

**The South American Tomato Leaf Miner
(*Tuta absoluta*):
Monitoring and Management Strategies**



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The South American tomato leaf miner, *Tuta absoluta* (Meyrick) (Gelechiidae : Lepidoptera) is a devastating pest of tomato. Originating from Peru in South America it has spread to Europe, Africa and Asia. The larval stage of *T. absoluta* causes damage by mining leaves, stems and buds. The larvae burrow into fruits and feed on the inner contents. The damage so caused reduces the market value of the fruits and severe infestations cause 100% yield loss. The first report of this pest in India was in October 2014 from Pune, Maharashtra by ICAR scientists. From then on it has spread to tomato growing regions of Gujarat, Maharashtra, Telangana, Andhra Pradesh, Karnataka and Tamil Nadu.

Biology

The adult of *T. absoluta* has high reproductive potential with 12-14 generations / year. The biostages of this pest are depicted in figure 1(a-d). The life cycle ranges from 21-23 days under Bengaluru conditions. A female can lay on an average 200 eggs singly on the under surface of the leaves, buds, stems and calyx of young fruits.

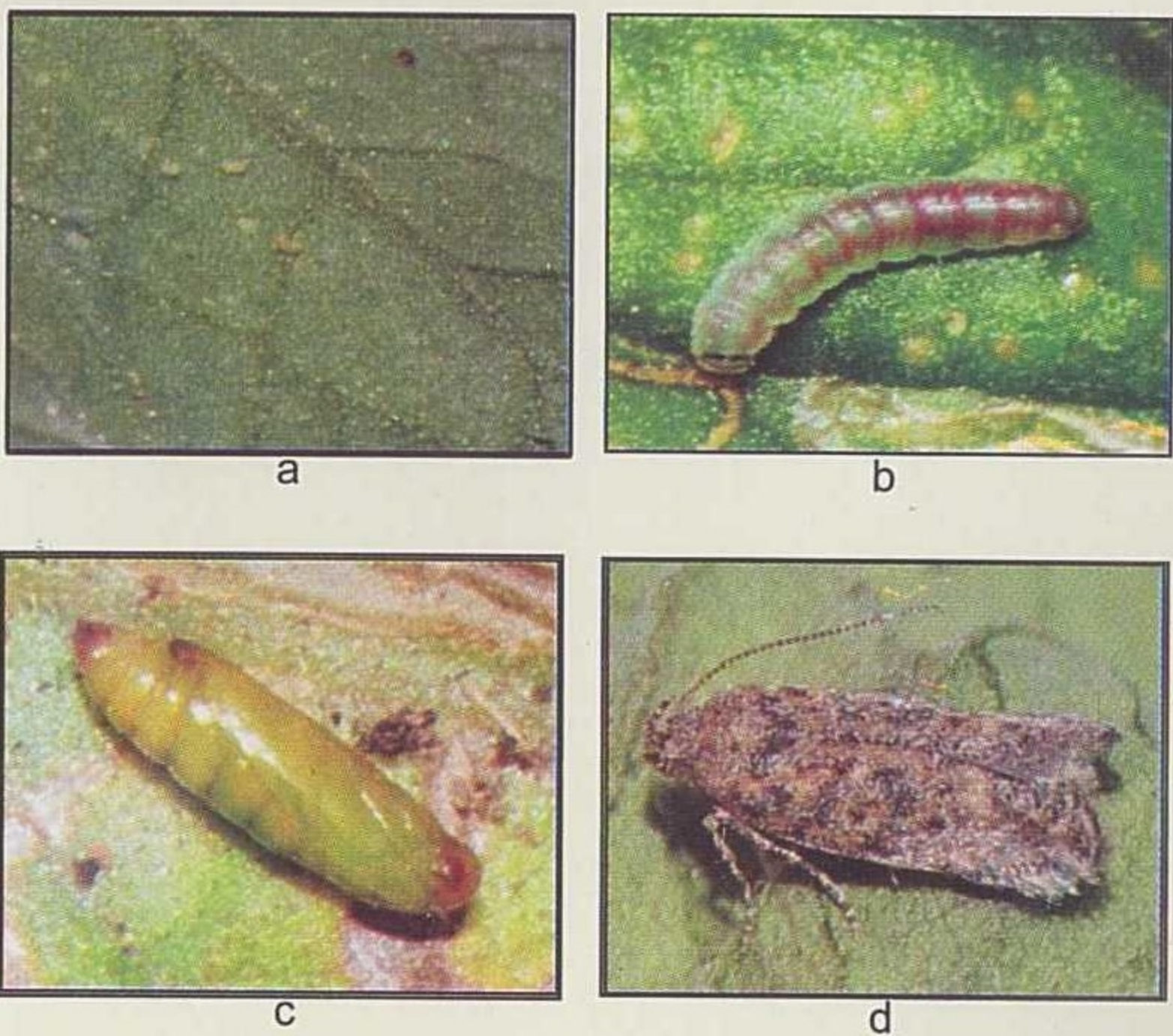


Figure 1: Life stages of *T. absoluta*– (a) Eggs , (b) Larva, (c) Pupa, (d) Adult moth

The larval stage has four instars. Early instar larvae are cream in color with a dark head. The late larval instars become greener and slightly pinkish. They pupate in the soil or on curled leaf surface or within the blotch mine. Adult moths emerge after a week. Moths are active during dusk and early morning and hide between leaves during the day. Adults with a wingspan of 7-10 mm are silvery grey with black spots on the forewings. Males are polygynic (multiple mating).

Damage symptoms

All instars of the larvae damage the plants. Feeding by the larvae cause damage to leaves, flower buds, flowers, fruits, calyx and stem. The damage is spread throughout the crop stage, i.e. from seedling to harvest.



a



b



c

Figure 2: Damage by *T. absoluta* (a) leaf blotch with larva (b) damaged fruit (c) damage on stem

Tuta absoluta damage on tomato plants is recognized by the presence of large blotch like mines on leaves with dark frass in a corner and pinhead size holes on the developing fruits (Figure 2 a,b,c).

In case of serious infestation, leaves dry completely. The larval entry and exit holes on the fruits are pinhead sized. Damage by larvae invite secondary pathogens at a later stage leading to fruit rot and oozing of inner content.

Diagnostic features of *T. absoluta* damage on tomato

The leaf mine caused by serpentine leaf miner, *Liriomyza trifolii*, blotch mine by *T. absoluta* are shown in figure 3 a,b. Fruit damage caused by *T. absoluta*, *Helicoverpa armigera* and *Spodoptera litura* are depicted in figure 4 a-c and accompanied by brief description.



Figure 3 (a) Serpentine leaf mine (b) Leaf blotch mine

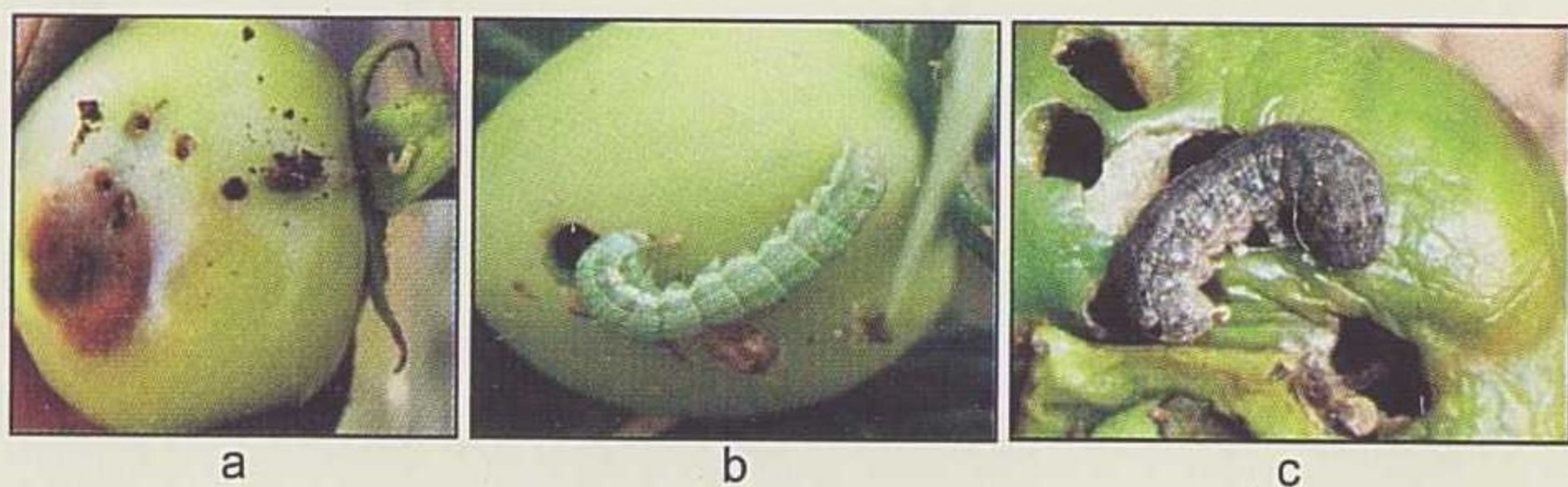


Figure 4. Damage on tomato fruits
(a) *T. absoluta* - Pin head size hole
(b) *H. armigera* - Circular hole with frass, larvae outside
(c) *S. litura* - Large irregular holes, larvae may or maynot be present

Alternate host plants

The preferred host of *T. absoluta* is tomato (*Lycopersicon esculentum*). However infestation of *T. absoluta* has also been reported on potato (*Solanum tuberosum*), egg plant (*S. melongena*), hot pepper (*Capsicum annum*), tobacco (*Nicotiana spp.*) and many other cultivated and weed hosts belonging to family Solanaceae.

Rapid action management plan

- * Destruction of infested tomato plants and fruits by burying them deep inside the soil
- * Crop rotation with non- solanaceous crops
- * Cover nursery with pest proof net and use pest free seedlings for transplantation
- * Conservation / augmentation of natural enemies like *Nesidiocoris tenuis*, *Necremnus* sp., *Orius* sp. and *Trichogramma* spp.
- * Installation of *T. absoluta* pheromone baits with modified traps of ICAR - NBAIR for monitoring and mass trapping male moths both in nursery and main field (40 traps /ha)



a



b

Figure 5. *T absoluta* pheromone trap: (a) Yellow sticky trap (b) water pan trap

* Initiate use of insecticides both in nursery and main field if moth catches in pheromone traps (Figure 5) exceeds 20-30 moths/trap / week

* The Registration committee of Central Insecticide Board (Minutes of 355th meeting of registration committee held on 29.04.2015) made adhoc recommendation to use the following insecticides (for a period of two years provisionally)

Insecticide

Dose
(ml/lit of water)

Chlorantraniliprole (Rynaxypyr) 10.26% OD :-	0.3
Cyantraniliprole (Cyazypyr) 18.5% SC :-	0.3
Flubendiamide 20% WG :-	0.3
Indoxacarb 14.5% SC :-	0.5
Imidacloprid 17.8% SL :-	0.3
Neem formulation (Azadirachtin 1% or 5 %) :-	2-3

* Use of ICAR-NBAIR neem based herbal repellent @ 2.5ml/lit to repel the pest

Precautions

- * Avoid continuous /overlapping cultivation of tomato season after season or year after year in the same place
- * Avoid use of insecticides that are not recommended for control of *T. absoluta*
- * Avoid using phorate in nursery and main field
- * Avoid indiscriminate use of fungicides, plant growth regulators, spurious pesticides and excessive fertilizers. Excessive use of these chemicals may cause resurgence of *T. absoluta*
- * Avoid accumulation of infested fruits / crop residues in the field

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