

Tomato Fruit Borer (*Neoleucinodes elegantalis*)

The tomato fruit borer is a serious pest of tomatoes and other vegetable crops, including eggplants and peppers. This moth species is an economically significant pest throughout South America, attacking many crops and tropical fruits of the Solanaceae family. It is considered one of the most important pests of tomato in parts of Brazil, Venezuela, and Colombia.

The larvae damage host plant fruit as they feed on the seeds and flesh. Just one larva per fruit can make the fruit unmarketable. Because their larvae develop within the fruit, this species is difficult to control with chemical treatment or changes to growing practices. Larval damage, especially the holes larvae make when they emerge from the fruit, can provide a pathway for disease-causing microorganisms to enter the plant. Tomato fruit borer damage can result in decreased seed viability compared to undamaged fruit.

This species is found in the Caribbean, Central America, and South America. The pest has likely been introduced to new areas via infested fruits moving in international trade. Natural spread may occur when adult moths take flight and disperse to new locations. The U.S. Department of Agriculture (USDA) is working closely with stakeholders to survey for the tomato fruit borer as part of an early detection program.



Figure 1. Tomato fruit borer adult (sized approximately one-half inch long [13 mm]) (Dr. M. Alma Solis, USDA/Agricultural Research Service)



Figure 2. Tomato fruit borer pupa in leaf fold (Dr. Ana Elizabeth Diaz Montilla, Entomologist, Corpoica La Selva [Colombia])

Description

The tomato fruit borer has four life stages: egg, larva, pupa, and adult. Eggs are initially white, later darkening before they hatch. Larvae are small when they emerge but can grow to about three-quarters of an inch (2 cm). Mature larvae are white to pinkish with a brown head. Pupae are light to dark brown and are one-half inch long or slightly longer (12 to 15 mm). Adults are nearly

an inch long (24 mm). Front wings have three irregular brown blotches, while the back wings have scattered black spots. Females are larger than males.

Life Cycle

Females lay eggs singly or in small masses on the underside of the calyx (leaf-like structures at the top of the fruit) or fruit of the host. The larvae enter the host fruit soon after hatching. Larvae

spend their entire time feeding in the fruit, eating the seeds and flesh. Once they mature, the larvae exit the damaged fruit and pupate in the nearby leaves, soil, or plant debris.

Adult moths are active at night, spending the day hidden in weeds or host crops. Females attract mates by emitting a sex pheromone. Adults live for about 7 days. The duration of the insect's developmental cycle from egg to adult depends on a number of environmental factors, such as temperature and humidity, but generally takes around 51 days. In Central America, populations of tomato fruit borer increase during the rainy season. Several generations per year occur in areas where this moth is currently established.

Symptoms and Signs

When a larva enters the fruit, it leaves a small scar or tiny hole. This scar can be hard to see and may appear as a pimple-like, sunken area with a spot of dying tissue. The larval exit holes are larger and occur when the larva leaves the fruit to pupate. Larval damage can cause fruits to fall prematurely, rendering them unmarketable. Damage is usually more evident near harvest.

Larvae can be found only by opening the infested fruit.



Figure 3. Holes on a tomato fruit where larvae have entered (example indicated by pointer) and exited (dark spots) (Dr. Ana Elizabeth Diaz Montilla, Entomologist, Corpoica La Selva [Colombia])

Adult moths are active at night. The males can be trapped by using a synthesized version of the female sex pheromone. The pheromone attractant and trap are available commercially.

Report Your Findings

USDA encourages growers and producers of eggplant, pepper, and tomato to look for the tomato fruit borer and report any suspicious findings. This species is present throughout the growing season. Greenhouse surveys may be conducted whenever the host crop is growing.

Properly identifying this pest is important because this species is very similar to many others in the same genus. The tomato fruit borer is most likely to become established in the United States within Plant Hardiness Zones 7 through 11, based on its current distribution and ability to survive in both warm and cold climates.



Figure 4. Larvae and their damage in a tomato fruit (Dr. Ana Elizabeth Diaz Montilla, Entomologist, Corpoica La Selva [Colombia])

If you observe the signs of a tomato leaf borer infestation described above, please contact your local Extension office or State Plant Regulatory Official as soon as possible. To locate an extension specialist near you, visit USDA's National Institute of Food and Agriculture Web site at www.nifa.usda.gov/Extension. A directory of State Plant Regulatory Officials is available on the National Plant Board Web site at www.nationalplantboard.org/member/index.html.

The Cooperative Agricultural Pest Survey (CAPS) conducts science-based national and State surveys that target specific exotic plant pests, diseases, and weeds identified as economic and environmental threats to U.S. agriculture and/or the environment. USDA is the primary funding source for CAPS activities, providing funds to State departments of agriculture, universities, and other entities through cooperative agreements.

