BUG BIZ
Pest Management and Insect Identification Series
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Frankliniella occidentalis, Western Flower Thrips

(Thysanoptera: Thripidae)

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Description

Natural populations of western flower thrips exist in a wide range of color forms. Adults are less than 1/12 of an inch (2 mm) long, with narrow, fully developed wings. Females have spindle-shaped abdomens and vary in color from yellow to nearly black with dark-brown markings on the abdomen. The male is smaller than the female, with a narrower abdomen, and is usually yellowish-white. Immatures are spindle-shaped and are creamy-white to yellow in color. Pupae are white to cream-colored, have wing buds extending more than halfway along the abdomen and antennae that curve back over the head. Eggs are tiny, opaque and kidney-shaped; they can be found on leaves, flower structures and fruits.

The wings of all members of the order Thysanoptera are narrow, straplike structures fringed with long hairs (alar setae). Thrips mouthparts are asymmetrical, with the left mandible more developed and the right vestigial. The feeding habits of thrips are described as "rasping sucking," allowing the insect to extract plant tissue using a combination of sawing movements of the mandible and suction. The spelling of the common name "thrips" is the same in both singular and plural references.

Life Cycle

The life cycle of the western flower thrips is completed in about 12 days at 86 degrees Fahrenheit (30 degrees Celsius) and 44 days at 59 degrees Fahrenheit (15 degrees Celsius) with intermediate durations that are weather dependent. The western flower thrips' life cycle is divided into two stages: a foliar-feeding stage (adult, first and second larval instars) and soil-inhabiting developmental stages (late second larval instars, pre-pupae and pupae). Insects in this latter resting stage may occasionally remain on the host plant. The life cycles of thrips are unusual, possessing immature stages that appear superficially similar to

Adult western flower thrips (Jack T. Reed, Mississippi State University, Bugwood.org).

those of true holometabolous insects, which undergo four dramatically different life stages, egg, larva, pupa and adult. The so called "larva" of thrips is similar in general anatomy to the adult, and the "pupa" is actually an extended larval resting stage, unlike the true pupae of other insects. Thus, the application of the terms larva and pupa to describe stages of the thrips life cycle is somewhat confusing. These stages in thrips are not equivalent to those in holometabolous insects.

In a year, western flower thrips may complete up to 15 generations under greenhouse conditions and five generations under field conditions. Larval development requires three to six days, and pupal development requires two to five days. Adults have an average lifespan of 30 to 45 days. Duration of all stages is influenced by weather and host plant conditions.

Ecological Significance and Pest Status

The western flower thrips is an important agricultural pest native to North America. The species is currently present in North, Central and South America, Oceania, Africa, Europe and Asia. The rapid spread of western flower thrips worldwide is associated with the movement of plant material and glasshouses among agricultural regions. In Louisiana, it was accidentally introduced to cotton fields in 1983. However, increases in tomato spotted wilt virus in field crops suggest it could have been established as early as 1976.

The western flower thrips is considered the most important pest of greenhouse-grown ornamental flowers. Thrips damage crops by feeding on the plant and laying eggs, which cause wounds in produce. They also have the ability to transmit plant pathogenic viruses. They affect more than 250 plant species under controlled and field conditions. These include cotton, cucumbers, melons, bell peppers, tomatoes, strawberries, peanuts, chrysanthemums and roses.

Western flower thrips is the most important vector for the tomato spotted wilt virus and impatiens necrotic spot virus, which are acquired during the larval stages from infected plants and can be transmitted throughout their lifespans. The wide host range of thrips and the aforementioned viruses facilitate their spread throughout ornamental and agricultural areas, causing aesthetic damage and up to 100% yield losses in some crops.

Control

To monitor western flower thrips populations, blue sticky traps were found to catch more thrips than yellow sticky traps. However, traps are not efficient in monitoring damage to crops. One of the most important natural enemies of western flower thrips is minute pirate bugs, *Orius* spp. (Anthocoridae). In pepper, suppression starts when at least one *Orius insidiosus* is present to 180 thrips, and control occurs when there is one *O. insidiosus* to 50 thrips. Cultivars with resistance to tomato spotted wilt virus and/or impatiens necrotic spot virus with acceptable yield and fruit quality can also decrease the effect of thrips-transmitted viruses. Increased thrips damage has been associated with nitrogen fertilization above recommended levels.

The use of insecticides for thrips management presents three problems due to thrips' behavior. First, thrips are usually hidden within flowers and leaves. Second, thrips' eggs are inserted into the leaves, which protect them from insecticides and third, thrips

Thrips feeding in cucumber (Bruce Watt, University of Maine, Bugwood.org).

Thrips feeding in pepper (P.M.J. Ramakers, Bugwood.org).

Thrips feeding injury to English daisy (Whitney Cranshaw, Colorado State University, Bugwood.org).

rapidly become resistant to insecticides. However, if an insecticide application is needed, please see the Louisiana Insect Pest Management Guide (publication No. 1838) for currently approved insecticides to control western flower thrips. Insecticides are registered for specific crops, and they should not be applied if they are not labeled accordingly. Insecticide resistance might be present in some fields. Therefore, rotating insecticides according to the mode of action is important. Please contact your parish extension agent for information about insecticide resistance.

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