

A close-up photograph of a bunch of purple grapes. Many of the grapes are covered in a white, powdery substance, which is powdery mildew. The grapes are clustered together on a stem. The background is a soft, out-of-focus green.

METOS[®]
BY PESSL INSTRUMENTS

Power of Technology For Farming

A Quick Guide To Smart Disease Monitoring: Powdery Mildew

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OVERVIEW

Powdery mildew is one of the most widespread plant diseases, affecting a variety of crops worldwide. Its ability to spread rapidly under favourable environmental conditions makes it a persistent challenge for any farmer.

Understanding how weather conditions influence disease risk and using smart monitoring solutions can help prevent outbreaks and optimize crop protection strategies.

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1. POWDERY MILDEW

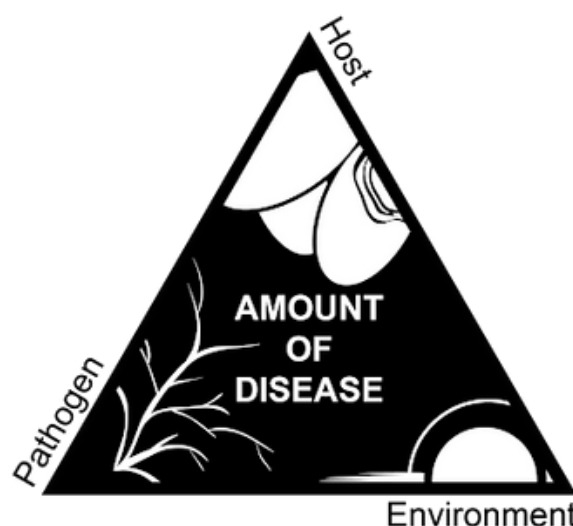
1. 1 INTRODUCTION: HOW WEATHER AND ENVIRONMENTAL CONDITIONS INFLUENCE DISEASE RISK?

The occurrence of fungal diseases like powdery mildew, depends on three factors: the virulence of the pathogen, the susceptibility/resistance of the host plant, and favorable environmental conditions.

This relationship is illustrated in the Disease Triangle: where all three elements must be present for an infection to occur.

1. 2 DISEASE TRIANGLE

- **Virulent Pathogen:** the fungus must be present
- **Susceptible host:** a crop must be vulnerable to infection
- **Favorable environmental conditions:** specific temperature, humidity, and leaf wetness levels must be met



1. 3 KEY CONDITIONS

But what key environmental conditions* influence powdery mildew outbreaks?

- **Temperature:** generally, most species of powdery mildew thrive in mild temperatures (15-25 °C), while high temperatures (above 30 °C) may suppress their growth.
- **Humidity and Leaf Wetness:** while powdery mildew does not require free water to germinate, most species benefit from high relative humidity (above 70 %), which promotes infection.
- **Rainfall:** unlike many fungal diseases, powdery mildew is not directly spread by rain. However, extended wet conditions can impact leaf wetness and humidity, indirectly affecting disease development.

- **Solar Radiation:** UV exposure can help reduce spore viability, influencing disease progression.



**These are general conditions that apply to most species of powdery mildew. It is always recommended to assess each situation individually for accurate disease management.*

2.OUTCOME

2. 1 WHAT DOES THIS MEAN FOR YOU?

We suggest monitoring temperature and humidity levels closely. While rain does not directly spread the disease, prolonged leaf wetness can create a favorable environment for infection.

To reduce the risk of outbreaks, make sure to:

- **Improve airflow** by pruning or adjusting plant spacing.
- **Apply fungicides preventively** when conditions favor mildew development.
- **Track humidity** in order to assess risky periods

By taking proactive measures and using environmental conditions to your advantage, you can effectively manage powdery mildew and protect your crops.

In 2024, a comprehensive study revealed that powdery mildew fungi are among the most widespread plant pathogens globally, infecting approximately 2.9% of all known flowering plant species across 200 countries. This extensive host range underscores the significant threat that powdery mildew poses to both global agriculture and biodiversity (🖱️ [Pfister Group, Harvard University](#)).

Additionally, a 2025 study highlighted the rapid global spread of *Erysiphe vaccinii*, a powdery mildew species that primarily affects blueberries. Previously confined



to North America, this pathogen has now spread to major blueberry-growing regions, including China, Morocco, Mexico, and the U.S., posing a significant economic threat due to potential crop losses (🍷 [North Carolina State University](#)).

These findings emphasize the urgent need for vigilant monitoring and management strategies to mitigate the impact of powdery mildew on agricultural production and plant health worldwide.



3. SENSORS

3.1 WHICH SENSORS DO YOU NEED?

To effectively monitor, track, and manage powdery mildew, precise environmental monitoring is crucial. Having real-time data on key factors influencing disease risk can help you secure your crop yields.

Here’s how the right sensors help:

SENSOR	FUNCTION	CROP-SPECIFIC BENEFITS
Air temperature and relative humidity	Measures temperature and humidity levels, crucial for disease development	Helps predict powdery mildew outbreaks in crops like grapevine, wheat, and tomatoes
Leaf wetness	Detects moisture on plant surfaces, a key factor in fungal infections	Essential for crops like cherry, strawberry, and hazelnut
Rain gauge	Tracks precipitation levels, impacting humidity and microclimate conditions	Helps assess the indirect influence of rain on powdery mildew
Solar radiation	Estimates disease risk decrease in sunlight susceptible Powdery Mildew	Supports disease risk assessment for all monitored crops

By integrating these sensors, you can accurately predict infection risks and take preventive measures.

4.SOLUTIONS

4. 1 METOS SOLUTIONS FOR MONITORING POWDERY MILDEW

Pessl Instruments offers all needed sensors combined with Disease model subscription for various crops that help take proactive steps against powder mildew.

PATHOGEN	CROP	RAIN	AIR TEMP	RH*	LEAF WETNESS	SOLAR RADIATION	SUGGESTED METOS SOLUTION*
Uncinula necator	Grapevine	✓	✓	✓	✓	-	METOS 5 200 Disease Model Subscription
Podosphaera aphanis	Strawberry	-	✓	✓	✓	-	METOS 5 200 Disease Model Subscription
Podosphaera clandestina	Cherry	-	✓	-	✓	-	METOS 5 200 Disease Model Subscription
Podosphaera xanthii	Cucurbits	-	✓	✓	✓	✓	METOS 5 250 Disease Model Subscription
Sphaerotheca Pannosa	Stone fruits	-	✓	-	✓	-	METOS 5 200 Disease Model Subscription
Blumeria graminis	Wheat	-	✓	-	-	✓	METOS 5 BASE + HSE Disease Model Subscription
Phyllactinia guttata	Hazelnut	✓	✓	-	✓	-	METOS 5 200 Disease Model Subscription
Leveillula taurica	Tomato**	-	✓	✓	✓	✓	METOS 5 250 Disease Model Subscription

*RH: Relative Humidity

**Please ask for our disease models on warm and moderate climate tomato

5. NEXT STEP

5.1 TAKE CONTROL OF YOUR FIELD, ORCHARD OR VINEYARD WITH METOS

- **Prevent outbreaks before they happen:** real-time disease modeling helps detect high-risk periods before outbreaks occur, giving a head start in disease management.
- **Reduce unnecessary fungicide use:** monitoring disease risk levels allows to apply fungicides only when necessary, reducing costs and minimizing environmental impact.
- **Data-Driven Decision Making:** with site-specific weather forecasts and historical data, informed decisions about irrigation, pruning, and other preventive measures are made.
- **Increase yield, quality, and profitability:** by preventing severe infections, healthier crops, leading to higher yields and better product quality are ensured



Don't let disease take your crops
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