KEEP WHAT WORKS WORKING

STRAWBERRY GROWERS NZ

From agrichemical crisis to IPM success - thrips control in Australian strawberries

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Introduction

Strawberries are grown extensively across Australia, particularly in Victoria, Queensland, Western Australia, South Australia, and Tasmania. The climate for growing varies from sub-tropical (Queensland) to cooler temperate areas (Victoria, South Australia and Western Australia), this enables year-round supply.

Commercial strawberry production in Australia includes traditional field farming but a significant move has been made to production under protected cropping and in media as tabletop systems.

One of the most economically damaging pests for Australian strawberry growers is Western flower thrips (WFT) (*Frankliniella occidentalis*), which causes fruit bronzing, seediness, reduced shelf life, and market downgrades on strawberries.

What are Western flower thrips?

Western flower thrips (*Frankliniella occidentalis*) is a major agricultural and horticultural pest in New Zealand, commonly damaging tomatoes, strawberries, and ornamentals in greenhouses and outdoors.

On strawberries, WFT feeds on flowers and young fruit, resulting in bronzing (russeting) near the cap, fruit discoloration, and deformation. Affected berries often look stunted, "seedy," and develop a rubbery, brown texture, making them unmarketable.



Western flower thrips (Credit: David Cappaert, Bugwood.org).



WFT feeding in a strawberry flower (AHDB).

Background

Following the introduction of WFT to Australia in the early 1990's growers relied heavily on calendar-based applications of broad-spectrum insecticides. While initial control was adequate, the thrips very quickly developed almost complete resistance to key insecticides (Herron & James, 2007).

By the early to mid-2000s Western flower thrip resistance in Australia was severe, covering nearly all major chemical classes previously used for control. The industry was in a pest management crisis.

Confirmed resistance to mode of action groups includes Group 1: organophosphates (e.g., malathion), carbamates (e.g., methiocarb), Group 3: pyrethroids (e.g., alpha-cypermethrin), Group 5: spinosyns (spinosad and spinetoram), Group 6: avermectins (abamectin) and Group 2B: fipronil.

By the early to mid-2000s WFT resistance in Australia was severe, covering nearly all major chemical classes previously used for control. The industry was in a pest management crisis, with no effective management tools due to widespread insecticide resistance in thrips populations. The regular spraying also caused several compounding problems for the industry including **destruction of natural enemies** leading to secondary outbreaks of Two-spotted mite, whitefly and aphids, **escalating input costs** due to increased spray frequency, **residue and market risks** including detections of fipronil that threatened retailer confidence and market access. Two-spotted mites were also showing signs of insecticide resistance.

Drivers to transition to Integrated Pest Management (IPM)

By 2008, the Australian industry and government stakeholders recognised that continuing with agrichemical-dominant programs was economically and biologically unsustainable. Thrips could no longer be controlled through conventional chemical programmes as insecticide resistance was widespread, and resistance management through chemical rotation would not solve the problem.

The industry was forced to shift away from agrichemical dependence to look for alternative methods for controlling WFT and other key pests (Two-spotted mites) of strawberries. In response, the Victorian strawberry industry supported by Hort Innovation and led by IPM Technologies, implemented a 3-year project (2008–2011) to develop and roll out a whole-of-system Integrated Pest Management (IPM) strategy.

The solution – development of an IPM strategy

The solution focused on the development of a whole system IPM strategy, tailored to strawberry production. Fundamental to the IPM approach was the repositioning of insecticides from being the primary control tool, to a tool that could be used to support IPM. Biological and cultural controls were integrated as the first line of defence for managing pests.

Key components that helped to feed into the IPM strategy were:

- The development of a **standardised field monitoring** methodology for WFT that growers could easily adopt. A simple monitoring method, taking 10 newly opened flowers at random from any block was implemented. The emphasis was to measure WFT population trends over time within blocks and relative pest pressure between different farms.

- Identifying **key beneficial insects** and testing potential predators in the laboratory. The biological control agents included both naturally occurring and commercially produced predatory insects and mites.

The IPM solution fundamentally shifted pest control away from chemicals and toward understanding pest biology with the integration of the following core elements:

- **Elimination of disruptive insecticides** as the first step, allowing natural enemy populations to recover. Monitoring demonstrated that thrips were often a pesticide-induced pest. When insecticide controls were removed and predators were allowed to establish early, thrips populations declined and stabilised without routine spraying.

- **Regular crop monitoring**, with emphasis on population trends rather than single spray thresholds.

- **Early, preventative release of effective biological control agents**, particularly:
    - *Neoseiulus cucumeris* for thrips larvae in flowers
    - Hypoaspis mites for soil-dwelling thrips pupae
    - Native predatory thrips (*Haplothrips victoriensis*), which were shown to survive solely on western flower thrips
    - Persimilis (*Phytoseiulus persimilis*) for two-spotted mite control.

- **Selective chemical use only when essential**, chosen and timed to preserve beneficial species.

- **Cultural control** methods such as the removal of heavily infested leaf material, weed management, grass inter-rows, the use of covers or not, and plant canopy management.



Grower confidence in the IPM strategy was built through on-farm results

A core part of the programme was strong grower engagement; this included workshops, on-farm demonstrations, and one-to-one technical IPM support.

The IPM strategy was initially trialled on volunteer farms to provide growers confidence that an IPM approach could work.

Growers adopting the IPM strategy were supported during the programme by regular crop monitoring and technical entomology support.

As a result of this close collaboration between growers and entomologists' industry adoption of the IPM strategies progressed rapidly.

By the end of the project in 2011 around 50–75% of Victorian strawberry plantings were under IPM-based management and large commercial growers in South Australia and Tasmania were adopting IPM. Over 90% of growers had also ceased using broad spectrum insecticides.

The Australian strawberry industry's transition from agrichemical-based thrips control to IPM represents one of the most rapid and successful examples of IPM adoption. What began as a pest crisis evolved into a system-wide transformation, positioning IPM as standard practice within the industry rather than an alternative approach.

Key learnings

- Thrips could not be sprayed out of the system once resistance had established; biological control was essential.
- Early establishment of beneficial organisms was critical.
- Removing non-selective insecticides was as important as adding biological controls.
- Grower confidence was built through on-farm results.
- IPM could be adopted rapidly and at scale when supported by monitoring, training, and consistent technical advice.
- Long-term pest stability, reduced costs, and improved market security outweighed the short-term comfort of chemical insurance sprays.

Reports and resources

Herron, G. & James, T. (2007). Insecticide resistance in Australian populations of western flower thrips, *Frankliniella occidentalis* Pergande (Thysanoptera: Thripidae). General and Applied Entomology. 36. 1-6.

Horne, P (2011). Develop an effective IPM strategy to deal with pests in the Victorian strawberry industry. A report prepared for Horticulture Australia Ltd by Dr Paul Horne, IPM Technologies Pty Ltd. Project Number: BS08011. 56p. (https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/bs08011/ , accessed May 2026).

Strawberry Growers NZ. Thrips Factsheet. 2p. (https://www.strawbsnz.co.nz/assets/Grower-Resources-v2/Disease-sheets/B11-Thrips.pdf). Accessed May 2026.

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