

Managing Thrips in Greenhouses

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Western flower thrips (WFT), *Frankliniella occidentalis*, are likely the most serious pest of greenhouse crops in the world. WFT have spread throughout the horticulture industry on plugs, cuttings, and small plants. Because of WFT's small size (1/16 inch) and tendency to remain hidden in flower buds, they are difficult to detect before severe feeding damage is evident. WFT causes damage to greenhouse crop in several manners: feeding damage, laying eggs on the plant, and indirectly by acting as vectors for tospoviruses.

Plants Attacked and Damage Thrips feed by piercing plant cells with their mouthparts and feeding on the exuded plant juices. Ultimately, the collapse of plant cells often results in deformed flowers, leaves, and shoots. Silvery flecked scars or small black "fecal" spots may be seen on the expanded leaves. WFT have a relatively broad host range feeding on greenhouse crops such as carnation, chrysanthemum, fuchsia, geraniums, hibiscus, impatiens, ivy, marigolds, petunia, roses, and verbena. In addition to direct feeding damage, WFT may vector (spread) two closely related tospoviruses; impatiens necrotic spot virus (INSV) and tomato spotted wilt virus (TSWV), to uninfected plants. The tospoviruses have one of the widest host ranges of any know virus affecting over 600 plant species in 62 families. Substantial losses have occurred for growers of begonia, cineraria, cyclamen, exacum, gloxinia, impatiens, New Guinea impatiens, primula, and ranunculus. Young plants may be especially susceptible to infection. There is no cure for this virus. Roguing of infective plant material must be combined with strict thrips management to prevent serious losses.



Western flower thrips adult
(Photo by L. Lindquist, OARDC)



Thrips injury on petunia, an indicator plant for WFT and virus
(Photo by L. Lindquist, OARDC)

Life Cycle and Biology Most thrips in greenhouses are females. Adult females live for approximately 30-45 days and lay 150-300 eggs that are inserted into plant tissue. Eggs are laid on the upper or lower leaf surface depending upon the plant species. Thus, it is important to target spray applications to the area when and where respective thrips are located. The first two larval stages remain protected in the tender young growth, after which second instar larvae stop feeding and drop to the soil or substrate to pupate (transform into the adult). Adults emerge 2-5 days later, depending on temperature.

Thrips life cycle is dependent on temperature with development occurring between 50-90 °F. Thrips can survive temperatures below 50 degrees Fahrenheit, however they do not develop at this temperature. Life cycles vary from 7-14 days at fluctuating temperatures between 68-98 °F that are most common in greenhouse environments.

Control The most effective thrips management strategy is to prevent thrips from entering greenhouses. Monitor for adult and larval thrips as soon as young plants or cuttings are received. When possible, keep thrips-infected plants isolated in a separate area to avoid the spread of thrips. Although winged adults are relatively weak fliers, they can be carried on air currents or on employees clothing. Consider worker movements to and from highly infested greenhouses, and avoid wearing highly attractive colored clothing such as pink, blue, yellow, white, or green.

Both chemical and biological control strategies are available for thrips control, however the “bottom line” is that there are no easy answers for WFT management. Several reasons exist as to why chemical control of thrips is difficult. Thrips tend to hide in flowers and buds, they have a rapid life cycle with a high reproductive rate, they have a wide host range including many weed species, and there is widespread resistance to numerous chemical control products. When using insecticides to control thrips, select a very small droplet size of less than 100 microns to attain more effective contact. Also, apply insecticides before peak thrips activity (every 2-3 weeks) to ensure control of adults before they start to lay eggs. The interval between applications may vary between **3-7 days depending on the temperature**, relative numbers, and stage of the crop. When selecting control materials, rotation between classes of insecticides may help to delay the development of resistance. Research suggests that when using a material or a combination of materials for one generation (2-3 weeks) before switching to an insecticide in another class.

The use of biological controls (natural enemies) against thrips has been used in greenhouse vegetable production. The potential exists for biological control to be part of an IPM strategy for thrips control in ornamentals. For success, it is important to become familiar with monitoring and the use of environmentally friendly or “softer” control products such as botanicals and insect growth regulators (IGR’s). There is no single pesticide that will provide total WFT control. Abamectin and methiocarb are the most effective control products registered for WFT. Other products that provide some control are azadirachtin, cyfluthrin, acephate, endosulfan, and fenoxycarb. Tank mixes of abamectin, azadirachtin followed by a fenoxycarb spray have provided good control.

For pesticide recommendations: Contact your County Extension Agent.