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# Cotton Fleahoppers

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Cotton fleahoppers, *Pseudatomoscelis seriatus,* are pests in early squaring cotton. They cause square (flower bud) loss, which affects crop yield and quality. Cotton fleahoppers are not considered pests beyond first bloom and their ecological role in later-stage cotton is not certain. They are omnivorous, feeding on plant tissue and other insects, particularly the eggs of bollworms and other caterpillar pests.

## Description

The adult fleahopper is about 1/8-inch long, pale green, and has sucking mouthparts. It is flat, with an elongated, oval outline and prominent antennae. The body is usually yellowish-green, although it may be white or yellow with minute black spots and hairs on the upper surface (Fig. 1).

**Figure 1.** Adult cotton fleahopper. *Source: Salvador Vitanza*

Nymphs resemble adults but lack wings and are initially almost white or pink. After feeding, the immature stage is pale green with prominent, often reddish eyes (Fig. 2). Other parts of the body may also be reddish.

**Figure 2.** Cotton fleahopper nymph. *Source: Winfield Sterling*

Nymphs are sometimes confused with immature minute pirate bugs, big-eyed bugs, aphids, and lygus bugs. But differences in color, shape, and behavioral patterns can help distinguish these insects from cotton fleahoppers.

## Life cycle

The cotton fleahopper overwinters in the egg stage, primarily in wild host plants such as woolly croton, horsemint, cutleaf evening primrose, showy sundrops, woolly tidestromia, spotted beebalm (horsemint), lemon beebalm (horsemint), and silverleaf nightshade.

The eggs, rarely visible with typical scouting techniques, are about 1/30 of an inch long and inserted under the bark of small stems. At 80°F, eggs hatch in about 11 days, and the

young nymphs feed on tender vegetation. They usually molt five times and in 14 to 15 days, mature into reproductive adult cotton fleahoppers.

Cotton fleahoppers can produce six to eight generations a year. Of these, only one to three occur in the cotton field. Early in the spring, fleahoppers build up large numbers on alternate hosts. As these hosts mature and become less succulent, or are controlled through weed management in the fields or along field margins, the cotton fleahopper searches for alternate hosts. If cotton is present, fleahoppers readily colonize it and feed on leaf and fruit buds, often found in large numbers well into boll development and beyond cutout (growth stage when no new squares will form).

## Damage

Both adults and nymphs suck sap from the tender portion of the plant, including small squares (Fig. 3). Pinhead-size and smaller squares are most susceptible to damage. The cotton fleahopper also feeds on anthers of the small squares and sucks sap from leaf buds, causing the squares to die and turn brown, resulting in a "blasted" appearance (Fig. 4). The damaged squares soon drop from the plant.

**Figure 3.** Cotton fleahopper nymph. *Source: Xandra Morris*

**Figure 4.** Blasted square. *Source: Suhas Vyavhare*

When fleahoppers are abundant, heavy fruit loss can occur on preflowering plants. Cotton is primarily susceptible to cotton fleahopper damage during the first 3 weeks of squaring. The cotton fleahopper prefers terminal bud clusters, including young leaves and tiny squares.

The piercing, sucking habit of nymphs and adults interferes with normal growth patterns in cotton. Feeding punctures stimulate the plant to produce shorter main-stem internodes, and more nodes and spindly branches or "suckers" from the lower parts of the plant. The fleahopper injects saliva when feeding, but its effects are only local. There is no evidence that fleahoppers transmit plant diseases or toxic substances other than digestive enzymes.

Given sufficient time, cotton can compensate for lost squares with little impact on yield, particularly those lost during the first week of squaring in the more southern areas of the state. However, where the cotton is planted late, or the growing season is significantly shortened by cool temperatures, the crop may be less likely to compensate with lint yield and quality.

## Management and decision making

*Cultural management.* Managing weedy hosts in and around cotton fields before crop planting may help reduce the source for cotton fleahoppers. But, if you eliminate weed hosts by spraying or mowing during critical fleahopper damage periods, you may force

them into adjacent cotton and cause a spike in fleahopper damage. Late-planted fields are often the target of fleahopper infestations that developed in earlier-planted fields.

*Scouting.* As the first small squares appear (approximately 4- to 6-leaf stage), examine the main stem terminal buds (about 3 to 4 inches of the plant top) of 25 plants at each of at least four locations across the field. Sample more sites in fields larger than 80 acres. Scout fields for cotton fleahoppers weekly. If conditions are conducive to the rapid buildup of cotton fleahoppers in alternate hosts, monitor fields every 3 to 4 days.

Cotton fleahoppers can be extremely "flighty," flying or hiding within the plant canopy when disturbed. When approaching a plant to sample, watch for adults flying from it. Grasp the plant at about the middle of the main stem to help prevent nymphs from moving from the terminal toward the lower canopy before you have time to inspect the terminal. Count the number of adult and immature cotton fleahoppers.

*Chemical control and action thresholds.* The action threshold for cotton fleahoppers varies depending on the region of Texas. When considering an insecticide application, be aware that as plants increase in size and fruit load, they can tolerate larger numbers of fleahoppers without yield reduction. When plants are blooming, fleahopper control is rarely justified.

Also, insecticides applied early in the blooming period may result in outbreaks of aphids, bollworms, and tobacco budworms because the insecticide can destroy predaceous insects and spiders. The later the insecticide application in relation to the week of squaring and the planting date, the more important it is to avoid using broad-spectrum insecticides. A less disruptive, "soft" insecticide may be the best choice when applying insecticide during the third week of squaring, or to late-planted cotton.

In the High Plains, Rolling Plains, and the Trans-Pecos areas, the cotton fleahopper action threshold is based on an estimate of the percent square set for the field, which is calculated from the number of cotton fleahoppers counted and how many squares the scouted plants retain. A plant mapping program such as COTMAN is an effective tool for monitoring squaring progress, but any plant mapping or fruit-retention-versus-fruit-loss counting technique will work.

Although these tools can monitor all squaring positions, focus on the first-position squares. These squares are produced about every 3 to 4 days, depending on the temperature and other environmental factors. When monitoring plants for square set, look for

**Table 1.** Cotton Fleahopper Action Thresholds

| Region | Fleahoppers | Cotton growth stage | |
|---|---|---|---|
| Blacklands | 10–15 per 100 terminals | During the first 3 weeks of squaring | |
| Coastal Bend<br>Winter Garden<br>Lower Rio Grande Valley | 15–25 per 100 terminals | | |
| Panhandle<br>South Plains<br>Permian Basin<br>Rolling Plains<br>Trans Pecos | 25–30 per 100 terminals with: | Week of squaring | Square set |
| | | 1st week | < 90% |
| | | 2nd week | < 85% |
| | | 3rd week | < 75% |
| | | After 1st bloom, treatment is rarely justified. | |

squares all the way up to the highest, curled up, main-stem leaf. This leaf should have a pin-head-size square. Larger leaves will have larger squares and represent older squares that were previously vulnerable to fleahopper damage and shedding.

Also, look for scars indicating that a square has been shed. Many environmental factors can cause squares to shed; large scars indicate the loss of a large square, usually not due to fleahopper feeding.

Record the number of first-position fruiting positions and the number still with squares to determine the percent square set:

(% square set = No. of 1st position squares present/the total number of 1st position fruiting positions) × 100)

In areas outside the High Plains, Rolling Plains, and Trans-Pecos regions, the action threshold for cotton fleahoppers is based on the number of insects found in the plant terminal during the first 3 weeks of squaring.

**Table 2.** Suggested Insecticides and Rates for Managing Cotton Fleahoppers in Cotton

| Insecticide (trade name) | Lb active ingredient per acre | Amount of formulated product per acre | Acres treated per gal or lb of formulated product | Mode of action group (*IRAC) |
|---|---|---|---|---|
| Acephate[1] (Orthene 97, Acephate 90, generics) | 0.24 | 4 oz | 4 | 1B |
| Acetamiprid[1] (Intruder Max 70WP/ Strafer Max, generics) | 0.026–0.048 | 0.6–1.1 oz | 26.67–14.55 | 4A |
| Dicrotophos[1] (Bidrin 8EC, generics) | 0.25–0.5 | 4–8 fl oz | 32–16 | 1B |
| Flonicamid (Carbine 50WG) | 0.054–0.089 | 1.7–2.8 oz | 9.41–5.71 | 29 |
| Imidacloprid[1] (Alias 4F, Admire Pro, generics) | 0.031–0.063 | 1–2 fl oz | 128–64 | 4A |
| Oxamyl (Vydate C-LV 3.77) | 0.125–0.5 | 8–32 fl oz | 16–4 | 1A |
| Thiamethoxam (Centric 40WG) | 0.031–0.063 | 1.25–2.5 oz | 12.8–6.4 | 4A |

[1] Rates vary depending on product and formulation.
*IRAC = Insecticide Resistance Action Committee (1A = Carbamates, 1B = Organophosphates, 4A = Neonicotinoids, 29 = Flonicamid)



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