KVH Best Practice Advice

Male Management—protecting male plants in a Psa-V environment

Male vines often express Psa-V symptoms before female vines. This was seen in Hort16A, new varieties and now in Hayward.

While this observation may be due to some male varieties having a lower tolerance of Psa-V, it is also likely that incomplete spray programmes, poor spray coverage and infection through late season growth, have contributed to these levels of infection.

Canopies with medium to low vigour wood appear to have less infection. This is possibly due to the wood being mature and hardened off by autumn, when the risk of Psa-V infection through green tissue is high.

Male Management

Manage infection

- Monitor and tag infected vines
- Remove infected material
- Cauterise cankers
- Protect wounds

Develop low vigour systems

- Create a flat open canopy
- Promote spur growth
- Minimise pruning cuts - particularly soft tissue
- Remove late Autumn growth
- Complete Winter pruning prior to sap flow
- Spray - Spray - Spray

Late winter to spring (July/August/September)

- Monitor males for red exudate. Cankers are often associated with broken canes or tip dieback (Fig. 1).
- Tag infected vines. Also tag position of symptoms on the vine.
- Assess the impact of infection in each block by identifying the number of males affected and the severity of infection:
  - If only a few males are infected consider removing whole plants.
  - If more than a few vines are affected, remove infections as follows.
    - If cankers are isolated (e.g the tips of canes or on crowns) remove these and seal all wounds.
    - For leader cankers, excise (cut out) infected tissue and seal the wound. Alternatively cauterise cankers using a butane torch (Fig. 2).
  - If a high proportion of males are badly infected, remove large cankers and strengthen the protective spray programme to minimise inoculum spread.
- Make an assessment of pollination requirements based on the level of infection.
- **Note:** Pollination research has shown male size is less important than male distribution within a block. Removal of infected material from males will reduce the risk of *Psa-V* infection. However, this may not significantly compromise pollination.
- Follow the KVH Best Practice Spray Programme— Bud Break to Flowering in the KVH Seasonal Management Guide. Use copper, antibiotic products and elicitors in the pre-flowering window.

Figure 1: High broken canes can be associated with *Psa-V* infection.

Figure 2: Tag symptoms. Assess the severity of infection and determine the best course

Flowering (October/November/December)

- Apply an elicitor prior to flowering to add protection through the high-risk flowering and pruning periods.
- Harvest as many male flowers as possible for current and future pollination requirements.
- Avoid collecting infected flowers from exudating male plants.

Immediately post-flowering

- Prune males as soon as possible after flowering. Only prune in dry conditions.
- Sterilise tools between plants to minimise the risk of infection transfer. For example, have two sets of pruning tools per pruner.
- Consider removing infected wood ahead of the pruning team. This may help minimise infection transfer during pruning.
- Prune to create a flat open canopy.
- Minimise the number of pruning cuts. A few large hardwood cuts are preferred to multiple smaller cuts (Fig. 8).
- Minimise cuts made on juvenile vines. Juvenile vines are more susceptible to Psa-V.
- For vines being transitioned to low vigour, remove complex growth points . Consider reducing plant size by shortening leaders (Fig. 3).
- Flush cut highly vigorous growth to encourage spur wood (Fig. 4).

- Stub cuts should only be made on low to medium vigour wood.
- Minimise green tissue cuts.
- Maintain sufficient mature leaves to support the vine. Mature leaves are less susceptible to infection.
- Note: Where multiple cankers exist along the leader, consider removing leaders to promote new, clean growth.
- To protect wounds, apply a copper spray immediately after male pruning.

Figure 3: Reduce plant size by shortening leaders.

Figure 4: Make flush cuts to encourage new, low vigour growth

Post pruning (January/February/March)

- Late autumn growth is prone to infection and reduces spray penetration (Fig. 5).
- Remove regrowth early, and often, throughout the summer to autumn period. Consider late January, and March to April rounds.
- Ripping is recommended. Secateur use poses a higher risk of infection transfer.
- Use squeeze tipping to control the vigour of actively growing canes (Fig. 6).
- Continue monitoring male vines throughout this period. Remove any infected material.
- High growth is more prone to breakage, and is difficult to spray. Therefore it is susceptible to Psa-V infection. (Fig. 7)

Figure 5: Dense canopies reduce spray coverage, increasing the chance of

Figure 6: Use squeeze tipping to control actively growing canes.

Figure 7: Unchecked high growth increases the chance of infection.

Late autumn to winter (March/April/May/June)

- Apply copper sulphate to promote leaf-fall. Follow this with persistent copper sprays regularly until leaf-fall has finished. Apply these before rainfall events. (Vines have no active defence against infection when dormant.)
- Remove broken canes and tie down high growth.
- Where necessary, make big cuts to reduce complexity of male plants (Fig. 8)
- Maintain space between male and female vines (approximately 30 cm) (Fig. 9).
- Consider notch grafting to more tolerant male varieties

Figure 8: Make big cuts to the leader to remove complexity in male plants.

Figure 9: Maintain space between male and female vines.

Other options to manage vigour in male plants

Girdling

- Girdling can be considered as part of a low vigour management strategy.
- Girdles applied earlier in the season may provide some devigouring effect within that growing season.
- Only girdle in dry weather.
- Strictly supervise staff. Avoid extreme girdling.
- Girdling tools are preferable to chains.
- Maintain effective tool hygiene between plants (Fig. 10).
- Avoid girdling young or stressed vines. Girdle rootstocks rather than scions.
- Protect girdles with copper sprays.

Fertiliser

- Banded applications could be considered in strip-male orchards.
- To reduce succulent growth, avoid excessive fertiliser application.
- Maintain adequate boron and calcium. Reduce nitrogen inputs.

Vine footprint

- Control excessive growth by manipulating planting density of male plants.
- Pruning practices need to avoid stimulation of lush new growth, and should occur early enough to allow resulting growth to harden off before autumn frosts.

Environmental factors

- Take steps to counteract environmental factors that predispose vines to stress.
- Improve block shelter to reduce wind damage.
- Break up hard soil pans.
- In light, shallow soils, mound soil around vines to improve drainage at the root zone.
- Manage soils to achieve the correct soil pH.
- Optimise frost protection systems to minimise frost injury.
- Use under-vine irrigation systems that do not wet the foliage.

Remember:

- Only prune in dry conditions
- Clean your tools
- Reduce dense canopies to improve spray coverage
- Remove high growths and late autumn growth
- Avoid green tissue cuts where possible
- Protect all wounds
- Maintain a protectant spray programme throughout the year

Resources

- KVH Seasonal Management Guide
- Zespri male management video
- NZ Kiwifruit Journal article—November/December issue: P*rotecting males – stabilising your orchard's pollen producers in a Psa environment*
- KVH Information Sheet: Male susceptibility to Psa-V
- KVH Information Sheet: Vine age and disease susceptibility
- Video—Girdling in a Psa-V environment
- Video—Assessing Spray Coverage # 4 (male canopy management)