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Thrips on Onions

Identification and Management

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Thrips are the major arthropod pests of onions throughout Texas. They can attack both green onions and dry bulb onions at any point during the growing season, but are primarily a late-season pest of dry bulb onions. This is probably because of the long growing season for dry bulb onions and the warmer weather late in the production season

General appearance

Thrips are minute, slender-bodied insects that taper at both ends. Adults of the thrips species that attack onions are less than 1/8 inch long and range in color from light tan or yellow to nearly black. Adult thrips have four long, slender wings fringed with long hairs. Eggs are laid in plant leaves and are not likely to be seen because of their microscopic size. Immature thrips are smaller than adults, light colored, wingless, and move more slowly than adults.

Figure 1. Adult (l) and immature (r) thrips.

Thrips damage on onions

Thrips can damage the entire leaf area of onions, but most thrips, particularly the immatures, are found between the young leaf blades in the neck of the onion. Thrips also congregate in leaf folds.

Thrips have asymmetrical mouthparts, with only one mandible. They are generally thought to be sucking or rasping-sucking insects, but microscopic examination of damage shows that thrips actually pierce plant tissue and

Figure 2. Onion leaf damaged by thrips.

Figure 3. Onion plots damaged by thrips.

Figure 4. Adults of the onion thrips (l) and western flower thrips (r).

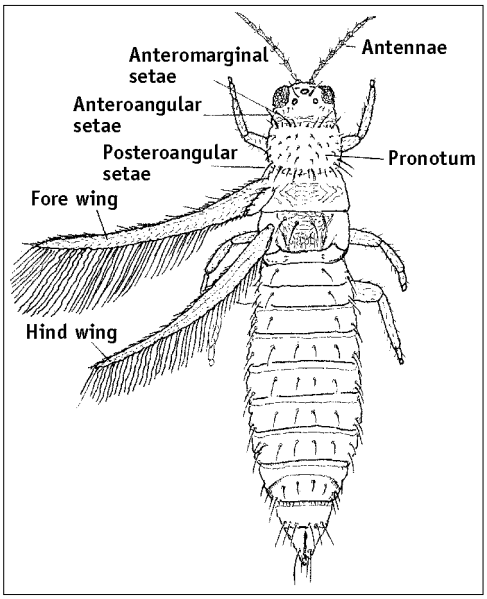

Figure 5. Adult thrips.

likely ingest the fluids. Onion leaves develop characteristic longitudinal streaking, which gives the appearance of rasping damage. Under heavy infestations, infested plants appear white and dried out.

Thrips damage reduces the size of onion bulbs and, thus, lowers yield. Economic returns are reduced because of lower total yield and the lesser value of smaller bulbs. If bulb size is acceptable before the thrips population swells, there may be no economic damage. Thrips injury also creates entry points for pathogens, making plants more susceptible to diseases. Plants that are heavily infested with thrips may die.

Temperature has a tremendous effect on the reproductive capacity of thrips. The higher the temperature, the less time thrips need to complete their development. Thus, thrips densities reach their highest levels late in the season, and later-maturing onion varieties are most at risk. When winter weather is warm, thrips populations can begin increasing earlier in the year, causing greater problems throughout the season.

Thrips identification

Several thrips species attack onions. In South Texas the two most common are the onion thrips, *Thrips tabaci* (Lindeman), and the western flower thrips, *Frankliniella occidentalis* (Pergande). Both species have similar biologies, produce similar plant damage, and look alike to the naked eye. However, these two species may respond very differently to pesticides. So although species identification is not necessary in sampling and determining threshold, it is very important in selecting a control strategy, particularly when an insecticide will be used.

Begin by collecting representative samples from several areas within the field. Preserve the thrips in 75 percent alcohol. The two species commonly found on onions in Texas can be separated using a 14x to 20x handheld lens or microscope; however, identification will be more accurate if specimens are properly mounted on slides and viewed under a compound microscope.

Next, make sure you are viewing adult thrips. It is very difficult to separate the two species in the immature stage. Adults are easy to identify by their wings.

Color is not an accurate indicator of species because there is so much variation. The best characteristics for distinguishing onion thrips from western flower thrips are the antennae and the setae (hairs) on the prothorax. Onion thrips adults have antennae with seven segments,

while the antennae of western flower thrips adults have eight segments. High magnification is required to see this characteristic.

With low magnification you can see the length of the setae on the anterior margin of the prothorax (top of the first segment behind the head, edge nearest the head). Western flower thrips have four large setae on the anterior margin of the prothorax—an obvious row of setae immediately behind the head. Onion thrips lack these large setae and appear to have no setae at all on the anterior margin of the prothorax. Both species have a row of setae at the back edge of the prothorax.

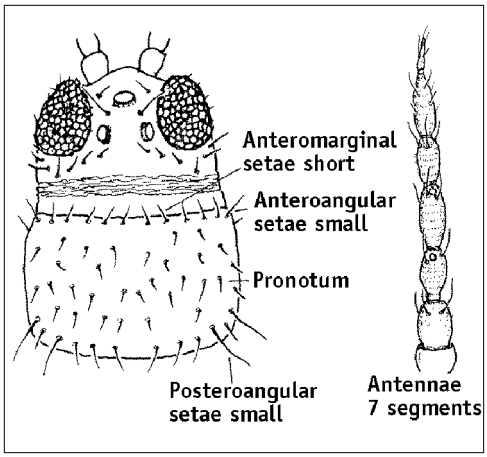

Figure 6. Pronatal setal patterns and antenna of adult onion thrips.

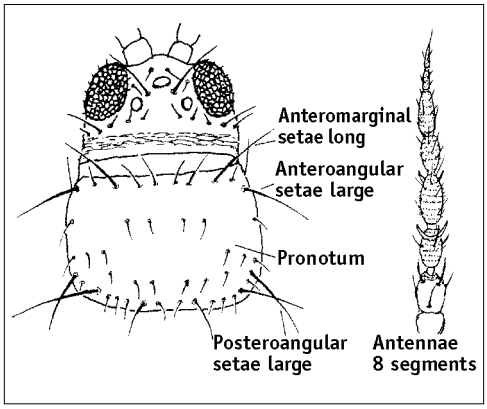

Figure 7. Pronatal setal patterns and antenna of adult western flower thrips.

Management of thrips

A variety of biological, cultural and ecological factors affect thrips densities within a field. However, management usually consists of sampling to determine pest densities, using thresholds to trigger insecticide applications, and properly selecting insecticides for the species of thrips present.

There are only minor differences in thrips' preferences for onion varieties, or in the responses of onion varieties to thrips damage. These minor differences play no roll in variety selection and are of minor consequence in thrips management.

While a number of natural enemies attack thrips, including pirate bugs, predatory thrips and predatory mites, none is effective in preventing economic injury. Minute pirate bugs are the most noticeable thrips predators in South Texas.

Monitoring for thrips is done by examining individual plants, especially the necks of the onions and the leaf folds. These tight, protected locations are preferred sites for adult and immature thrips. Plants should be sampled from multiple locations across each field, as thrips distribution within a field can be clumped, particularly early in the development of an infestation.

Research has demonstrated that an average of even one thrips per plant over the production season can cause significant economic loss. Unfortunately, the lack of effective controls, and thrips biology, make a threshold this low impractical. Current control options are not likely to maintain thrips below 20 per plant. Thus, producers use a variety of thresholds to trigger insecticide applications, depending on crop development. These commonly range from five to 25 or more thrips per plant, often increasing as the season progresses.

Insecticide selection and resistance

Pyrethroid insecticides have controlled onion thrips very well, while the organophosphate and carbamate insecticides (which have similar modes of action) have been the products of choice for western flower thrips. In mixed populations of the two species, shifts in the predominant species can be influenced by insecticide use.

The development of resistance to insecticides is of paramount concern with thrips. The potential for resistance is high because there is generally a single mode of action or chemistry that is effective for each pest species, and because female thrips reproduce without mating (parthenogenetic reproduction). Thus, thrips that survive an insecticide application produce thrips that can survive exposure to the same type of insecticide.

The location of thrips on onion plants also affects the efficacy of insecticides and the development of resistance. In the neck and leaf folds, thrips are somewhat protected from insecticide exposure. This reduces the effectiveness of the treatment, but may also ensure that some susceptible individuals remain within the population.

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