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## An Overview of Invasive Western Flower Thrips: *Frankliniella occidentalis* (Thripidae: Thysanoptera) and Its Damage and Control Strategies

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The western flower thrips (WFT), *Frankliniella occidentalis* is a major invasive pest of agricultural and Horticultural crops. This insect feeds on a wide range of plants, leading to damage that reduces both crop yield and quality. WFT feeds on plant tissues, including flowers, leaves, and fruits, causing direct damage through feeding and indirectly transmitting plant viruses, such as the Tomato Spotted Wilt Virus (TSWV). Greenhouse losses due to impatiens necrotic spot virus have been severe. The combination of thrips damage and this virus can cause serious economic loss for flower growers. The excessive use of pesticides has resulted in the Western Flower Thrips (WFT) developing resistance to key insecticide groups, leaving harmful residues on marketable crops, posing toxicity risks to beneficial non-target organisms, and causing environmental contamination. Implementing effective control strategies is crucial to minimize their impact on agriculture.

**Scientific name:** *Frankliniella occidentalis*

**Family:** Thripidae

**Order:** Thysanoptera

**Distribution:** Cosmopolitan distribution, Europe, Asia, South and Central America, Oceania, and New Zealand.

**The host range** includes Chili, onions, tomatoes, peanuts, grapes, cucumbers, and flower crops like rose, chrysanthemum, and gerbera.

### Biology of Western Flower Thrips (WFT)

These thrips reproduce continuously, with up to 15 generations in a year. Female western flower thrips are small, slender, winged insects that are amber or yellowish-brown to dark brown. The wings have microscopic fringes of setae. Females are about  $\frac{1}{16}$  long. Males are similar to females but smaller and always light yellow. Eggs are small and oval, female thrips inserted into the leaf, stem, and plant tissue, and difficult to identify. Nymphs are slender and have 4 instars. The first two instars are fed on plant tissue and the remaining 3<sup>rd</sup> and 4<sup>th</sup> are no-feeding stages, which are called as pupal stage. Pupation takes place within the soil. These thrips can occur in various color morphs such as yellow, black, orange, and brown. The female lives up to 90 days and the male lives up to 30-45 days. Short-distance spread is by flight and weak fliers. Self-propelled and quickly develops resistance.

### Damage symptoms

Thrips damage in two ways.

- Direct damage is both nymphs and adults suck the sap from the cell of flowers and leaves to release their contents.
- **Deformation and discoloration of flowers** and fruits, reducing aesthetic value in ornamental plants and marketability in crops.
- **Scarring or stippling** on fruits and vegetables causes surface damage that affects both quality and yield.
- Indirect damage is caused by infection of crops by viruses. Thrips spread tomato spotted wilt (photo3).Symptoms of the virus the virus vary with host, plant age, and temperature.

### Management

- Remove weeds from within and around crops. Note that thrips and TSWV have a very wide host range.
- Collection and destruction of crop debris by burying or burning
- Check seedlings to ensure that are free from symptoms. The farmer should raise their seedling.
- Do not plant the same crop on the same land without a break. Follow the crop rotation.
- Erection of blue sticky traps @ 25-30 per acre for mass trapping in thrips infested fields.
- Spraying the crop with strong jet of water to make the conditions unfavorable for growth and multiplication of thrips.
- The most effective strategy is to integrate biological control into pest management. Several species of beneficial insects and mites are now commercially available in Australia, including predatory mites that feed on thrips larvae (such as *Transeius montdorensis* and *Neoseiulus cucumeris*), and mites that target pupae (*Hypoaspis* spp.).
- Conservation of natural enemies by avoiding spraying of chemical pesticides to the extent possible.
- The three-spray approach suggests alternating insecticides to minimize resistance. Growers are advised to apply different insecticides in rotation, with treatments spaced 3-5 days apart when temperatures exceed 20°C, or 6-12 days apart when temperatures are below 20°C.



**Thrips adult**



**Both nymphs & adults infects on flower**

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