



**Biotica
Research
Today**
Vol 2:9 ⁹⁵⁰
2020 ⁹⁵²

Integrated Pest Management of Invasive “Tomato Pinworm Pest”

M. Venkateswara Reddy

Dept. of Horticulture, College of Agriculture, Rajendranagar, Hyderabad, Telangana (500 030), India

 Open Access

Corresponding Author

M. Venkateswara Reddy
e-mail: reddymanukonda1973@gmail.com

Keywords

Integrated Pest Management, Nature of damage, Pinworm, Tomato

Article History

Received in 17th September 2020
Received in revised form 24th September 2020
Accepted in final form 25th September 2020

E-mail: bioticapublications@gmail.com

How to cite this article?

Reddy, 2020. Integrated Pest Management of Invasive “Tomato Pinworm Pest”. Biotica Research Today 2(9): 950-952.

Abstract

Tomato (*Solanum lycopersicon* L.) is one of the most popular and widely grown vegetables in the world, ranking second in importance to potato in many countries. The fruits are eaten raw or cooked. Scientific name of Tomato pin worm is *Tuta absoluta*, which is a moth belongs to family Gelechiidae, order Lepidoptera. This is known by the other common names tomato leaf miner, and South American tomato moth. It affects the plant parts such as leaves, stems, buds, young fruit, and ripe fruit. It can cause up to 90% loss of yield and fruit quality under greenhouses and field conditions. No single method is effective for management of this pest. However integrated approach is effective measure for management of tomato pinworm pest.

Introduction

Tomato (*Solanum lycopersicon* L.) is one of the most popular and widely grown vegetables in the world, ranking second in importance to potato in many countries. The fruits are eaten raw or cooked. Tomato supplies vitamin C and adds variety of colours and flavours to the foods. Tomato is also rich in medicinal value. The pulp and juice are digestible, promoter of gastric secretion and blood purifier. It is also considered to be intestinal antiseptic. It is one of the richest vegetables which keep our stomach and intestine in good condition.

At present, the production share of tomato is 11.5 percent of the total vegetable production with 10.2 percent of the total vegetable area in the country. In India it is being grown in an area of 0.789 million hectares with a production of 19.759 million tones. Andhra Pradesh is leading state in tomato production followed by Madhya Pradesh and Karnataka. In Andhra Pradesh it is cultivated in an area of 6.16 lakh hectares with a production of 27.44 lakh tones.

Tomato being a cash vegetable crop brings good income to farmers and particularly around big cities. Among different pests, invasive tomato pin worm has become major pest and causing severe losses to the tomato crop. It is essential to know the life cycle and management of this pest.

Pest Description

Scientific name of Tomato pin worm is *Tuta absoluta*, which is a moth belongs to family Gelechiidae, order Lepidoptera. This is known by the other common names tomato leaf miner, and South American tomato moth. It is a serious pest of tomato crop in South and Central America; it spreads to Europe, Africa, western Asia and India. The invasive pest was first found to be occurring in Maharashtra state of India in the year 2014. In India this pest is mostly confined to large scale tomato growing areas such

as Madanapalli region in Chittur district of Andhra Pradesh, parts of Karnataka and Madhya Pradesh. This pest mostly restricted to members of Solanaceous family. It affects the plant parts such as leaves, stems, buds, young fruit, and ripe fruit. It can cause up to 90% loss of yield and fruit quality under greenhouses and field conditions.

Life Cycle of Tomato Pinworm Pest

Egg

Eggs are small cylindrical, creamy white to yellow 0.35 mm long. *Tuta absoluta* deposits eggs on the underside of leaves or stems. Hatching takes place after 4-6 days. The egg colour varies from oyster-white to bright yellow.

Larva

The first-instar larvae are whitish soon after emergence, becoming greenish or light pink. There are usually four instars. Larval period lasts 10–15 days. *Tuta absoluta* has a high reproductive potential. Larvae do not go to diapause stage while food is available.

Pupa

Pupation takes place within 10 days on the leaf surface, in mines or in soil.

Adult

Adult moths are 5-7 mm long and with a wingspan of 8-10 mm, with silverish-grey scales, filiform antennae, alternating light or dark segments and recurved labial palps which are well developed. Adults are nocturnal and usually hide during the day between leaves. The pest may overwinter as eggs, pupae or adults. Adult female lays about a total of about 250 eggs during her lifetime. The total life cycle is completed in 30–40 days. There up to 12 generations per year. It is known to have many generations in a year and affects tomato in all growing stages.

Host Plants

The Pin worm or Leaf miner prefers solanaceous family members like Potato, Brinjal and Tomato. But Tomato crop is more preferred followed by Potato and Brinjal.

Nature of Damage

Tomato pin worm affects the tomato plants right from seedling stage to ripening of tomato fruits. The pest affects leaves, stems, flowers, immature fruits and ripening fruits. The larvae of *T. absoluta* mine the leaves producing large galleries and burrow into the fruit, causing a substantial loss of tomato production in protected and open filed cultivations. The larvae feed on mesophyll tissues and make irregular mine on leaf surface. Damage can reach up to 100%. This pest damage occurs throughout the entire growing cycle of tomatoes. *Tuta absoluta* has a very high reproduction capability. There are up to 10-12 generations in year in

favourable conditions. The larvae are very unlikely to enter diapause as long as food source is available. *Tuta absoluta* can overwinter as eggs, pupae and adults. Adult female could lay hundreds of eggs during her life time.

Symptoms of Damage

The symptoms of damage of *Tuta absoluta* leaf miner is differed with serpentine tomato leaf miner (*Liriomyza trifolii*). In case of serpentine leaf miner symptoms are observed majorly on upper surface of the leaves, but in case of *Tuta absoluta* leaf miner, the symptoms can be seen on both sides of leaves.

- Affected leaves exhibit white patches which later dry up leading to burnt appearance.
- Affected fruits shows fine pin holes on the site of entrance and exit, which leads to secondary infection and rotting.
- Affected stem dries up and droops down.

Management or Control

No single method is effective for controlling tomato pin worm or tomato leaf miner. IPM practices to be followed for effective control of this pest.

Host Plant Resistance

Several *solanum* wild species found to be resistance against Tomato Leaf miner. Among those, *Solanum pennelli* is more promising, which can be used in breeding programmes for development of new varieties or hybrids.

Physical Methods

Using light traps is an effective method. In this, 60 watts incandescent light attracts more adults of *Tuta* moth. This can be operated between 7.00 to 10.30 PM, so that it avoids falling of beneficial insects to the light trap. Light traps can be placed @ one bulb per 150 m² area under green house condition.

Pheromone traps can be used to monitor the activity of insect. One pheromone trap can be placed per 300 m² area under green house condition.

Biological Control

Egg parasitoid like *Trichogramma pretiosum* is found to be more successful Release @ 50,000 per ha 6 times at weekly interval.

Use of Insecticides

Spray indoxacarb 14.5% SC @ 0.8 ml/l or flubendiamide 20% WG @ 0.2 g/l or novaluron 10 % EC @ 0.75 ml/l or carbaryl 50% WP @ 2g/l or chlorantraniliprole 18.5% SC @ 0.3 ml/l or lambda-cyhalothrin 4.9% CS @ 0.6 ml/l of water. When the pest is in low incidence, spray Neemzal @ 2 ml per litre of water from seedling stage.

Control for Open Filed Cultivation of Tomato

- Destruction of crop residues.
- Summer ploughing helps in exposing resting stages of pests to sunlight, it helps in reducing the pest load in the succeeding crop.
- Light traps with 60 watts incandescent lights can be placed @ 8 no. per acre.
- Pheromone traps can be placed @ 5 no. per acre.
- Adopt chemical spray as above.

Conclusion

Tomato pin worm is *Tuta absoluta* is a serious pest in Tomato. It affects the plant parts such as leaves, stems, buds, young fruit, and ripe fruit. It can cause up to 90%

loss of yield and fruit quality under greenhouses and field conditions. No single method of control like biological or chemical or cultural is effective. Integrated method is very effective for control of Tomato pinworm.

References

Horticultural statistics at glance, 2018.

<http://agropedia.iitk.ac.in/content/tomato-pinworm-tuta-absoluta-new-invasive-pest-india>.