kaligreen (OAT Agrio Co.)	5 lb/acre	M2	Potassium bicarbonate
Regalia (ProFarm)	4 quarts/acre	P5	Extract of <i>Reynoutria sachalinensis</i>
JMS Stylet Oil (JMS Flower Farms)	2 gallons/acre	NC	Paraffinic mineral oil
Plasma-activated water	—	Not classified	(experimental)
Vivando (BASF)	15.4 fl oz/acre	50	Metrafenone
Torino (Gowan)	3.4 fl oz/acre	U6	Cyflufenamid
Quintec (Corteva)	4 fl oz/acre	13	Quinoxifen

Date	Product / Treatment	Target / Application	Notes
Monday, June 9, 2025	Luna Experience	Whole field	Commercial application
Tuesday, June 24, 2025	Cevya (4 fl oz/acre)	Study plots only	Applied only to plots under the trial
Tuesday, July 8, 2025	Table 1 products	Corresponding plots	Plasma-activated water was not supplied on time; plots remained untreated
Tuesday, July 22, 2025	Table 1 products	Corresponding plots	All products applied
Thursday, August 7, 2025	Table 1 products	Corresponding plots	All products applied



2025 Valley Center Field Trial - Results



- 25 random clusters per treatment.
- **Incidence:** % of clusters affected.
- **Severity:** % of cluster area affected.

Eskalen Lab @UCdavis

Grapevine, Tree fruits and Small Fruits Pathology

[Home](#) [The PI](#) [Research](#) [Fungicide Efficacy Trials](#) [Team](#) [Publications](#)

Fungicide Efficacy Trials



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