Spotted wing drosophila: the overseas experience & tips to stay a step ahead

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

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In a review headed by Plant and Food Research – Australia, the project has now investigated circumstances surrounding first detections of SWD in over 30 countries spanning North America, South America, and Europe.

Thumbs down for this hitchhiker

Fast spread throughout regions and between countries has been supported by this fly's ability to survive in warm and cool climates (Figure 1). Only one year after a confirmed 2008 detection of SWD in California the fly had been found in 20 counties across the state, as well as the cooler climate states of Oregon and Washington, and the decidedly warm climate state of Florida.

How did it travel so quickly? SWD larvae make a home out of developing or ripe fruit until pupation. With the larvae hidden away, long range transmission is supported by movement of produce. In reviewing the academic literature, it was noted that South American researchers were able to rear SWD out of imported blueberries purchased at a Sao Paulo grocery store – blueberries that had been grown in an entirely different Brazilian state.

Several first detections of SWD overseas have occurred near fruit transit hubs. Examples of this include near a grocery store in Sweden, by a selling point for imported fruit in the Netherlands, and in a tourist area in Croatia. The first detection in Hungary was at a highway rest stop. Detections near major seaports have also been common, which may indicate a higher risk of entry and establishment near seaports.

When it comes to more modest expansion of the fly range within a region or country, the rate of spread observed overseas suggests that vehicles play a role, rather than flight-based spread (remember – this is a very small fly!).

SWD adults and larvae in raspberry
Photo credit: Hannah Burrack, Bugwood.org

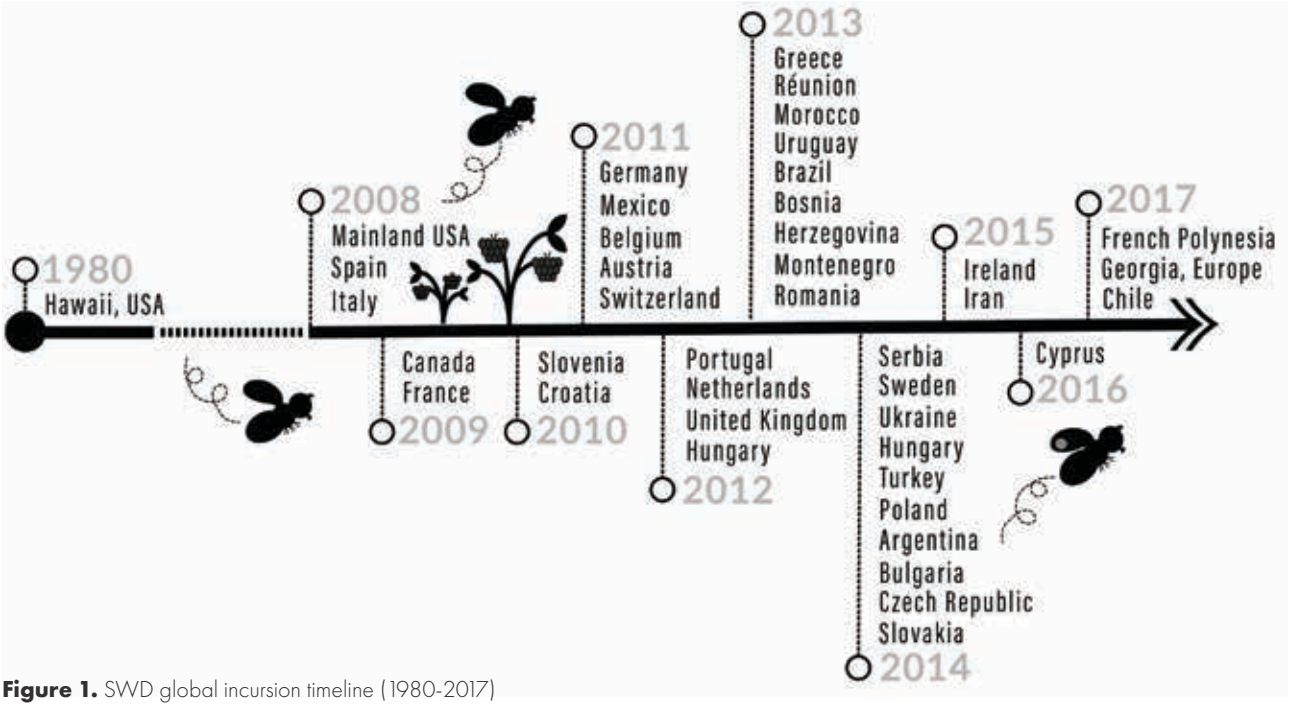

Figure 1. SWD global incursion timeline (1980-2017)

What can we say about likely incursion sites?

The majority of early detections overseas have occurred in horticultural regions, although this may be a product of proactive trapping and grower vigilance, rather than the fly preferentially establishing in production zones.

Indeed, past surveys have shown higher SWD trap counts in wilderness (woodland) areas compared to cropping areas, and we cannot ignore those detections made at sites of fruit transit.

The location of proactive trapping efforts or regions where awareness is high is likely to play a big role in where this fly is detected first if it does travel to Australia or New Zealand.

We can only speculate on likely incursion sites in Australia and New Zealand at this stage. Early detections made in Europe, South America and the United States in recent years were not necessarily at the site of the initial incursion.

What we can say is:

- Our berry, grape and stone fruit production zones would be, on the whole, suitable for establishment;
- First detections of SWD commonly occur on the coast;
- Based on how SWD moves long distance (in imported fruit) urban areas are likely incursion sites;
- Imported fruit move through ports and airports, which have been common detection sites overseas;
- Wholesaler and retailer sites are important to consider - unsold imported fruit left in waste piles can present a risk;
- Detection of SWD all year round may be possible in temperate areas of Australia and New Zealand.

Establishment obstacles – it all needs to go the right way for SWD

Long range movement of imported fruit is the standout risk for bringing SWD into Australia or New Zealand. If SWD were to arrive via long range movement of fruit and subsequently establish, it would need to run a gauntlet first. These steps are shown in Figure 2.

Catching an incursion early – what can you do?

Picking up an exotic pest before it takes a foothold in the environment is pretty important when it comes to eradicating it from an area. So, is there anything industries can do to increase the chance of an early report? Early detection of SWD overseas was a result of detection through trapping or reporting of infested produce. Therefore, the two best options are: raising awareness about SWD identification, symptoms and the reporting process, and early detection trapping programs that could be run at a farm, regional, state, or industry level.

In the United Kingdom an industry working group was formed to troubleshoot the problem before the fly was found in the country. This working group raised awareness of the fly among United Kingdom industries and educated growers on monitoring techniques. It eventually oversaw a SWD research project when the fly was detected in the United Kingdom.

Many overseas detections were made as a result of specific SWD monitoring efforts after neighbouring countries or regions had detected the fly. A number of countries (Bulgaria, Poland, Ukraine, Germany and Spain) were running dedicated SWD trapping programs prior to the fly being detected. Early detection programmes were generally run with cost effective, basic apple cider vinegar or red wine traps that are attractive to Drosophila species. Since SWD has become a global pest a variety of lures and traps have been developed to improve sensitivity and selectivity. The best colours for attracting SWD have also been tested. Unsurprisingly, red is a very attractive colour for this berry addict. As part of an awareness and education campaign, this project has developed an instructional video for identification of SWD. One handy trick described in the video that will test for fruit infestation is the 'sugar test'. Host fruit is collected and squashed in dissolved sugar (or salt) and any larvae quickly squirm their way out of the fruit.

Exotic pest incursions can be pretty stressful and disruptive. If SWD were to be detected in a production zone, understanding how your farm can work with biosecurity authorities and minimise disruption of fruit sales from your farm or region is very important. For growers in high risk industries, such as Rubus, strawberry and stonefruit, we have suggested some ways that you can plan and prepare in Table 1. Hopefully your planning is never needed!

Figure 2. SWD needs to run the gauntlet to establish

Table 1. Farm and local preparedness for SWD - action checklist

Preparedness activity	Supporting actions For SWD resources visit cesaraustralia.com and planthealthaustralia.com.au
Staff understand how to identify SWD adults or infestation	– Circulate SWD identification video – Circulate Plant Health Australia SWD fact sheet
A farm operating procedure for reporting a suspect SWD infestation is in place	– Source pre-emptive advice from your state Biosecurity Authority – Train staff in internal procedure for logging details of an infested site, containing the site, taking a fruit sample and making a report
Trapping protocol developed and ready for execution	– Identify best trapping locations (heavily wooded areas, wild blackberry stands, fruit waste sites) – Develop data collection method with Biosecurity Authority
Farm biosecurity plan is up to date	– Identify pest pathway risks – Use your Industry Biosecurity Plan to decide on actions to minimise pathway risks (available from your industry body or Plant Health Australia) – Ensure farm staff have read and follow the plan
Local industry understands the risk	– Add SWD as an agenda item for discussion at your next local grower group meeting – Invite somebody from your Biosecurity Authority or Plant Health Australia to present on emergency response procedures to your local industry – Take Plant Health Australia's online biosecurity training
Local industry has agreed on emergency actions	– Agree on local level actions if a detection is made – Set up a local emergency response working group that can be 'activated' to act as an information source and trusted communicator (consider members from local government, agronomy groups, and influential community groups)

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