

Collecting Pathogen Samples for Fungicide Resistance Monitoring

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Various methods may be used to collect pathogen samples from diseased grapevines, depending on sampling conditions. The sampling guidelines below have been optimized for grapevine powdery mildew.

Sampling Timing

When assessing the prevalence of fungicide resistance in populations of grapevine powdery mildew, samples may be collected at any time during the growing season. However, sampling efforts conducted from budbreak (E-L 4) to prebloom (E-L 12), can provide actionable information earlier in the season to mitigate potential consequences of resistant populations. Sampling later in the season, close to harvest (E-L 38), may provide actionable information for the following growing season. To interpret your results, reference the guide to “Interpreting FRAC 11 Fungicide Resistance Tests-Vineyards” on the framenetworks.wsu.edu website.

Sampling Methods

Cotton Swab

Visible powdery mildew colonies may be sampled using a sterile cotton swab.

Supplies:

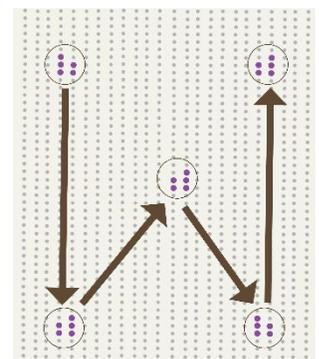
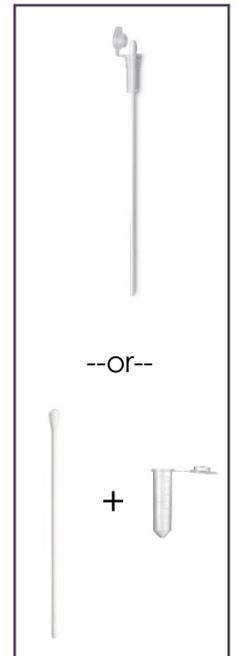
- Cap-Sure 6" sterile cotton swab & protective cap (plastic handle); or
- Sterile cotton swab + microcentrifuge tube

Cotton Swab Protocol

- Identify visible powdery mildew colony.
- Prepare the swab: Open the cap and extend the swab just beyond the lip of the cap.
- Gently rub the swab on the lesion to collect fungal material.
**Avoid collecting grape pollen as it interferes with sample processing. This will likely only be an issue if swabbing the inflorescence (grape cluster in bloom).*
- Close the cap by grasping the sides; avoid touching the swab.
- Label the tube with the sample location.
- Continue to additional sampling points, following the “sampling pattern” guidelines.
- Store samples in a cool location.
- Bundle samples in a padded envelope and submit to a laboratory for processing.

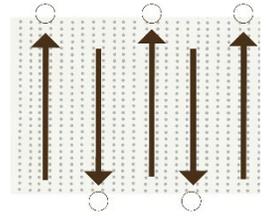
Sampling Pattern

- Navigate the sampling area in a ‘W’ pattern. Collect samples at vertices, as indicated (right).
- Collect a minimum of five, 5-vine samples from each 1- to 5-acre vineyard increment.



Glove Sampling

Gloves that have extended contact with the grapevine canopy can be used as a sample.



Supplies:

- Cap-Sure 6" sterile cotton swab & protective cap (or similar)
- Disposable gloves (nitrile or latex) –or– Worker gloves (latex, nitrile, leather, suede)

Glove Sampling Protocol (Self)

- Place a glove on your non-dominant hand.
- Walk the length of the sampling area (vineyard row or portion thereof). Keep the glove in near continuous contact with the grapevine canopy, at varying canopy height and depth.
- Once you reach the end of the sampling area, prepare the swab by opening the cap and extending the swab just beyond the lip of the cap.
- Gently rub the swab across the surface of the glove, covering as much of the glove area as possible.
- Close the cap by grasping the sides; avoid touching the swab.
- Label the tube with the sample location.
- Continue to collect samples. Collect a minimum of five samples for each 1- to 5-acre vineyard increment.
- Store samples in a cool location.
- Bundle samples in a padded envelope and submit to a laboratory for processing.



Glove Sampling Protocol (Worker)

- Coordinate with a crew conducting canopy management activities. Ensure that all workers are wearing gloves.
- When a worker reaches the end of a row, prepare a swab by opening the cap and extending the swab just beyond the lip of the cap.
- Gently rub the swab across the surface of the glove, covering as much of the glove area as possible.
- Close the cap by grasping the sides; avoid touching the swab.
- Label the tube with the sample location.
- Continue to the next worker, until you have collected sufficient samples to represent the area of interest.
- Collect a minimum of five samples for each 1- to 5-acre vineyard increment.
- Store samples in a cool location.
- Bundle samples in a padded envelope and submit to a laboratory for processing.

Spore Traps

Impaction traps that are used to detect the movement of airborne spores can also be used to monitor fungicide resistance.

Supplies:

- Rotating arm impaction air sampler (spore trap).
- Contract with a commercial entity or build your own
<https://doi.org/10.1094/PDIS-01-24-0131-SR>

Resources:

- Video Tutorial: How to build a rotating arm Spore Trap for grapevine powdery mildew (YouTube video)
<https://www.youtube.com/watch?v=D0kJZbNw7tc>



How To Article



YouTube Video

Spore Trap Protocol

- Collect the sampling rods from the spore trap following established protocols to avoid contamination.
- Store the spore rods and submit to a commercial laboratory for processing

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