

Pest Alert

Florida Department of Agriculture and Consumer Services,
Division of Plant Industry

Tomato Leafminer, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), a devastating pest of tomatoes

James E. Hayden, James.Hayden@FreshFromFlorida.com, Taxonomic Entomologist, Florida Department of Agriculture and Consumer Services, Division of Plant Industry

Julieta Brambila, Julieta.Brambila@APHIS.USDA.GOV, Regional Domestic Identifier, Entomology, United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine

INTRODUCTION: *Tuta absoluta* (Meyrick) is a devastating pest of tomatoes and related crops. A moth native to South America, it has invaded and spread through the Mediterranean region, the Middle East and northern Africa since 2006. It has not been detected in North America to date. It is subject to USDA quarantine restrictions, and it is the target of an ongoing monitoring program by a joint USDA and FDACS-DPI Cooperative Agricultural Pest Survey (CAPS) program.

DISTRIBUTION: *Tuta absoluta* is native to tropical and subtropical South America, as far north as Panama and as far south as Uruguay, northern Chile and northern Argentina. Since its detection in Spain in 2006, it has spread rapidly to many countries, primarily southern Europe, as far east as Iran, and as far south as Senegal and Sudan. Infestations have occurred in glasshouses and packing houses as far north as the Netherlands, the United Kingdom and Lithuania. The moth is most likely to be transported by tomato fruits or plants for planting.

IDENTIFICATION: Adult moths are mottled brown and measure about 3/16 inches long from head to end of the forewing. They closely resemble some other species of native pests on solanaceous crops, such as the tomato pinworm (*Keiferia lycopersicella* [Walsingham]) and the potato tuberworm or tobacco leafminer (*Phthorimaea operculella* [Zeller]). Authoritative identification requires dissection of internal structures of adult specimens.

Larvae are cream-colored when young and become green or pink in later stages. The shield on the first segment behind the head has a brown posterior margin, but there are no other distinctive markings. Larvae molt through four stages before pupating.

Eggs are nearly microscopic, oval, cream-white to yellow, and usually laid singly underneath leaves, on buds, or on the fruit calyx.

Pupae are brown and 1/4 inch long. Pupation may occur in a number of places, including on a leaf, inside a mine, or in the soil.

SIMILAR SPECIES: *Tuta absoluta* is related to the tomato pinworm and the potato tuberworm, which are common pests of solanaceous crops in Florida and the Southeast. All are small, brown moths that can be distinguished externally only under magnification of good-quality specimens, and dissection is required for authoritative identification. Native *Keiferia* larvae inflict similar damage by mining in leaves and stems and boring in fruit when in high population density.

Some other species that are native to western North America are also classified in the genus *Tuta*. They feed on non-commercial Amaranthaceae, such as *Atriplex* (saltbush), not Solanaceae. Recently, a gelechiid leaf miner was discovered in saltbush in Bay County, Florida, but it has not yet been identified to species.

Many other species of small, brown gelechiid moths are common in Florida, but only a few pest species are associated with tomatoes. A species of the unrelated genus *Sinoe* Chambers is also attracted in large numbers to the *Tuta* pheromone. These moths are gray with a few black spots.



Larvae of *Liriomyza* flies commonly mine in leaves of tomatoes and many other crops. The mines are narrow, serpentine and irregular, without broad blotches. In contrast, mines of *T. absoluta* rapidly broaden into blotches with round branches, but they may resemble narrow *Liriomyza* mines when just beginning.

HOSTS: *Tuta absoluta* attacks primarily tomato (*Lycopersicon esculentum*), but it also infests other plants in the family Solanaceae, including potato (*Solanum tuberosum*), eggplant (*S. melongena*), pepino (*S. muricatum*), black nightshade (*S. nigrum*), peppers (*Capsicum* spp.) and related non-economic plants. It has also been reported infrequently on common bean (*Phaseolus vulgaris*).

BEHAVIOR AND DETECTION: Larvae mine leaves and other tissues above ground, including buds and stems, and they prefer new growth. Mines in leaves are narrow at first, then expand into tree-like blotches with lines of black excrement. A larva is not restricted to one mine, and it may exit to start another mine elsewhere on the plant. Larvae may bore into fruit when in high population densities, creating pinhole entries (Fig. 7) or mines under the skin. Unlike the potato tuberworm, *Tuta absoluta* has not been recorded in potato tubers.

Up to ten generations occur per year. Eggs, pupae, or adults may overwinter. Adults are nocturnal. Their natural flight range and dispersal ability are not known.

The female pheromone is commercially available and is widely used for monitoring (Fig. 3). The lure is suspended over water or a sticky board to attract male moths.

Because larvae are difficult to distinguish from related native tomato pests, growers should pay attention to infestations of unusual intensity and resistance, and acquire adult specimens for identification.



Fig. 1: Adult *Tuta absoluta*. Photography credit: Dr. Sangmi Lee, Mississippi Entomological Museum, available at <<http://mothphotographersgroup.msstate.edu/genitalia.php?hodges=19715>>.



Fig. 2: Live adult at rest. Photography credit: M. van der Straten, Plant Protection Service, Wageningen, Netherlands. Available at <<http://photos.eppo.org/index.php/image/3871-gnorab-45>>.

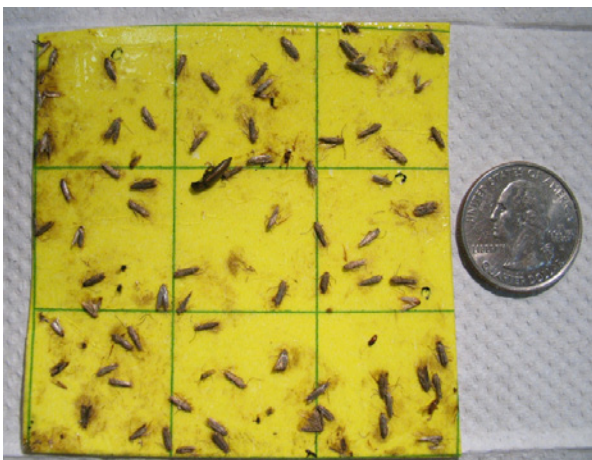


Fig. 3: Sticky board with males attracted to pheromone. Photography credit: Dr. J.E. Hayden, FDACS-DPI.



Fig. 4: Larva of *Tuta absoluta*. Photography credit: J.M. Cobos Suarez, Ministerio de Medio Ambiente y Medio Rural y Marino, Madrid, Spain. Available at <<http://photos.eppo.org/index.php/image/3501-gnorab-28>>.



Fig. 6: Massive damage to whole plants. Photography credit: Dr. Andrea Minuto, CERSAA, Albenga, Italy. Available at <<http://photos.eppo.org/index.php/image/3760-gnorab-41>>.



Fig. 5: Leaf mine in tomato plant. Photography credit: J.M. Cobos Suarez, Ministerio de Medio Ambiente y Medio Rural y Marino, Madrid, Spain. Available at <<http://photos.eppo.org/index.php/image/3496-gnorab-23>>.



Fig. 7: Pinholes in tomato. Photography credit: J.M. Cobos Suarez, Ministerio de Medio Ambiente y Medio Rural y Marino, Madrid, Spain. Available at <<http://photos.eppo.org/index.php/image/3494-gnorab-25>>.