# Spotted wing drosophila: What would management look like?

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*MT17005 'Improving the biosecurity preparedness of Australian horticulture for the exotic Spotted Wing Drosophila (Drosophila suzukii)*

Exploiting microclimates to keep cosy, hiding out in fruit, hitching rides to new places – this pest knows all the tricks. But do you know the tricks for its management? The spotted wing drosophila (SWD: *Drosophila suzukii*) is a significant horticultural pest overseas that has been spreading to a growing number of countries and regions over the past two decades, although it is not yet found in Australia.

It is termed an 'emergency plant pest' of soft fruit industries in Australia. This means that detection of spotted wing drosophila in Australia would start the process for considering if eradication is possible, and feasible.

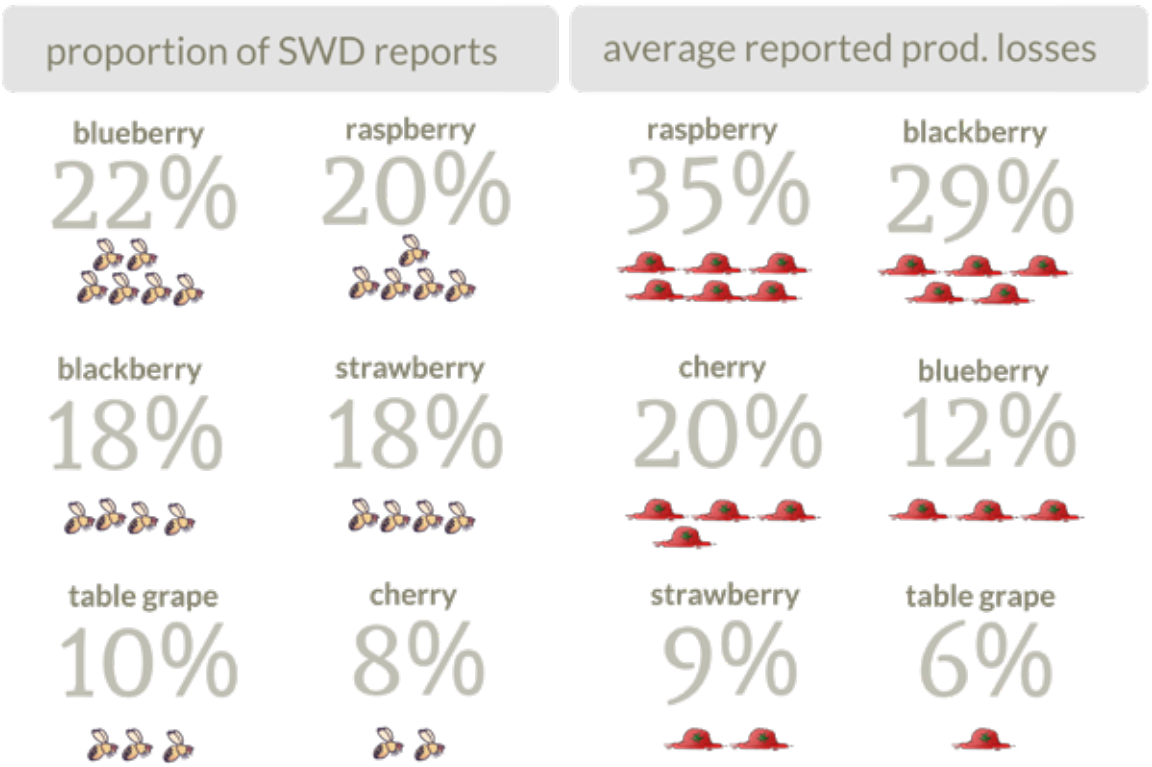
Sometimes a new pest cannot be eradicated. In the case of spotted wing drosophila, it would need to be detected very early in the incursion for eradication to be a possibility as it is a species that is known to spread extremely quickly.

Its ability to spread quickly is made possible by its lifecycle and appearance. This exotic fly is cryptic (it looks very similar to *Drosophila melanogaster*, the vinegar fly), it can pierce and lay eggs in unripe fruits still on the vine, and it can survive in both warm and very cold environments.

Larvae stay protected from chemical controls as they feed within the fruit, and adult flies can quickly build up in large numbers, particularly if fruit waste is left to rot in paddocks.

Let's remind ourselves of what SWD is capable of doing to soft fruit crops once it is established in an area by looking at data from other regions. While losses in the US and Europe as high as 80% have been reported among Rubus, strawberry and cherry crops, production losses of 20-40% on affected farms are more common.

**SWD on raspberry in the United States.**
Photo credit: Hannah Burrack, North Carolina State University, Bugwood.org




## Management – what to consider

Management overseas follows an integrated approach, with a heavy focus on cultural controls. In Australia, like overseas, management would involve introducing a range of practices to maintain crop quality and minimise losses.

Below we highlight key considerations for management, based on current practices and findings overseas.

### Generation time and fecundity

- A female fly lays 1-3 eggs per site and can lay up to 400 eggs throughout her lifetime
- Population growth throughout a season is highly dependent on environmental conditions
- Spotted wing drosophila will rapidly increase its population size under mild conditions (approx. 22°C)

### Host preferences

- Raspberries bear the brunt of egg laying compared to strawberries, blueberries, and blackberries
- This may be due to the thin skin of the raspberry, but research into what drives preferences is ongoing
- Use of the SWD Host Preference Index (Bellamy et al. 2013) indicates the following hierarchy: raspberry>strawberry>blackberry>cherry>peach>blueberry>grape

### Microclimate manipulation

- A humid environment is important for spotted wing drosophila viability
- Strategic pruning and plant spacing will allow for greater airflow, better chemical coverage and reduce shading
- Research into optimised pruning methods is ongoing overseas

### Exclusion and mulches

- Exclusion netting must be at least 80 grams
- Netting must be in place before spotted wing drosophila adults are detected in the area
- Plastic weed barriers will stop larvae from burrowing into soil to pupate and will reduce presence of standing water, thus reducing humidity

### Chemical control & trapping

- If detected in Australia, the minor use and emergency permit system (and registrations) would support access to appropriate chemistry
- Chemical control must be timed to target the adult
- Overseas, regular use of a limited number of chemicals has increased risk of resistance. Flare-ups of secondary pests, such as scale, has also been an issue

- A trapping network set up early in the growing season will give an indication of adult presence and abundance, which can help inform strategic sprayin
- A range of lures and trapping systems are now available commercially, or traps can be made using basic ingredients, such as wine (plenty of that in Australia!)

## Natural enemies

- Hort Innovation funded research project reviewing Australian natural enemy options, including parasitoid potential, is underway (MT18010)
- Ground dwelling generalists, such as carabid beetles and earwigs are likely to have the greatest suppressive effect (and will need to be protected from off-target insecticide impacts)

## Reducing harvest intervals

- Reducing harvest intervals will:
  - reduce olfactory attractants from over ripe fruit
  - reduce number of preferred egg laying sites
  - reduce number of larvae that develop into adults, limiting population growth
- Past studies on raspberry indicate harvesting every two days gives good protection from egg lay and does not significantly impact yield
- Harvesting every three days resulted in a noticeable difference, with more eggs and larvae detected

## Quality control

- The floatation test is often used as a batch test for infected fruit
- Training packing line workers to remove fruit with feeding symptoms (sunken blemishes on fruit are an indicator) adds another layer of quality control

## Waste disposal

- Fruit waste is removed during and after harvest. This includes fruit that has already dropped
- Waste is sealed in pallet bins or drums. Fermenting of waste for 2–4 days at 18°C, creates an anaerobic environment that will kill larvae

In Australia, the wide climatic zones spanned by host fruit growing regions will require nuanced regional management planning. If there is an incursion, it is possible that efficiencies could be made by aligning certain practices with those used to manage Queensland fruit fly or Mediterranean fruit fly depending on location.

Early detection really does increase the chances of eradication. However, if eradication is not an option, at the end of the day early detection remains a crucial part in giving growers time to learn more about this pest, to plan, and put in place management infrastructure and processes so the supply chain can continue without hiccup.

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