

## Background

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- ⊙ Psa is a pathovar of *Pseudomonas syringae* that attacks all commercial species of kiwifruit.
- ⊙ Psa requires sufficient inoculum load and the right environmental conditions to cause infection.
- ⊙ The ability of Psa to survive on other natural or man-made surfaces is unknown.
- ⊙ The bacteria does not have a spore phase so it is short lived without a food source. However, bacteria can multiply very rapidly under wet conditions on live kiwifruit material which provides the food source it needs.
- ⊙ Movement of Psa around and between orchards can occur without visible signs of infection. This may be due to low inoculum levels and/or because the environmental conditions are not favourable.

## Relative risk

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- ⊙ There are various orchard activities and natural events that can aid the spread and infection of Psa from plant-to-plant and orchard-to-orchard.
- ⊙ The risk matrix on the following page considers the relative risk of transferring Psa through various activities.
- ⊙ Not all risks are considered equal with regards the spread and infection of Psa.
- ⊙ It is essential that the priority is on managing the activities that pose the greatest risk, while being aware of and having measures in place for other risks..
- ⊙ The risk of orchard activities will vary depending on the time of year, weather conditions at the time and the stage of vine growth.
- ⊙ Orchard activities that have a high risk of transferring plant material directly between orchards pose the highest risk.

## Orchard Environment

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- ⊙ The location of an orchard is its biggest risk. Ensuring neighbours are undertaking good preventative practices is the best line of defence.
- ⊙ Good orchard shelter to restrict air flow may help to prevent spread. Good shelter also prevents blow outs that provide an entry point for Psa. Hail netting

also reduces the risk of physical damage from hail or wind damage

- ⊙ Rainfall is uncontrollable so protectant agrichemical products are needed to minimise the chance of infection and to keep inoculum loads low.
- ⊙ The conditions around the time of transfer are thought to be critical for re-establishment. As Psa requires water to enable infection to occur, orchard activities that are undertaken during wet weather heighten the risk.
- ⊙ Infected plant material poses the greatest risk of spread.

## Kiwifruit plant material risk

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- ⊙ Because Psa has only been shown to multiply on or in kiwifruit plant material, the greatest risk of spreading Psa is the transfer of kiwifruit plant material.
- ⊙ Infected leaves and canes have been shown to contain live Psa and thus are the highest risk vine parts.
- ⊙ Psa can remain dormant inside the vine for several years so wood from vines in infected orchards is a risk even if the vine is not showing symptoms.
- ⊙ The situation is unclear with regards the risk of pollen, but until such time as is proven otherwise it is best to assume that pollen is a potential vector.
- ⊙ There is presently no evidence to suggest it can survive or spread through fruit.
- ⊙ While the fruit is considered low risk. It is still important to implement measures when fruit samples are collected (or harvest) from orchards with known Psa, or orchards that are high risk due to proximity to these orchards to minimise any risk.



## How have the risks been considered in the development of the Psa Resources?

- Best Practice protocols focus on those activities that pose the highest risk (i.e. the transfer of kiwifruit plant material). The protocols also considers measures that will best minimise the risk (e.g. clean-down areas, minimising contact with the kiwifruit vines)
- The main focus in the protocols is the containment of the Psa-V isolate. Although some activities are considered low risk, the protocols in and around Psa-V isolate orchards have additional measures to minimise the risks (e.g. disinfecting vehicles and equipment, bins etc) even further.

## Risk Matrix - Orchard

Very high	 Kiwifruit pruning waste and kiwifruit plant debris		
	 Budwood, nursery stock		
High	 Weather events (>25mm rain & prolonged leaf wetness >15km/hr wind & cool temps)		
Medium		 Vehicles + equipment used on the orchard with high probability of transferring kiwifruit plant material (e.g. pruning/cutting equipment mulchers, spraying equipment in summer, shelter trimmers)	
	 * Contamination of Non Kiwifruit Plant Material (e.g. grass clippings, weeds)		 * Orchard workers/ visitors/ contractors in the canopy (i.e. hands/ gloves, clothing, footwear, headwear)
Low		 Vehicles + equipment used on the orchard with low probability of transferring kiwifruit plant material (e.g. spraying equipment in winter, quad bikes, herbicide spraying gear)	
	 * Kiwifruit	 * Bins	
Very Low		 Vehicles + equipment on the orchard (away from the canopy)	 Visitors to the orchard
	Plant material	Vehicles/Equipment	People



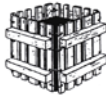

\* Wet weather conditions will heighten the risk

# Psa : Risk Considerations

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## Risk Matrix - Packhouse

Very high			
High	 Packhouse dust/debris + kiwifruit waste		
Medium			
Low	 Reject fruit Fruit - for sale on local market	 Bins	 Fruit handlers (graders/packers)
Very Low			
	Plant material	Vehicles/Equipment	People

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