



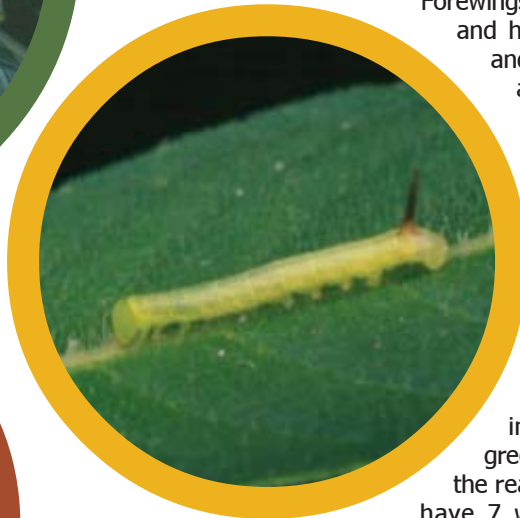
Tobacco Hornworm: *Manduca sexta* Tomato Hornworm: *Manduca quinque maculata*



Biology & Lifecycle: Females lay large, greenish eggs singly on the undersides of leaves in the upper canopy. Larvae feed on foliage, leaving only veins or consuming entire leaves. Mature larvae drop to the soil, burrow 4-5 inches deep and form a cavity in which they pupate. There are five instars and the egg to adult period lasts about 30-50 days.

Environmental Factors: Hornworms are most active April-November in north Florida, but are abundant for only the first two generations because many pupae enter diapause. They are active year round in south Florida.

Adult: Very large moths with 3 to 5 inch wingspan. Forewings are dull-grayish or grayish-brown and hind wings have alternating light and dark bands. The sides of the abdomen of the tobacco hornworm have 6 yellow-orange spots while those of the tomato hornworm have 5 spots. The adults feed on nectar of flowers, especially at dusk, hovering similar to small humming birds (**Figure 6**).



Larvae: Both species are very large, reaching up to about 2½ inches by the fifth instar. Larvae are usually pale green with a characteristic "horn" at the rear end. Tobacco hornworm larvae have 7 whitish, straight lines pointing diagonally on each side (**Figure 1**). The sides

of tomato hornworm larvae have 7 whitish "v"-shaped marks pointing toward the head.

Host range: Both hornworm species are restricted to hosts in the family Solanaceae, particularly tomato and tobacco, although they have been reported to occasionally feed on eggplant, pepper and potato. Wild hosts include groundcherry, *Physalis* spp.; horsenettle, *Solanum carolinense*; jimsonweed, *Datura stramonium*; and nightshades, *Solanum* spp.

Damage: Larvae damage plants by consuming foliage and can cause high levels of defoliation (**Figure 4**). Occasionally, green fruit are also fed upon.



Figure 1. Mature tobacco hornworm larva. Photograph by: Dave Schuster.

Figure 2. Young hornworm larva. Photograph by: Dave Schuster.

Figure 3. Hornworm egg. Photograph by: Dave Schuster.

Actual Size:



Larva

up to about 2½ inches by the fifth instar.

Monitoring:

Scouting: Light traps can be used to monitor adult activity. The upper portions of plants are inspected season long for larvae, concentrating where fresh feeding is evident.

Action Thresholds: Control should be initiated when larger larvae are detected.

Tobacco Hornworm: *Manduca sexta*
Tomato Hornworm: *Manduca quinquemaculata*



CULTURAL CONTROLS:

Field Manipulations: Soil tillage can destroy 90% of the pupae.

Because *Polistes* spp. wasps prefer hornworm larvae, wasp shelters or nesting boxes can be erected.

Completed crops should be destroyed in a timely manner and re-growth and volunteer plants should be controlled. Weeds can serve as larval hosts, but are unimportant relative to crops.

CHEMICAL CONTROLS:

- Insecticides should be applied when large larvae are present.
- Products containing *Bacillus thuringiensis* have been particularly useful and conserve natural enemies.

RESISTANCE MANAGEMENT:

- Products containing *B. thuringiensis* var. *kurstaki* (11B2) and *B. thuringiensis* var. *aizawai* (11B1) should be rotated with each other and with conventional insecticides of different chemical classes.

NATURAL ENEMIES:

- Hornworm eggs and larvae are heavily parasitized by parasitic wasps and flies, respectively, and, if left undisturbed, will usually control hornworm populations (**Figure 5**).
- Timed insecticide applications and the use of *Bacillus thuringiensis* and other selective insecticides can enhance biological control by conserving natural enemies.

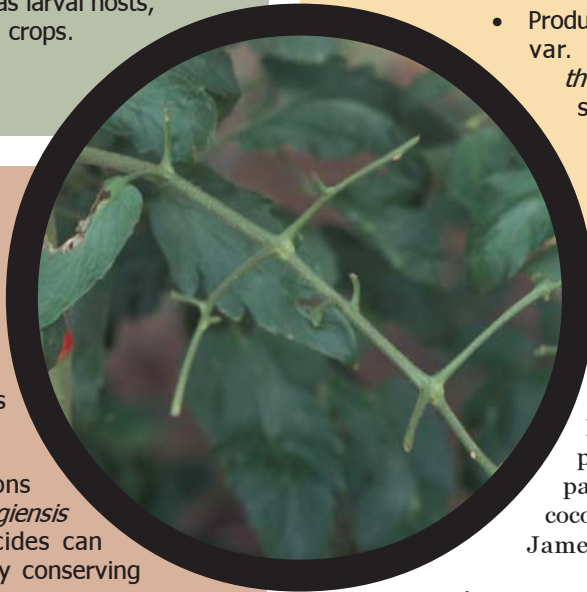


Figure 4. Defoliation by tobacco hornworm larva. Photograph by: James Castner.

Figure 5. Hornworm larvae parasitized by *Braconid* sp. Note: parasitic wasp larvae spinning its cocoon in lower left. Photograph by: James Castner.

Figure 6. Adult tobacco hornworm, *Manduca sexta*. The sides of the abdomen have 6 yellow-orange spots while those of tomato hornworm have 5 spots. Photograph by: John Capinera.



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References:

Villanueva, R. 1998. Tobacco Hornworm: *Manduca sexta* (Linnaeus) and Tomato Hornworm: *Manduca quinquemaculata* (Haworth) (Insecta: Lepidoptera: Sphingidae) UF/IFAS EENY-31, <http://creatures.ifas.ufl.edu/field/hornworm.htm>.

