Tomato Fruitworm (Corn Earworm): *Helicoverpa (Heliothis zea)*

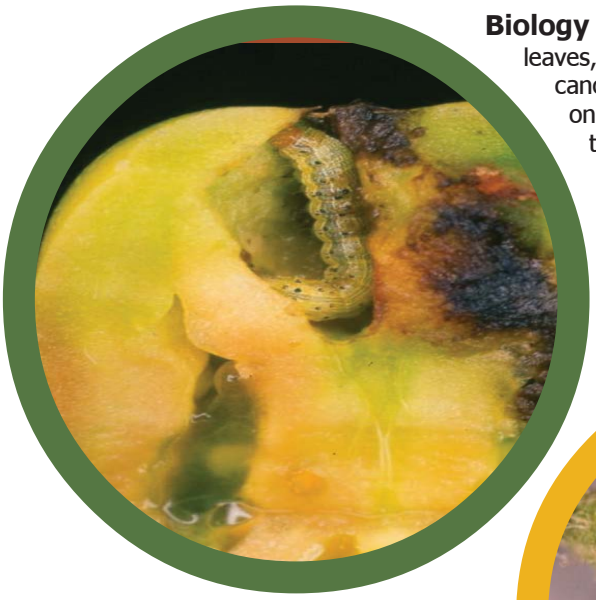


Figure 1. Internal tomato fruit damage by tomato fruitworm larva. Photograph by: Dave Schuster.

Figure 2. Tomato fruitworm egg on tomato flower. Photograph by: Dave Schuster.

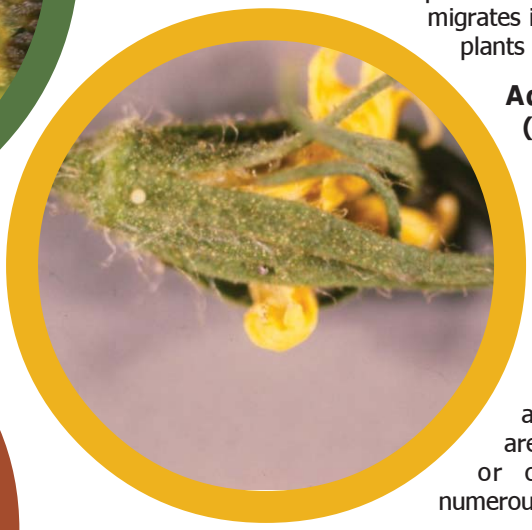
Figure 3. External tomato fruit damage by tomato fruitworm larva. Photograph by: Dave Schuster.

Actual size:

Larvae grow to a size of about 1½ inches in length.

Biology & Lifecycle: Female adults lay oval, heavily ridged eggs individually on leaves, especially those immediately below the uppermost flowers in the upper canopy. Hatching larvae prefer to bore into small, green fruit, but may feed on buds, flowers or stems if fruit are not present. Larvae may complete their development inside a single fruit or may move to other fruit. Mature larvae drop to the soil and form a cell 2-4 inches deep and pupate inside. The egg to adult period lasts about 30 days.

Environmental Factors: The tomato fruitworm is active year round, but is usually more abundant in tomato and pepper during warmer months of both the spring and fall. The insect may over summer on volunteer plants and numerous weed species, and migrates into tomato and pepper after the plants begin flowering.



Adult: Medium-sized moths **(Figure 4)** with a wing span of about 1 to 1¼ inch. They are yellowish brown and may sometimes have a slight greenish tinge. The front wings usually have an obscure dark spot in the center and a dark band followed by a lighter band around the edge. The hind wings are whitish gray with a dark band on the edge. Adults are nocturnal and feed on nectar or other plant exudates from numerous plant species, including citrus.

Larvae: Hatching larvae have black heads with white bodies and spines with black bases **(Figure 1)**. Older larvae have orange or light brown heads and yellowish to nearly black bodies that retain the black-based spines **(Figure 5)**. The top of the larvae have fine, white lines and the sides have a broad dark band with a light band below it.

Host range: The tomato fruitworm has a very wide host range, but among vegetable crops appears to prefer corn and tomato. Other vegetables attacked include pepper and other solanceous crops, and crucifer and cucurbit crops. Many common weeds serve as larval hosts.

Damage: Larvae bore deeply into fruit, usually at or near the calyx. Infested fruit are rendered unmarketable and usually rot due to invasion of secondary microorganisms **(Figure 3)**.

Monitoring:

Traps: Blacklight and conical, pheromone baited traps placed on field perimeters can be used to indicate when adults are migrating into fields.

Scouting: The leaves immediately above and below the highest flower cluster, as well as the flowers themselves, are examined for the presence of eggs. A sample of 10 fruit is examined for damage and the presence of larvae.

Action Threshold: 5-10 moths/trap/night or the presence of one egg or larva

Prepared by: Dr. David Schuster

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CULTURAL CONTROLS:

Start Clean: Tomato and pepper fields should not be planted near or adjacent to post-silking corn fields.

Sanitation: Cull fruit from infested fields should be disposed of as far from production fields as possible.

Field Manipulations: Abandoned fields can be a reservoir of migrating adults and, therefore, should be destroyed immediately after final harvest by deep disking to destroy infested fruit and pupating larvae.

Volunteer plants and weed hosts should be destroyed during the summer off season by frequent disking.

CHEMICAL CONTROLS:

- Insecticides should be applied when the action threshold is reached.
- Insecticides should be timed to control eggs and hatching larvae. Once larvae enter fruit, they are less accessible to insecticides and are more difficult to control.

RESISTANCE MANAGEMENT:

- Applying insecticides based upon the threshold and in conjunction with cultural controls will reduce the number of applications. Chemicals of different classes should be rotated.

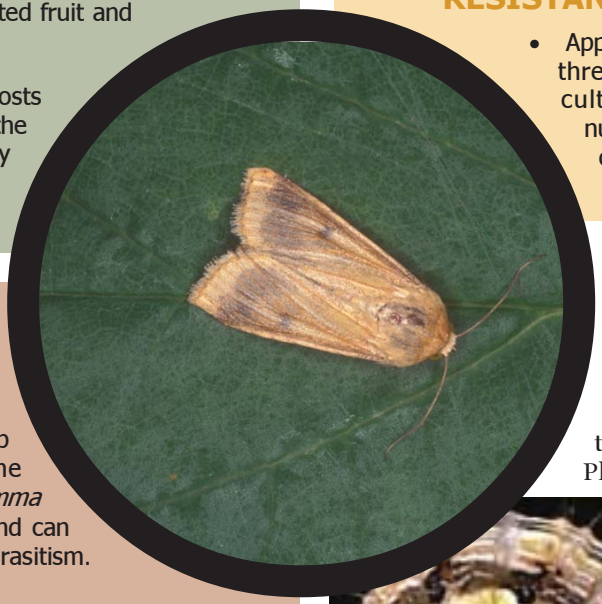

Figure 4. Tomato fruitworm adult. Photograph by: Lyle Buss.

NATURAL ENEMIES:

- Natural enemies do not usually cause high enough mortality of tomato fruitworm to prevent crop injury. Nevertheless, the parasitic wasp, *Trichogramma pretiosum*, attacks eggs and can account for 40 to 80% parasitism.
- Eggs and young larvae are attacked by generalist predators, including lacewings (*Chrysopa* spp. and *Chrysoperla* spp.), big-eyed bugs (*Geocoris* spp.), damsel bugs (*Nabis* spp.) and minute pirate bugs (*Orius* spp.).
- The most important species of parasitic wasps observed attacking larvae include *Cotesia* spp., *Microplitis croceipes* and *Hyposoter exiguae*.
- Natural enemies can be conserved by avoiding broad spectrum pyrethroid, organophosphate and carbamate insecticides. Fewer insecticide applications and applications of new, reduced risk insecticides can also enhance biological control.

Figure 5. Mature larva feeding on foliage. This brown form is characteristic of this insect, though other colors occur. Photograph by: Lyle Buss.

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