

7/31/2026

# Playing Defense

Dr. Raymond A. Cloyd



Growing basil, *Ocimum basilicum*, hydroponically in a greenhouse can be challenging because basil is susceptible to several insect pests, including aphids, whiteflies and thrips.

**Figure 1. (Top):** Western flower thrips larva.



**Figure 2. (Bottom):** Western flower thrips adult.

The main thrips species that feeds on basil in greenhouses is the western flower thrips, *Frankliniella occidentalis*. Western flower thrips are approximately 1/13 of an inch (2.0 millimeters) in length, light brown, elongated, with piercing-sucking mouthparts. The life cycle includes an egg, two larval instars (first and second), two pupal stages (prepupa and pupa) and an adult. The life cycle can be completed in

two to three weeks, depending on temperature.

Western flower thrips larva (Figure 1) and adults (Figure 2) cause direct plant damage by feeding on leaves and indirect damage by transmitting viruses, such as Impatiens Necrotic Spot Virus. Direct feeding damage by western flower thrips larvae and adults results in leaf scarring, distorted leaf growth and sunken tissue on the leaf underside. In addition, black fecal deposits may be present on the underside or topside of leaves.

### Real world solutions

A producer that grows crops hydroponically had a problem with western flower thrips feeding on the basil crop. The level of the infestation was extensive with all basil plants infested (Figure 3) and a mixed population of larvae and adults present simultaneously. Damage to the basil plants ranged from distorted growth to silvering of the leaves (Figures 4 through 6).

**Figure 3.** Basil crop extensively infested by western flower thrips.

**Figure 4.** Silvering of basil leaf and black fecal material associated with feeding by western flower thrips.



So, what could the producer do? The only option initially was to discard all the basil plants and start a new crop. After the new basil crop was started, a recommendation was made that a rigorous scouting program be implemented to alleviate problems with thrips in the future. The producer was requested to

place yellow sticky cards among the basil crop (Figure 7) to capture adults and shake leaves over a white sheet of paper attached to a clipboard to assess the presence of larvae (Figure 8). Scouting was to be conducted weekly throughout the growing season. The producer was given the option of installing yellow sticky tape among the basil crop to capture thrips adults. The use of yellow sticky tape can reduce the number of thrips adults, thus lessening damage to the basil crop during the growing season.



**Figure 5-6.** *Distorted growth on basil plants caused by western flower thrips feeding.*

Weeds can harbor thrips populations and the viruses transmitted by the adults. Consequently, all weeds were to be removed within the greenhouse operation. In addition, thrips can enter greenhouses

from weeds located outside openings, including vents, sidewalls and doorways. Therefore, establishing a weed free area around the outside perimeter of greenhouses (10 to 20 ft.) was recommended to reduce the possibility of adult thrips entering greenhouses through openings. The producer already had insect exclusion screening installed over the side vents to prevent adult thrips from entering the greenhouse from the outside. The installation of insect exclusion screening over greenhouse openings prevents adult thrips from entering greenhouses. Furthermore, insect exclusion screening can prevent weed seeds from entering greenhouses, which will mitigate problems with weed seeds establishing in gravel flooring.

**Figure 8.** *Shaking leaves over a white sheet of paper attached to a clipboard to detect the presence of western flower thrips larvae and adults.*



Although only a limited number of insecticides are registered for use on basil, a recommendation was made that the producer apply an insecticidal soap (potassium salts of fatty acids) product (Kopa Insecticidal Soap: OHP, Inc; Morrisville, North Carolina) that's registered for use on basil, if

necessary, to maintain thrips populations below plant-damaging levels. Insecticidal soap is a contact insecticide/miticide with activity on larvae and adults. However, don't apply more than the label rate (2 gal. of product/100 gal. of water) and avoid applying too frequently ("Repeat treatment every one to two weeks as needed. Apply a maximum of three consecutive applications to ensure plant injury does not occur.") to avoid phytotoxicity. Based on label information, "Do not spray during full sun. Spray early in morning or evening." Furthermore, avoid applying an insecticidal soap product a week before harvest.

In conclusion, producers that grow crops hydroponically, such as basil, need to be proactive in protecting crops from damage associated with the western flower thrips because once a crop is infested and damage is noticeable, then options for managing western flower thrips populations below plant damaging levels are limited. **IG**

---

*Raymond A. Cloyd is a Professor and Extension Specialist in the Department of Entomology at Kansas State University in Manhattan, Kansas. He can be reached at (785) 532-4750 or [rcloyd@ksu.edu](mailto:rcloyd@ksu.edu).*

### **More Information**

Dr. Raymond Cloyd wrote the book on western flower thrips—literally. He published his book, “Western Flower Thrips: Insect Pest of Greenhouse Production Systems,” in 2024. While it’s mainly geared toward ornamental flower growers, you may find some of it useful. [Click here to read more and to order.](#)