

# KVH Information Sheet

## Identification of Psa-V Symptoms



### Primary symptoms

Leaf spot is a primary symptom of Psa-V. Leaf spotting can result from the growth of bacteria outside/inside the vine. Primary symptoms include:

- Peppery spotting.
- Angular and irregular shaped spots in areas between the leaf veins.
- Very dark/black coloured spots.
- Spots that may or may not be surrounded by a pale yellow halo.
- Spotted leaves that begin to curl.

### Notes

- Spotting may occur 14–21 days after an infection event. (An infection event is a period of prolonged leaf wetness. The exact length is unknown but thought to be approximately 48 hours or longer).
- Spotting is often seen first on strung cane.
- Spots are typically across the leaf— not confined to the edges of leaves.
- Infected buds may also be seen close to leaves with spotting.

### Primary symptoms



Peppery spotting



Angular and irregular shaped spots in areas between the leaf veins.



Spots with surrounding halo



Spots with surrounding halo on strug cane



Spotted leaves that have started to curl



Infected buds close to leaves with spotting

### Secondary symptoms

A secondary symptom is the result of Psa-V progressing into the vascular tissue of the vine. This leads to a rapid decline in vine health. Secondary symptoms include the following three categories.

#### Category 1: shoot dieback/cane collapse

- Curled or dead leaf shoots.
- Collapsed dehydrated canes.
- Cane dieback with shrivelled fruit

#### Notes

- Curled or dead shoots may be seen first at the cane tip. Progression of shoot dieback along the cane toward the leader may follow.
- The cane/shoot will generally shrivel but remain attached to the cane/leader.
- Depending on the source of infection and/or time of season, red/orange exudate may also be found on the affected cane.



Shoot dieback



Collapsed cane



Cane dieback with shrivelled fruit

### Category 2: red/orange exudate

Typically seen on, but is not restricted to, cane/shoot nodules and graft union sites.

#### Notes

- Red/orange exudate is a plant response to bacterial infection.
- This exudate is a source of inoculum.
- Vines expressing red/orange exudate may also show unusual spring sap flow. This is due to the build-up of internal sap pressure through Psa-V infection within the vascular tissue.



Red/orange exudate



Red/orange exudate

### Category 3: white exudate

- Typically seen on, but is not restricted to, cane/shoot nodules and newly emerging buds.
- Sometimes seen on freshly cut canes from infected vines.

### Notes

- White exudate is an advanced stage of the disease and contains very high levels of inoculum.
- There is a significant risk material from these vines have the capacity to spread Psa-V.



White exudate



White exudate from a freshly cut cane

Photo credits: Category 1 leaf curl image. Category 2 red/orange exudate, second image. Category 3 white exudate first image Plant & Food Research Ltd.

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