Tomato Pinworm, *Keiferia lycopersicella* (Walshingham) (Insecta: Lepidoptera: Gelechiidae)\(^1\)

S. L. Poe\(^2\)

---

**Introduction**

The tomato pinworm is a small, microlepidopteran moth that is often confused with closely related species, which have similar habits. Apparently, much of the damage to tomatoes attributed to the eggplant leafminer (*Gnorimoschema glochinella* Zeller) in Mexico and California during the early 1920s was actually inflicted by the tomato pinworm (Morrill 1925). It persisted in the literature as the eggplant leafminer until redescribed as a new species (Busck 1928) collected from tomatoes. It was later synonymized with *Eucatophtus lycopersicella* Walshingham. Capps (1946) provided a key, with descriptions, that defines the species and permits identification of larvae with which it might be confused.

---

**Distribution**

Tomato pinworms are found in the warm agricultural areas of Mexico, California, Texas, Hawaii, Cuba, Haiti, and the Bahamas. Also, they have been reported from greenhouses in Delaware, Mississippi, Missouri, Pennsylvania, and Virginia. Fields near greenhouses may become infested, but the species does not overwinter out of doors in colder regions (Thomas 1933). In Florida, it is common in tomato-producing areas south of Tampa along the west coast and from Ft. Pierce south along the east coast.

---

**Life History**

The developmental time for each stage from egg to adult is shown in the table below (Elmore and Howland 1943). Eggs are laid singly or grouped in twos and threes on the host-plant foliage. The eggs are opaque, pale yellow when laid, but turn orange before hatching. The first instar larvae spin a tent of silk over themselves and tunnel into the leaf. Further feeding results in a blotch-like mine usually on the same leaf. The third and fourth larval stages feed from within tied leaves, folded portions of a leaf, or enter stems or fruits. Mature larvae abandon the host and form a loose pupal cell of sand grains near the soil surface. The adult emerges from this pupal cell two to four weeks later. Although the life cycle is lengthy, generations overlap and infestations quickly mount to damaging proportions. Seven or eight generations or more per year can be expected.

---

1. This document is EENY074 (originally published as DPI Entomology Circular No. 131), one of a series of the Department of Entomology and Nematology, UF/IFAS Extension. Original publication date February 1999. Revised November 2005, June 2014, and April 2017. Visit the EDIS website at http://edis.ifas.ufl.edu. This document is also available on the Featured Creatures website at http://entnemdept.ifas.ufl.edu/creatures/.

2. S. L. Poe; Department of Entomology and Nematology, UF/IFAS Extension, Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county’s UF/IFAS Extension office. U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.
Hosts

Plants of the nightshade family, Solanaceae, are the preferred hosts of pinworms. Tomato, *Lycopersicon esculentum* L., is infested most commonly, but eggplant, *Solanum melongena* L. var *esculentum* Nees, and potatoes, *Solanum tuberosum* L. also are attacked. Weeds such as *S. carolinense* L., *S. xanthii* Gray, and *S. umbelliferum* Esch. have been suitable hosts. Tomato, potato, eggplant, and a weed, *S. bahamense* L., are recorded hosts in Florida.

Economic Importance

Damage to tomatoes results from the feeding of larvae on leaves, stems and fruit. Initial injury is slight and appears as a small leaf mine. Later injury includes leaf folding and leaf tying. Mature larvae may abandon the leaf and bore into the fruit leaving a small “pin” size hole. Secondary damage results when plant tissues become infected by pathogens and the plant dies or the fruit rots. Approximately 60 to 80 percent of tomato fruits may become infested in a single season (Elmore and Howland 1943).
Several sanitary measures should be followed because infestations often result from shipment of pinworms in picking containers, crates, infested fruit or seedlings, and from populations perpetuated on plants left in fields after harvest or left in seed flats or compost heaps (Poe 1973). The precautions include use of transplants that are free of eggs and larvae when set in the field, and the destruction of all plant debris and fields after harvest. Populations may be controlled early during the first or second larval stages with several recommended insecticides (Poe 1973); however, third or fourth instars are protected by leaf folds or fruit, making the control of older infestations difficult. Consequently, chemical control is contingent upon frequent and accurate observations of fields for pinworm mines.

Insect Management Guide for Tomatoes, Peppers, and Eggplant

Selected References


Tomato Pinworm, Keiferia lycopersicella (Walshingham) (Insecta: Lepidoptera: Gelechiidae)
Table 1. Life Cycle of Tomato Pinworm

<table>
<thead>
<tr>
<th>Developmental Stage</th>
<th>Number of Days Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Egg incubation</td>
<td>8.9</td>
</tr>
<tr>
<td>Leaf mining</td>
<td>11.5</td>
</tr>
<tr>
<td>Leaf folding</td>
<td>9.5</td>
</tr>
<tr>
<td>Prepupae</td>
<td>6.9</td>
</tr>
<tr>
<td>Pupa</td>
<td>30.2</td>
</tr>
<tr>
<td>Egg to adult</td>
<td>67.0</td>
</tr>
</tbody>
</table>