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Tomato Hornworms in Home Gardens

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Introduction

Tomato hornworms, *Manduca quinquemaculata*, are very large caterpillars that have a "horn-like" tail that gives them their name. Large numbers of caterpillars can occur in home gardens and can quickly defoliate plants. Tomato hornworms feed only on solanaceous plants, i.e. the nightshade family, especially tomato. There are many solanaceous weeds that also serve as alternate hosts, including horsenettle, jimsonweed and nightshade.

Identification

Hornworms are amongst the largest caterpillars in Minnesota and can measure up to four inches in length. Small tomato hornworms are yellow to white in color with no markings. Large caterpillars develop eight white, "V-shaped" marks on each side. Tomato hornworms have a black projection or "horn" on the last abdominal segment.

The adult moths, sometimes referred to as a "sphinx", "hawk", or "hummingbird" moths, are large, heavy-bodied insects with narrow front wings. The tomato hornworm moth is a mottled gray-brown color with yellow spots on the sides of the abdomen and a wingspread of four to five inches. The hindwings have alternating light and dark bands.

Life Cycle

Moths emerge from overwintering sites in spring. After mating, females deposit oval, smooth, light green eggs singly on lower and upper leaf surfaces. Caterpillars hatch, begin to feed and are full grown in three to four weeks. The mature caterpillars drop off plants and burrow into the soil to pupate.

Moths emerge in two weeks to begin a second generation, during mid summer. Second generation moths deposit eggs on host plants, such as tomato. The caterpillars feed until late summer or early fall and then pupate. The pupae remain in the soil through the winter.

Figure 1. Tomato Hornworm. Robert L. Anderson, USDA Forest Service, Bugwood.org

Damage

Tomato hornworm caterpillars feed initially on the leaves on the upper portions of the plants. Tomato is a preferred host although they have also been found on potato, eggplant, and pepper. The caterpillars blend in with the plant canopy, and can go unnoticed until most of the damage is done. As they feed, they create dark green or black droppings that can be conspicuous. Older tomato hornworms are capable of destroying several leaves as well as the fruit. As they become larger, the amount of defoliation increases. The last caterpillar stage consumes nearly as much as all the younger stages combined.

Figure 2. Tomato hornworm damage. Jackie Smith

Figure 3. Parasitized hornworm. Eric Burkness

Management

Plants should be examined at least twice per week during the summer to check for tomato hornworms.

Cultural

- Keep your garden as weed free as possible, to discourage egg laying on solanaceous weed hosts.
- Till the soil after harvest to destroy burrowing caterpillars and pupae.

Physical

- Handpick hornworms from infested plants (this is the most effective means of managing them). Tomato hornworms are fairly easy to find because of their large size. Just throw them into soapy water to kill them.

Biological

There are many natural enemies of the tomato hornworm. Various general predatory insects such as lady beetles and green lacewings often prey upon the egg stage and on young caterpillars. Another important predator is paper wasps, Polistes spp. This common wasp feeds on many types of caterpillars including those found in gardens.

Tomato hornworms are also parasitized by a number of insects. One of the most common is a small braconid wasp, *Cotesia congregatus*. Larvae that hatch from wasp eggs laid on the hornworm feed on the inside of the hornworm until the wasp is ready to pupate. The cocoons appear as white projections protruding from the hornworms body. If such projections are observed, the hornworms should be left in the garden to allow the adult wasps to emerge. These wasps kill the hornworms when they emerge from the cocoons and will seek out other hornworms to parasitize.

Insecticidal

Insecticides are typically not necessary. However, if the above options are not effective or practical, you may consider applying a product. Small caterpillars are more easily controlled than large ones. Be sure that if you treat tomato hornworms you do so before defoliation is severe.

Examples of common insecticides appropriate for tomato hornworm treatment

Common name	Residual*	Notes
insecticidal soap	short	Contact but no residual, only affect what it directly contacts
Bacillus thuringiensis subsp. kurstaki	medium	Stomach poison that needs to be ingested. Is specific to caterpillars
carbaryl	medium	Contact
spinosad	medium	Contact; easy on beneficial insects
permethrin	medium-long	Contact
bifenthrin	medium-long	Contact

**Long residual can persist as long as four weeks. Medium residual can persist as long as long as 10-14 days. Short residual is one day or less*

CAUTION: Read all insecticide labels very carefully before buying and again before using to ensure proper application. It is especially important that the label specify recommended use on the specific vegetable you wish to treat, or generally on vegetables. Also be sure to observe the number of days between pesticide application and when you can harvest your crop. The label is the final authority on how you may legally use any pesticide.

This publication was modified from a Department of Entomology University Minnesota publication entitled *Tomato Hornworm* by S.J. Wold-Burkness and W.D. Hutchison.,