

Powdery Mildew in Strawberries

Podosphaera aphanis

A BC Small-Scale Farmer's IPM Guide- *Guide series, March 2021*

Powdery mildew is one of the major strawberry diseases that attacks all parts of the plant, but is usually first seen on the older leaves. As this fungal disease can overwinter on dead tissue from previous seasons, sanitation is an important part of pre-season management. The common name "powdery mildew" is also found in other crop groups, but those are different fungi that cannot infect strawberries (e.g. powdery mildew in strawberries is different from the powdery mildew in raspberries). Day neutral strawberry varieties can be harder hit than June bearing varieties, as they have a longer season. This manual contains integrated pest management (IPM) guidelines geared towards small-scale production, but they are applicable to any operation wanting to improve pest identification, monitoring and management.

Identification

Leaf infections

- Mature leaves curling upwards.
- Splotchy pink-purple discolouration visible on the top and underside of leaf.
- Delicate white fungal growth later in season.



Berry infections

- Delicate white fungal growth.
- Smaller fruit with raised seeds.



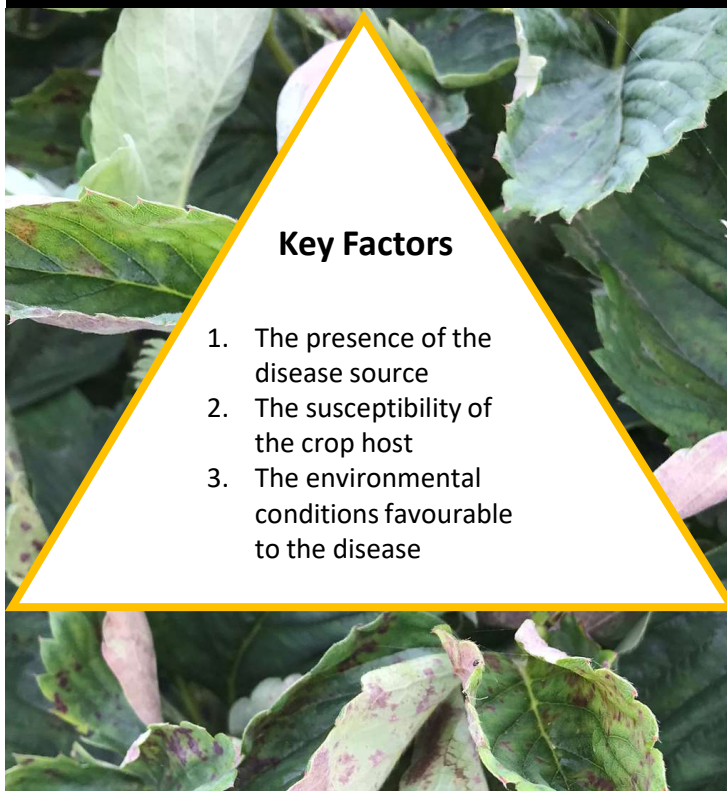
Look-alikes

This disease can commonly be mistaken with other diseases or issues such as leaf scorch, sun scald, or virus, due to the red splotchy appearance of leaves or reddening of the plant tissue. With powdery mildew, delicate white fungal growth will appear on infected tissue, and leaf edges will curl up and inwards. Virus symptoms, for example, cause the leaves to become disfigured and twisted.



Conditions

There are three key factors (also known as the 'Disease Triangle') to account for powdery mildew disease severity:



Source of powdery mildew

- Spores from old foliage from the previous year.
- Spores spread by wind.

Susceptible tissue

- Mature leaves in spring.
- Blossoms.
- Developing fruit.

Conditions for infection and spread

- Warm temperatures (between 15-27°C).
- High humidity but dry leaves.
- Does not require standing water on the surface of leaves for infections (spore germination is actually suppressed by rain).

How to Monitor

Monitoring period and frequency

- Start monitoring when there are at least two older leaves per plant, and continue at weekly intervals until the end of harvest. Infection can occur from early spring until first frost.
- Closely monitor day-neutral varieties in the late summer and early fall, when there are warm days and heavy dew in the mornings.

Key objectives for monitoring

Initial Infections

- Begin to check for leaf distortion and purple discoloration near the edge of the older leaves in the early spring, especially in areas that have had powdery mildew issues in the past.

Increasing levels

- After finding the first symptoms, continue with regular checks (weekly) to monitor for any increases in infection levels until the end of the harvest season.

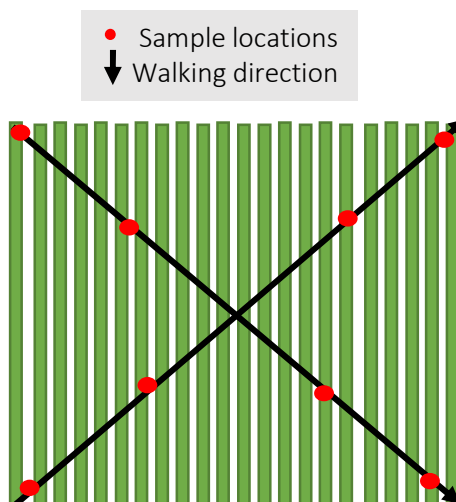
Monitoring to track increases in disease infection levels

- Each planting/variety should be inspected.
- **Make two passes** through each planting.
- Stop at a minimum of **four locations per pass** and inspect **five plants** per stop.
- **Record the number of plants** with powdery mildew to track the percentage of infected plants each week.

$$\text{Percentage of infected plants} = \frac{\text{total \# of plants with powdery mildew}}{\text{total \# plants checked}}$$

Record

Keep record of the numbers using a printout of the data sheet template provided in this guide.



When to Act

There is no threshold for powdery mildew in strawberries, so management should be based on field history, environmental conditions, and disease presence and severity. Once powdery mildew is established within a field in the spring it is very difficult to manage. The disease can spread quickly. **Consider the following risk factors** to help determine if you should enact some form of management:

Risk factors

- High humidity and warm conditions** - Does not need leaf moisture.
- Time of year** - Higher risk in early warm springs and mid-late summer.
- History of infection** - In fields with a history of infection, begin sprays before any symptoms are found.

How to Manage

Cultural control

- **Manage weeds** within the field to help **increase air flow** and reduce humidity. The use of plastic mulch or landscape fabric can decrease humidity and help control weeds.



- **Renovate June-bearing plantings** as soon as harvest is complete to destroy infected tissue, as the disease will overwinter on old plant tissue and persist into the next season.
- **Cleanup** last year's leaves in **day-neutral plantings** in the spring by pruning out old tissue around the new leaf growth.



Chemical control

- Fungicide applications should be applied at first sign of symptoms when conditions are conducive to disease development.
- Once the disease is found in the field, multiple fungicide applications may be needed to keep infection levels down.
- It is important to rotate between products with different modes of action to reduce the risk of resistance build-up in a field, especially as this disease is present in fields over multiple years.
- Registered pesticides used in **organic production** for management of powdery mildew in strawberries include the active ingredient *Streptomyces lydicus*, extract of *Reynoutria sachalinensis*, and tea tree oil. Always check with your organic certification body before using any pesticide products.
- Please refer to the **BC Strawberry Production Guide** for current organic and conventional spray options for powdery mildew in strawberries.
- Always read the label prior to applying any pesticide products.



References and Links:

BC Production Guide – Strawberries

<https://www2.gov.bc.ca/gov/content/industry/agriservice-bc/production-guides/berries/strawberries>

Ontario Crop IPM

<http://www.omafra.gov.on.ca/IPM/english/strawberries/diseases-and-disorders/powdery-mildew.html#advanced>

PNW Plant Disease Management Handbook

<https://pnwhandbooks.org/node/3568/print>



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