

Rapid action plan for South American tomato pinworm: an invasive pest

South American tomato pinworm, *Tuta absoluta* (Meyrick, 1917) (Lepidoptera: Gelechiidae), also known as tomato leaf miner, is one of the destructive invasive pests, observed for the first time on the tomato-crop in Maharashtra. The pest was later observed in Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Gujarat. It can cause losses up to 90% in fruit yield and quality.

Adult moth is small with a body length of around 6-7 mm and with a wing span of 10-14 mm. The ground colour of the adult moth is greyish or silvery-grey, with darker patches on the fore-wings. The eggs are small, cylindrical, creamy-white to yellow, 0.35-0.40-mm long. Larva is cream-coloured with dark head in the early stage; later turns to slightly pinkish coloured with brown head. Pupa is brownish. The adult moth lays on an average 260 eggs on the underside of leaves, petiole, and on buds. Eggs hatching is over in 4-6 days. The larvae feed on

leaves for a few hours before mining into plant tissues. Mined galleries can be seen on leaves, which are much wider in comparison to mined galleries of dipteran leaf miner (*Liriomyza trifolii*);

often seen on tomato-crop. Dipteran leaf-miner excreta is like a black thread-like stain but in case of *T. absoluta*, it is like black pellets. Grown-up larvae of pinworm create large blotches on leaves. The excreta of larvae could also be seen inside mined galleries. Full-grown larvae are easily visible inside the galleries. Often more than one larva can be seen in a single leaf. Larva also affects terminal buds of tomato-plants and perforates fruits. The fruit infested by *T. absoluta* shows typical pin-holes compared to *Helicoverpa armigera*; wherein half body of larva is outside and half inside. To detect *T. absoluta*, fruits are cut open. There are four

larval instars and the larvae completely feed on green material of the leaf by remaining within mined galleries. Grown-up larvae pupate inside mined galleries or drop down to ground for pupation. Life-cycle of the pest depends mainly on environment, and completes in 23.8 days at 27°C.

Tomato is the most ideal host for *T. absoluta*, however it is also known to attack several other solanaceous crops like brinjal (*Solanum melongena*), pepper (*Capsicum annum*), potato (*Solanum tuberosum*), sweet-pepper (*S. muricatum*) and tobacco, *Nicotiana tabacum*. This moth has also been reported from several solanaceous weeds also, including *N. glauca*, *Datura ferox* and *D. stramonium*.

T. absoluta—Management Strategies

T. absoluta is very difficult to control using chemical pesticides since larvae remain inside the mined galleries. However, eggs are laid on the surface of leaves and other parts and thus are amenable for attack by several



A: *Tuta absoluta* infested fruits (Pin hole) B: *Helicoverpa armigera* feeding on tomato (Larval half body outside)



A: *Tuta absoluta* B: Dipteran leaf miner (*Liriomyza trifolii*) feeding on tomato. Excreta of dipteran leaf miner is like a black thread like stain but in case of *T. absoluta*, it is like black pellets (see arrows)

predators and parasitoids. First instar larva after hatching remains on leaf before mining into leaf tissue. During this period, the insect can be managed effectively.

Population monitoring

Population of male moths can be monitored using pheromone traps available commercially (Ex. Pest Control (India) Pvt. Ltd; Epheromone Ipm Solutions etc.). Trapping of 20-50 moths/trap is considered a threshold level for initiating control measures.

Cultural methods

- Do not take seedlings from pest-infested areas.
- Two months gap between two crops is essential to avoid carry-over population in monocropping or in other solanaceous crops.
- After ploughing, cover soil with plastic mulch or solarize soil.
- Removal of alternate weed hosts, *Datura* sp. (*Datura*) and *Nicotiana glauca* (Tree tobacco).
- Use pest-free seedlings for transplanting.

Biological control

Conservation and augmentation of natural enemies — *Nesidiocoris tenuis* (Mirid bug), wasps, like *Neochrysocharis formosa*, *Goniozus* sp. and

Trichogramma sp.

Insecticide application

- Once larvae are inside galleries only those chemical pesticides are effective which can penetrate leaf lamella.
- The Central Insecticide Board Registration committee made adhoc recommendation of chlorantraniliprole 10.26% OD @ 0.3 ml/L, cyantraniliprole 18.5% SC @ 0.3 ml/L, flubendiamide 20%WG @ 0.3 ml/L, indoxacarb 14.5% @ 0.5 ml/L and imidacloprid 17.8%SL @ 0.3 ml/L for a period of two years provisionally (up to March 2017).
- Please take care that same insecticide is not used all times; it should have rotation with others.

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