

Organic Solutions for Tomato Hornworms

A Factsheet from Toxic Free NC

About Tomato Hornworms

The tomato hornworm and the related tobacco hornworm are pests of the “nightshades,” or Solonaceae family of plants. These include potatoes, tomatoes, eggplants, peppers, tomatillos, tobacco, and petunias. Tomatoes are their favorites to attack, but they may also attack the other plants in this family.

Hornworms are the caterpillars of a species of sphinx moth, but only the caterpillars damage crops. They eat leaves, stems, and fruits of the plants, which can hurt or even kill the plant.

It’s rare that hornworms could completely kill your crop, although damage on individual plants can be serious. The tips below are meant to help you keep hornworms under control. Sustainable pest management strategies usually work best when used together. Think about your garden, your resources, and your time, and put several of these tips together into a plan that works for you.

Identifying Tomato Hornworms

Adult sphinx moths are large, dull brown hovering moths with thick bodies. They may be seen hovering around flowers near dusk and are easy to mistake for hummingbirds. The tiny yellowish oval eggs are laid alone or in small groups.

The hornworm caterpillar starts out small and yellowish-white, but quickly grows to 3.5-4” long and about as thick around as your thumb. They are pale green with white diagonal or V-shaped markings along their sides and a black or red “horn” sticking up from their rear. When they’ve been munching on plants, they leave behind round, dark green frass.

Hornworms which have been attacked by parasitic wasps have white cocoons on their backs that look like rice – don’t kill those! You might even want to move them to a sheltered spot to protect them. Parasitic wasps will soon come out of those cocoons to kill more hornworms, and that’s a very good thing.



Tomato hornworm.

Photo credit: Sturgis McKeever, Georgia Southern University



Adult Sphinx moth.

Photo credit: R.J. Reynolds Tobacco Company Slide Set, R.J. Reynolds Tobacco Company

Life Cycle

Adult moths come out of the soil in June and July after spending the winter as pupae. They lay their eggs on the leaves of plants in the “nightshade” family, and the young hornworms hatch in about 7 days. They eat for three weeks to a month, growing rapidly, before digging back into the soil to pupate. There are at least two generations each year in North Carolina.

Prevention

1) Grow healthy organic plants. Strong tomato plants are better able to handle some damage from hornworms than weak, struggling plants. Make sure that your tomatoes are getting enough sun and water, and that their soil is well-drained, rich in nutrients, and has plenty of organic matter.

2) Till in the fall. Tilling the soil in the fall can kill as many as 90% of the hornworms living in the soil, so far fewer hornworms will come out to eat and breed in your garden the next year.

Getting Rid of Tomato Hornworms Without Toxic Chemicals

1) Scout and hand pick. Hand picking is by far the easiest and most effective method for managing hornworms in a small garden. Finding them can be hard since the worms are the same color as the plants. Look for leaves eaten down to the central vein, chewed fruit, or the dark green, round droppings.

Hornworms often hide along the leaf stems when they are not feeding, so to find them just follow the stem with your eye away from the damaged area. When you find them, simply crush them, drop them into a pail of soapy water, or snip them in half with scissors. But if you find a hornworm covered in small white cocoons that look like grains of rice, don't kill it! See #4 to find out why.

2) Attract natural enemies. You can attract parasites and predators of the tomato hornworm to your garden by creating homes for beneficial insects and other helpful creatures. Lacewings and ladybugs, both of which eat hornworm eggs and young caterpillars, will make a home in herb and flower beds and small shrubs near the garden.

A fierce hornworm killer is the parasitic braconid wasp which can be attracted by pollen and nectar plants with small flowers, such as wildflowers and herbs. These wasps lay their eggs directly on tomato hornworms. When the eggs hatch, the larvae dig into the hornworm and eat it from the inside out. They then come back out to pupate in small white cocoons on the hornworm's back that look like grains of rice. The hornworm is killed in the process. When the cocoons hatch, the new adult wasps fly away to attack other hornworms. So if you find a hornworm with these cocoons on its back, leave it alone! Better yet, move it to a protected place in the garden as a nursery for your friends the parasitic wasps!



Tomato hornworm frass.

Photo credit: Whitney Cranshaw, Colorado State University



Parasitized tomato hornworm.

Photo credit: Clemson University - USDA Cooperative Extension Slide Series

4) Release predators. Lady beetles, parasitic wasps, aphid midges, and lacewings can also be purchased and released into the garden. Look for them in gardening and seed catalogs.

5) Bioinsecticide BTK. BTK (*Bacillus thuringiensis*, var. *kurstaki*) is a type of bacteria. When eaten by the hornworm, BTK makes a poison in the caterpillar's gut. The pest will stop eating and eventually die. BTK is partly selective, meaning it will kill many caterpillar pests but isn't harmful to most other creatures. However, BTK can also kill the caterpillars of friendly butterflies and moths, so use it carefully. It must be eaten by the hornworms to work, so spray it on the leaves of your plants where you see hornworm damage. It is easily washed away, so it should be reapplied after a heavy rain.

To find BTK, check gardening and seed catalogs. Make sure to check the BTK product you select on the Organic Materials Review Institute's list of products approved for certified organic farms to avoid any toxic ingredients. BTK can be expensive, and since hand picking and natural enemies can work so well for hornworms, BTK should only be used as a last resort. For the same reasons, other insecticides are not recommended for hornworm control.

Sources

Ellis, Barbara and Bradley, Fern Marshall, editors. *The Organic Gardener's Handbook of Natural Insect and Disease Control: A Complete Problem-Solving Guide to Keeping Your Garden and Yard Healthy Without Chemicals*. Rodale Press, 1996.

Flint, Mary Louise. *Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide*, 2nd Edition. University of California Press, 1998.

Wold-Burkness, S.J. and Hutchison, W.D. "Tomato Hornworm." University of Minnesota: VegEdge – Vegetable IPM Resource for the Midwest. Viewed March, 2012: [link]

"Hornworms." Insect and related pests of vegetables. North Carolina State University: Center for Integrated Pest Management. Viewed March, 2012: [link]



This factsheet was written with the needs of non-commercial home, school and community gardeners in mind. Certified Organic growers, or those seeking a certification, should check with their certifying agency before using ANY insecticide. Some organically acceptable insecticides are approved for use in Certified Organic systems only against certain pests or in certain situations.