



First Report of the Invasive Tomato Pin Worm, *Tuta absoluta* (Meyrick) from Jodhpur Region of Western Rajasthan in India

Vipin Chaudhary, Mahendra Choudhary*, Surjeet Singh Bharath and Pradeep Kumar

ICAR-Central Arid Zone Research Institute, Jodhpur 342 003, India

Received: April 10, 2026 Accepted: September 14, 2026



OPEN ACCESS

Editor-in-Chief
Praveen Kumar

Editors (India)

Anita Pandey
Hema Yadav
Neena Singla
Ritu Mawar
Sanjana Reddy
Surendra Poonia
R.K. Solanki
P.S. Khapte

Editors (International)

M. Faci, Algeria
M. Janmohammadi, Iran

***Correspondence**

Mahendra Choudhary
entomahendra07@gmail.com

Citation

Chaudhary, V., Choudhary, M., Bharath, S.S. and Kumar, P. 2026. First report of the invasive tomato pin worm, *Tuta absoluta* (Meyrick) from Jodhpur region of western Rajasthan in India. *Annals of Arid Zone* 65(4): 78-82

<https://doi.org/10.56093/aaz.v65i4.177931>

<https://epubs.icar.org.in/index.php/AAZ/article/view/177931>

Abstract: In Western Rajasthan, which is characterized by extreme climatic condition and low productivity, the infestation of tomato leaf miner, *Tuta absoluta* on the upcoming tomato crop was reported for first time under protective cultivation in the western Rajasthan. The infestation of tomato leaf miner was initiated in saplings only and after transplanting it became severe at flowering stage in 2023 leading to complete loss of the crop. It reappeared in 2024 after transplanting of crop and infested 40-50% plants in the playhouse. Keeping in view the severity of the tomato leaf miner, *Tuta absoluta* on tomato crop, which is an upcoming crop in Western Rajasthan, the present study is useful for stakeholders for undertaking various interventions in time.

Key words: *Solanum lycopersicum*, *Tuta absoluta*, Western Rajasthan, protected cultivation, invasive pest.

In India Tomato (*Solanum lycopersicum* L) is grown in 14 states as an important commercial vegetable crop. Its Production at national level is 22.33 MT with a productivity of 24.18 t ha⁻¹ (Anamika *et al.*, 2024). India is the largest producer of tomatoes in South Asia with 95 percent contribution (Anonymous, 2018). Rajasthan it is upcoming state and contributes about 0.4 per cent in countries total production of tomato. The biotic stresses, especially insect pests inhibited the production of tomato world over, among them South American tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) is the serious threat to tomato production in open field as well as polyhouses. It is endemic to South America (EPPO, 2010) and was reported as invasive pest for first time, in Spain in 2006 (Urbaneja *et al.*, 2013), since then it invaded Europe, Africa, and Asia (Kroschel *et al.*, 2016).

Karnataka was the first Indian state to record *T. absoluta*, (Bajracharya *et al.*, 2016) thereafter it was recorded from Maharashtra (Sridhar *et al.*, 2016), Tamil Nadu, (Shasank *et al.*, 2015), Gujarat, (Shanmugam *et al.*, 2016), Delhi (Ballal *et al.*, 2016), Madhya Pradesh (Shashank *et al.*, 2016), Andhra Pradesh and Telangana (Swathi *et al.*, 2017), Meghalaya (Kumari *et al.*, 2015), Punjab (Sankarganesh *et al.*, 2017), and Himachal Pradesh (Sandeep *et al.*, 2017) causing severe damage to tomato in invaded areas in India.

Materials and Methods

The present study reveals the first incidence of *T. absoluta*, an invasive pest in Jodhpur, the desert district of Western Rajasthan. Western Rajasthan represents the major portion of Thar Desert, situated between 69.50°-76.50°E Longitudes and 24.50°-30.50°N Latitudes, characterized by extreme temperatures in both summer and winter. The first incidence of *T. absoluta* was reported in tomato crop var. NS4266 grown under protected conditions in the precision farming block of ICAR-Central Arid Zone Research Institute, Jodhpur, when some blotches on the leaves of tomato plant 25-30 days after transplanting of tomato seedlings in the month of May during 2023 was observed. The careful examination of these spots by removing the skinny portion revealed the presence of tiny larvae feeding on the mesophyll. The infested leaves were collected and kept in the petri-dishes with fresh leaves for adult emergence (Sharma and Gavkare, 2017). The emerged adults were collected and preserved in alcohol and the specimens were sent to ICAR-Indian Agricultural Research Institute (IARI), New Delhi for identification where it was identified as *T. absoluta*.

Results

During subsequent survey at flowering stage the infestation found increasing and around 40% of plants were observed infested with the leaf-miner with 7-21 such leaf mines in each infested plants. At this stage single spray of Emamectin benzoate 5 SG were applied to control the further spread of infestation. The control measures proved insufficient and the infestation of *Tuta* was spread in whole poly house with 100% plant succumbed to the pest and no yield was realized during 2023. The plants were uprooted to prevent the spread of *Tuta* infestation in the vicinity and other poly houses and to reduce the inoculum of the pest in the poly-house to prevent the infestation in the subsequent crops. In 2024 the incidence of *Tuta* was again observed on tomato plants in poly house, it was less during vegetative growth stage of crop but increased to 50% at maturity of fruits. This time damage was more in foliage and less in fruits, but due to defoliation of infested leaves the fruit setting was less.

In Rajasthan, although the *Tuta absoluta* was reported first in Udaipur district of Southern Rajasthan (sub-humid zone of Rajasthan) during 2018-2020 under open field and protected cultivation in tomato where, its life span was in the range of 30-40 days with several overlapping generations. However, in Western Rajasthan, which is characterized by extremes of temperature during summer and winter, this is a first distributional record of the pest (Fig. 1). In the country it was first reported on tomato at ICAR-Indian Institute of Horticultural Research (IIHR) and adjoining farmers' fields in Bengaluru, Karnataka during November 2014, and in no time it spread in several kilometers from South to North and East to West. The fast spread of pest is mainly attributed to trade of fruit (Meyrick, 1917) and its long distance dissemination through packaging materials (boxes) from infested countries (EPPO, 2010).

The larval stage of *Tuta* was responsible for major damage in the tomato crop. The tiny larvae mined inside the leaves between upper and lower epidermis and devoured the mesophyll tissue and produced large blotch like mines consists of dark colored excrement inside the mine. The heavily infested leaves turned brown and lost the turgidity and fold upon itself. The larval damage did not restrict to leaves only, they were found boring into the floral buds, apical shoots and immature and mature fruits leaving a pin like a hole on the surface. The infested fruits were further infested by pathogen leading to rotting of fruits and thus rendered the fruits unfit for the consumption.

In Rajasthan the tomato is upcoming vegetable crop and ranked 18th among the states with 0.4 per cent contribution in country's total production of tomato. The extreme temperatures are detrimental for the growth and development of insect, in such areas the different developmental stages can survive in green house. In the present study the infestation of *Tuta* was observed in poly houses only and the severity was in the range of 50-100 percent for the study period (2023-24). Being a cash crop its trade is high and this is the only reason behind its spread (Potting, 2009). Further being oligophagous it can survive on other solanaceous crops and it is therefore necessary that a strict and regular surveillance

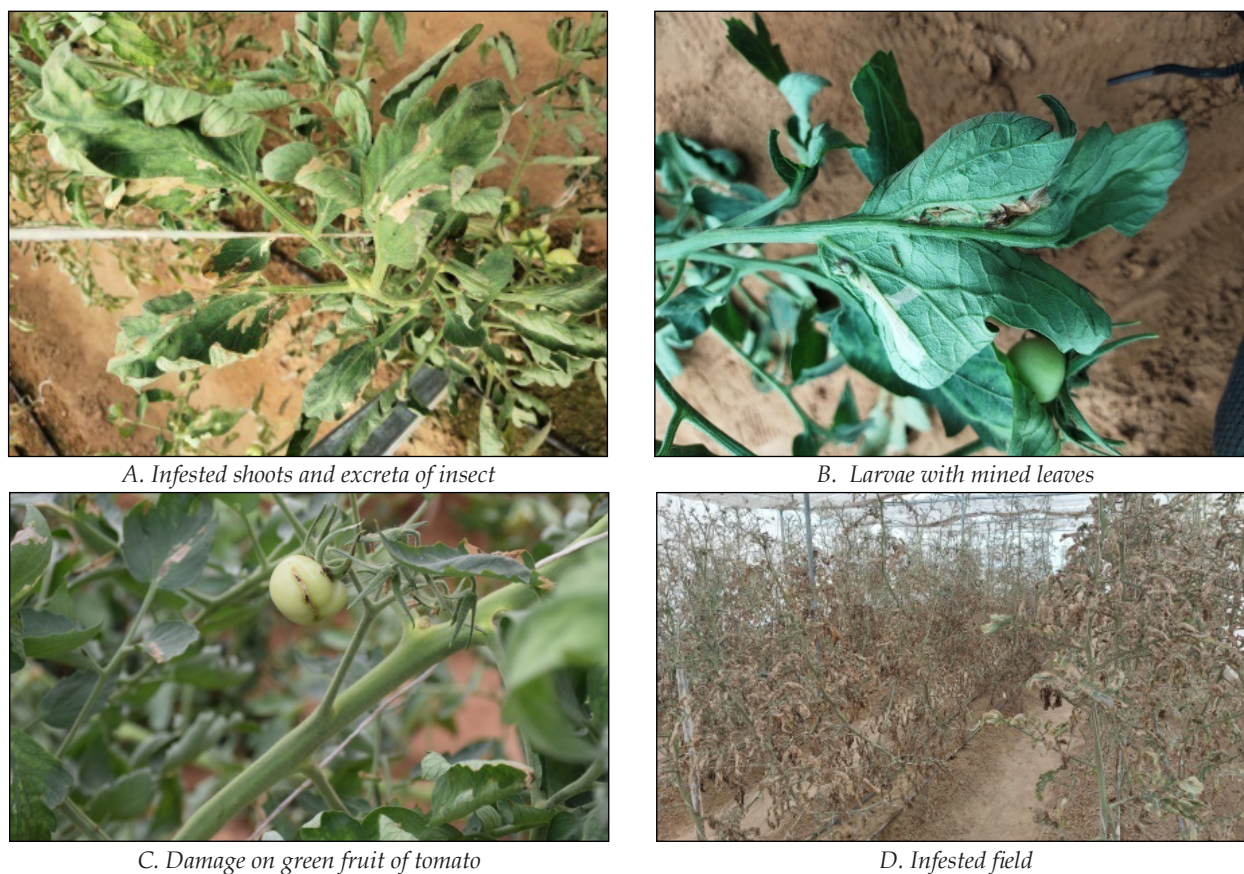


Fig. 1. Damage symptoms of *Tuta absoluta*.

for timely reporting of pest is necessary to check the outbreak of pest (Singh *et al.*, 2023).

Conclusions

The present study reports the first report of *Tuta absoluta* in Western Rajasthan under protected cultivation. The infestation was initially observed 25–30 days after transplanting and increased substantially at the flowering stage during 2023. The infestation subsequently spread throughout the polyhouse, resulting in 100% plant infestation and complete loss of the crop. The pest reappeared in 2024 and infestation increased to 50% at fruit maturity, with greater damage observed on foliage than fruits. The occurrence and severity of *Tuta absoluta* under protected cultivation in Western Rajasthan highlights the need for strict and regular surveillance and timely reporting of the pest to check its outbreak.

Acknowledgement

The authors acknowledge the Director, ICAR-Central Arid Zone Research Institute, Jodhpur

and the Director, ICAR-Indian Agricultural Research Institute, New Delhi for their support.

Conflict of Interest

The authors declare no conflict of interest.

Author Contribution

Vipin Chaudhary: Conceptualization, investigation, manuscript review and final approval of the manuscript. Mahendra Choudhary and Surjeet Singh Bharath: Investigation, data collection, and manuscript preparation. Pradeep Kumar: Supervision and manuscript review. All authors read and approved the final manuscript.

References

- Anamika, Ghalawat, S., Goyal, M., Mehla, S., Malik, J.S. and Yadav, E. 2024. Growth trend in area, production and productivity of tomato in India and Haryana. *Indian Journal of Extension Education* 60(3): 72-76.
doi:10.48165/IJEE.2024.60314.
- Anonymous, 2018. Monthly report: Tomato. Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmers Welfare,

- Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi, 7 p.
- Bajracharya, A.S.R., Mainali, R.P., Bhat, B., Bista, S., Shashank, P.R. and Meshram, N.M. 2016. The first record of South American tomato leaf miner, *Tuta absoluta* (Meyrick, 1917) (Lepidoptera: Gelechiidae) in Nepal. *Journal of Entomology and Zoology Studies* 4: 1359-1363.
- Ballal, C.R., Gupta, A., Mohan, M., Lalitha, Y. and Abraham, V. 2016. The new invasive pest *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in India and its natural enemies along with evaluation of Trichogrammatids for its biological control. *Current Science* 110(11): 2155-2159. doi:10.18520/cs/v110/i11/2155-2159.
- EPPO, 2010. First report of *Tuta absoluta* in Hungary. *EPPO Reporting Service* 3(052): 2. <https://gd.eppo.int/reporting/article-420>.
- Kroschel, J., Mujica, N., Carhuapoma, P. and Sporleder, M. (eds) (2016) Pest Distribution and Risk Atlas for Africa: Potential Global and Regional Distribution and Abundance of Agricultural and Horticultural Pests and Associated Biocontrol Agents under Current and Future Climates. International Potato Center (CIP), Lima, Peru, 416 p. ISBN 978-92-9060-476-1. doi:10.4160/9789290604761.
- Kumari, A., Anitha, G., Anitha, V., Lakshmi, B.K.M., Vennila, S. and Rao, N.P.H. 2015. New record of leaf miner, *Tuta absoluta* (Meyrick) in tomato. *Insect Environment* 20(4): 136-138.
- Meyrick, E. 1917. Descriptions of South American Micro-Lepidoptera. *Transactions of the Entomological Society of London* 1917: 1-52. doi:10.1111/j.1365-2311.1917.tb01401.x.
- Potting, R.P.J. 2009. Pest Risk Analysis: *Tuta absoluta*, Tomato Leaf Miner Moth. Plant Protection Service, Ministry of Agriculture, Nature and Food Quality, The Netherlands, 24 p.
- Sandeep, K.S., Sridhar, V., Sharma, A. and Asokan, R. 2017. Report on the occurrence of South American tomato moth *Tuta absoluta* (Meyrick) in Punjab, India as evident from trap catches and molecular diagnosis. *Pest Management in Horticultural Ecosystems* 23(1): 89-91.
- Sankarganesh, E., Firake, D.M., Sharma, B., Verma, V.K. and Behere, G.T. 2017. Invasion of the South American tomato pinworm, *Tuta absoluta*, in northeastern India: A new challenge and biosecurity concerns. *Entomologia Generalis* 36: 335-345. doi:10.1127/entomologia/2017/0489.
- Shanmugam, P.S., Ramaraju, K. and Indhumathi, K. 2016. First record of South American tomato moth, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Tamil Nadu, India. *Entomon* 41(1): 61-66. doi:10.33307/entomon.v41i1.123.
- Sharma, P.L. and Gavkare, O. 2017. New distributional record of invasive pest *Tuta absoluta* (Meyrick) in North-Western Himalayan region of India. *National Academy Science Letters* 40: 217-220. doi:10.1007/s40009-016-0526-1.
- Shashank, P.R., Chandrashekar, K., Meshram, N.M. and Sreedevi, K. 2015. Occurrence of *Tuta absoluta* (Lepidoptera: Gelechiidae), an invasive pest from India. *Indian Journal of Entomology* 77(4): 323-329. doi:10.5958/0974-8172.2015.00070.X.
- Shashank, P.R., Suroshe, S.S., Singh, P.K., Chandrashekar, K., Nebapure, S.M. and Meshram, N.M. 2016. Report of invasive tomato leaf miner, *Tuta absoluta* (Lepidoptera: Gelechiidae) from northern India. *Indian Journal of Agricultural Sciences* 86: 1635-1636. doi:10.56093/ijas.v86i12.65687.
- Singh, B., Mahla, M.K., Babu, S.R., Jain, D., Vyas, A.K., Singh, V., Ojha, M.L., Sharma, K., Kumar, V. and Jagawat, S. 2023. First report of the South American tomato pinworm, *Tuta absoluta* (Meyrick), as invasive pest in Udaipur Region of Southern Rajasthan in India. *BiolInvasions Records* 12(1): 117-123. doi:10.3391/bir.2023.12.1.10.
- Sridhar, V., Chakravarthy, A.K., Asokan, R., Vinesh, L.S., Rebijith, K.B. and Vennila, S. 2014. New record of the invasive South American tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in India. *Pest Management in Horticultural Ecosystems* 20(2): 148-154.
- Swathi, P., Swathi, B., Das, S.B., Sridhar, V., Giribabu, O., Snehalatha, G. and Raypuriya, N. 2017. First report of South American tomato leaf miner, *Tuta absoluta* (Meyrick) from Madhya Pradesh, India. *Pest Management in Horticultural Ecosystems* 23(1): 92-93.
- Urbaneja, A., Desneux, N., Gabarra, R., Arnó, J., González-Cabrera, J., Mafra-Neto, A., Pinto, A.S. and Parra, J.R.P. 2013. Biology, ecology and management of the South American tomato pinworm, *Tuta absoluta*. In: *Potential Invasive Pests of Agricultural Crops* (Ed. J.E. Peña) pp. 98-125. CAB International, Wallingford, UK. doi:10.1079/9781845938291.0098

About the Authors

Vipin Chaudhary is the Network Coordinator, AINP on Vertebrate Pest Management, ICAR-Central Arid Zone Research Institute, Jodhpur. His research work focuses on vertebrate pest management and agricultural pest-related studies in arid ecosystems.

Mahendra Choudhary is a Young Professional-II, AINP on Vertebrate Pest Management, ICAR-Central Arid Zone Research Institute, Jodhpur. His work involves field investigation, data collection, and monitoring of vertebrate and insect pests in arid agricultural ecosystems.

Surjeet Singh Bharath is Chief Technical Officer, AINP on Vertebrate Pest Management, ICAR-Central Arid Zone Research Institute, Jodhpur. His work involves technical and field-based activities related to vertebrate pest management and insect pest management in arid agricultural ecosystems.

Pradeep Kumar is Senior Scientist, ICAR-Central Arid Zone Research Institute, Jodhpur, working in the area of Vegetable Science. His research activities include vegetable production and protected cultivation.

