

Cooperative Extension

Citrus Thrips (*Scirtothrips citri*)

The University of Arizona \$ College of Agriculture \$ Tucson, Arizona 85721 (part of the publication "Citrus Arthropod Pest Management in Arizona")

David Kerns¹, Glenn Wright², and John Loghry³

¹Department of Entomology, Yuma Agricultural Center - Valley Station, 6425 W. 8th St., Yuma, AZ 85364

²Department of Plant Science, Yuma Agricultural Center - Mesa Station, RR1, Box 40M, Somerton, AZ 85350

³Arizona Crop Improvement Association, Yuma Agricultural Center - Mesa Station, RR1, Box 40M, Somerton, AZ 85350

DESCRIPTION AND LIFE HISTORY: Adult citrus thrips are small, orange-yellow insects with fringed wings. The females measure 0.6 to 0.88 mm. Males are similar in appearance but somewhat shorter and narrower. Under warm conditions, adult citrus thrips may live as long as 25 to 35 days, or longer under cool conditions.

The eggs (0.2 mm) are oviposited under the cuticle of new leaves, stems, and fruit. One female may lay as many as 250 eggs. They hatch in 6 to 8 days during warm weather. Those laid in the fall pass the winter and hatch in March (first generation) about the time new foliage growth commences. However, in the Yuma area, it is not uncommon to find citrus thrips throughout the year during warm periods.

There are two active nymphal stages (first and second instars) requiring 4 to 14 days for development. First instar larvae feed actively on tender leaves and fruit, especially under the sepals of young fruit. The third and fourth instars are pupation stages and do not feed. They complete development on the ground in litter beneath the tree or in the crevices of the tree. The third instar is the prepseudopupal stage and the fourth instar is known as the pseudopupal stage. A single generation may be completed in a period of 15 days. In Yuma, there may be as many as 10 to 12 generations per year, while in Maricopa County they will usually complete 8 to 10 generations per year.



Figure 3. Second instar citrus thrips.

Citrus thrips tend to be more numerous on the south side of citrus trees, especially the southeast quadrant. Additionally, they tend to be more numerous between 2 to 3 meters than at other heights.



Figure 4. Citrus thrips adult.

Citrus thrips have a very broad host range. These hosts include among others, all types of citrus, alfalfa, rose, grape, laurel, cotton, date, fir, and various grasses and

deciduous trees.

Other species of thrips also occur on citrus in Arizona but none of these are of economic importance. These include the western flower thrips, *Frankliniella occidentalis*, the onion thrips, *Thrips tabaci*, and *Bregmatothrips sonorensis*. Of these thrips, the western flower thrips is most common and can be very abundant during bloom, on the flowers, small fruit, and flush growth. Care should be taken to not confuse western flower thrips with citrus thrips. Western flower thrips are more tolerant to insecticides than citrus thrips and when mistakenly identified may give the impression of poor insecticide efficacy.



Figure 5. Adult western flower thrips.

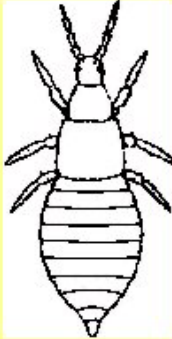
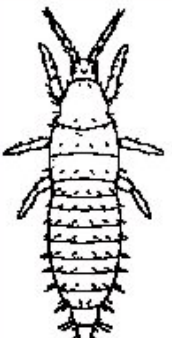
	Nymphs: <ul style="list-style-type: none">• Broadly oval-shaped as they mature. Abdomen noticeably wider than thorax and abruptly narrowed on the hind third.• Spines and hairs quite small, hardly visible with 10X magnification.• Color is pale yellow to opaque white.• Active crawlers, body doesn't tend to curve when turning.• Size, 0.5 to 0.9 mm.
Second instar citrus thrips	Adults: <ul style="list-style-type: none">• Abdomen oval-shaped.• Color, light orange-yellow.• Very active crawling and flying.• Size, 0.6 to 0.88 mm.
	Nymphs: <ul style="list-style-type: none">• Slender, cigar-shaped.• Abdomen not noticeably wider than thorax.• Spines and hairs easily visible with 10X magnification.• Color is pale, colorless.• Mostly slow moving, sluggish, body tends to curve when turning.• Size, 1.2 mm.
Second instar Western flower thrips	Adults: <ul style="list-style-type: none">• Abdomen long cigar-shaped.• Straw-colored or dark brown.• Relatively sluggish.• Size, 1.0 mm.

Figure 6. Distinguishing characteristics of citrus thrips and western flower thrips.

DAMAGE: Citrus thrips is the most economically damaging insect pest of Arizona citrus. On fruit, the citrus thrips punctures epidermal cells, leaving scabby, grayish or silvery scars on the rind. Second instar nymphs do the most damage because they feed mainly under the sepals of young fruit. As the fruit grows, damaged rind tissue moves outward from beneath the sepals as a conspicuous ring of scarred tissue. This damage, although entirely cosmetic, may result in a reduced quality rating and/or if severe may render the fruit unsuitable for fresh market.



Figure 7. Rind scarring on an orange due to the feeding by citrus thrips beneath the sepal when the fruit was young.

Feeding by citrus thrips on new flush growth will also result in damage to the developing foliage. These leaves will appear distorted and thickened with gray streaks usually parallel to the midvein. Extensive feeding on small leaves and leaf buds can result in significant defoliation and limb “buggy whipping”. Fruit bearing trees do not appear to be adversely affected by this damage, but growth may be stunted on non-bearing trees.



Figure 8. Leaves damage (left) and the “buggy whipping” effect caused by citrus thrips feeding when the leaves were small and subsequent defoliation.

MONITORING: Monitoring citrus for citrus thrips begins at the initiation of bloom, but becomes critical at petal fall (90% blossom drop) in late-March to early-April. On mature trees, sampling should continue until 70 to 90% of the fruit reach a minimal size of 1 inch in diameter. Once the fruit reaches this size it is no longer susceptible to citrus thrips scarring. On immature trees, sampling should continue until mid- to late-October when the fall flush ceases.

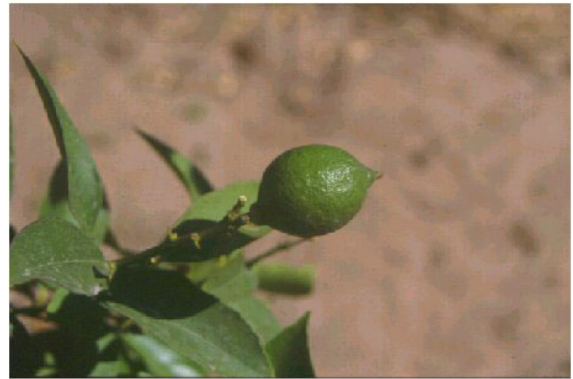


Figure 9. Once the fruit reaches 1 inch in diameter, it is no longer susceptible to significant citrus thrips scarring.

On immature trees and as a general indicator of citrus thrips age distribution regardless of tree age, flush should be sampled. The flush is best sampled by tapping it against a dark colored notebook or similar object, and observing what is dislodged. Although no treatment threshold exists, treatments should probably be applied when the citrus thrips population approaches 10 thrips per flush, when there are a large number of leaves less than one-half inch in length.

On mature trees it is important to sample individual fruit using a hand lens. Count the number of fruit with at least one immature citrus thrips. Samples should be taken from various locations throughout the grove, and from all four quadrants of the tree. Twenty to fifty samples may have to be taken to obtain an adequate estimate of the citrus thrips population. Treatments should be applied when 10% or more of the fruit are infested with immature citrus thrips.

Adult citrus thrips tend to be significantly more attracted to white and yellow compared to other colors. Thus yellow sticky cards can be used as a relative indicator of citrus thrips activity.

CONTROLS:

Cultural: There are no specific cultural control techniques utilized for citrus thrips.

Biological:

•**Predators.** A number of natural enemies attack citrus thrips including predaceous mites, spiders, lacewings, minute pirate bugs, etc. However, during most years,

This document and others on citrus insect pests can be found at
<http://cals.arizona.edu/crops/citrus/insects/citrusinsect.html>

citrus thrips densities are too high to be adequately controlled with natural enemies, thus making insecticide use unavoidable. However, conservation of natural enemies, namely predaceous mites, will often prevent citrus thrips resurgence.

Commonly used Chemicals: Citrus thrips are less of a problem in groves that receive minimal pesticide treatments than in groves that are heavily treated, especially those treated with broad-spectrum insecticides. Thrips populations tend to increase after treatments with insecticides that kill predaceous mites. Citrus thrips has a history of rapidly developing resistance to chemicals that are used repeatedly and frequently for its control. With the limited number of pesticides available for control of citrus thrips, growers should monitor citrus thrips levels carefully to avoid unnecessary treatments and should avoid sequential applications of the same or similar insecticides.

•**Abamectin.** 7 day pre-harvest interval (PHI). Abamectin (AGRI-MEK) is applied at a rate of 0.012 to 0.024 lbs-ai per acre. It is occasionally used in the Yuma area. It cannot be applied to nurseries or by aircraft. It should always be applied in combination with a horticultural spray oil at a rate of not less than 1.0 gal per acre. Abamectin is relatively nontoxic to beneficial insects and mites. It is most effective if substantial numbers of predators are present. Residual activity of abamectin is short; 3 to 4 days. Do not exceed three applications or 0.048 lbs-ai per acre per year, and allow at least 30 days between applications. The restricted entry interval for abamectin is 12 hours.

•**Cyfluthrin.** 0 day PHI. Cyfluthrin (BAYTHROID, RENOUNCE) is a broad-spectrum pyrethroid insecticide that is widely used at a rate of 0.1 lbs-ai per ac. It is fairly efficacious early in the season, but may not provide adequate or lengthy control once temperatures consistently exceed 32°C (95°F). Cyfluthrin provides a moderately lived residual control of about 5 days. Because some citrus thrips resistance to pyrethroids has been reported in Yuma, only one application per crop per season is permitted. Care should be taken to not apply cyfluthrin following fenpropathrin as well since these are similar chemistries. Cyfluthrin is toxic to both beneficial mites and beneficial insects, and may disrupt biological control. Do not apply to trees ≤ 3 years of age. The restricted entry interval for cyfluthrin is 12 hours.

•**Dimethoate.** 15 day PHI. Dimethoate

(DIMETHOATE) is an organophosphate that is widely used to control citrus thrips, and is the product of choice in areas other than in Yuma. It is used in Arizona at a rate of 2.0 lbs-ai per acre. Use of dimethoate is prohibited during any time of day when the grove has 10% or more open blooms until there has been at least 75% petal fall on the north side of the trees. Dimethoate may be used during the time between one hour after sunset until three hours before dawn under the following conditions: before petal fall when less than 10% of the blooms have opened, after the initiation of petal fall when there are less than 25% open bloom remaining in the grove, and it is between the calendar dates of February 15 and May 1. Dimethoate is toxic to bees, and both beneficial mites and beneficial insects, and may disrupt biological control. Dimethoate offers good control under cool conditions, and moderate control under hot conditions. Dimethoate has a short residual, generally providing about 3 days of control under constant thrips pressure. Applications to citrus seedlings are prohibited, and no more than 2 applications can be made to trees that have mature fruit. The restricted entry interval for dimethoate is 4 days.

•**Fenpropathrin.** 1 day PHI. Fenpropathrin (DANITOL) is a broad-spectrum pyrethroid insecticide that is used at a rate of 0.4 lbs-ai per acre. It is recommended that no more than one application be made per year, but there is an allowance of up to 0.8 lbs-ai per acre per year. Do not apply if the temperature exceeds 34.4°C (94°F). In recent years, fenpropathrin has only provided marginal thrips control, and where used, the citrus thrips population has often grown to become much greater than where no insecticides were used. Fenpropathrin is toxic to beneficial insects and is especially toxic to predatory mites. Additionally, citrus thrips resistance to fenpropathrin has been reported in Yuma County. These factors may be the reason severe citrus thrips resurgence following use of this product. The restricted entry interval for fenpropathrin is 24 hours.

•**Formetanate Hydrochloride.** 7 day PHI. Formetanate HCL (CARZOL) is a carbamate that is commonly used in Yuma and occasionally in other parts of the state. Most applications of formetanate HCL range from 0.9 lbs-ai per acre to 1.15 lbs-ai per acre. Formetanate HCL is a broad-spectrum insecticide that is persistent, providing residual control for 10 to 14 days, and works well under both hot and cool conditions. Do not apply more than 1.15 lbs-ai per acre per season. Formetanate HCL, may not be applied once the fruit is greater than 1.0-inch in

diameter. However, if mature grapefruit or Valencia oranges from the previous season are present, an application may be made to the new crop if a 30 day preharvest interval is observed for the unharvested crop. Formetanate HCL is toxic to both beneficial mites and beneficial insects and disrupts biological control. The restricted entry interval for formetanate HCL is 16 days for hand labor activities and 10 days for activities where the worker will not contact treated foliage.

•**Kaolin.** 0 day PHI. Kaolin (SURROUND, SNOW) is a refined clay mineral product that primarily disrupts citrus thrips feeding and behavior. Kaolin has little knockdown activity, but may result in 20 to 30% thrips mortality. Thus kaolin reduces thrips damage best when used preventively. Kaolin is applied prior to heavy thrips pressure at rates of 35 to 100 lbs per acre. The rate used is dependent on the effectiveness of the spray application equipment. Good coverage is essential to maximize control. Typically on mature citrus, kaolin should be applied just before or at petal fall, again 10 to 14 days later and a third time 3 to 5 weeks following the second application if needed. Once the fruit reaches 1.0-inch in diameter, further applications of Surround are not necessary. It is recommended that a non-ionic surfactant be used with kaolin. Kaolin is non-toxic to bees, but may disrupt the activity of some parasitic wasps. Kaolin has been shown to protect fruit from sunburn. Surround has been shown to increase fruit earliness and is an OMRI approved organic treatment. The restricted entry interval is 4 hours.

•**Spinosad.** 1 day PHI. Spinosad (SUCCESS, ENTRUST), a macrocyclic lactone isolated from the soil microorganism *Saccharopolyspora spinosa*. It is normally applied to citrus at rates of 0.06 to 0.10 lbs-ai per acre. Spinosad is highly effective towards citrus thrips and is a product of choice in Yuma. Spinosad works well under hot and cool conditions, and provides residual control for 10 to 14 days. Spinosad works best when used with a non-ionic surfactant or with a narrow-range oil. Spinosad is relatively nontoxic to beneficial insects and mites. Do not buffer spinosad below a pH of 6, since residual control will be much shorter, although initial insect knock down will not be affected. Spinosad may not be applied more than twice per year unless another class of products is used in the interim of 30 days or 2 sprays, whichever is longest. Spinosad may not be used in nurseries. The restricted entry interval is 4 hours.