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Report of invasive tomato leaf miner, *Tuta absoluta* (Lepidoptera: Gelechiidae) from northern India

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The tomato leaf miner or pinworm, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) is a native to South America. The pest's transatlantic invasion was first detected in Spain 2006. The moth then quickly spread and became the most dreaded pest of tomato in many parts of the Eurasian and African continents. This pest is an oligophagous pest associated with solanaceous crops, viz. tomato, potato, brinjal, pepper, tobacco and few weeds (Ferracini *et al.* 2012). A female of *T. absoluta* lays up to 260 eggs individually on the tender leaves during its lifetime (Desneax *et al.* 2010). Plants are damaged by direct feeding of larvae on leaves, stems, buds, calyces, young or ripe fruit and by the invasion of secondary pathogens which enter through the wounds made by the pinworm. It causes 50 to 100 per cent reductions in yield and fruit quality in greenhouses and fields (EPPO 2005).

In October, 2014 this pest was first detected infesting tomato fields in Pune, Ahmednagar, Dhule, Jalgaon, Nashik and Satara districts of Maharashtra, India (Shashank *et al.* 2015). Subsequently pest was recorded from Karnataka (ICAR 2015, Sridhar *et al.* 2014, Kalleshwaraswamy *et al.* 2015, Ballal *et al.* 2016), Tamil Nadu (Shanmugam *et al.* 2016, Ballal *et al.* 2016), Andhra Pradesh, Telangana (Kumari *et al.* 2015) and Gujarat (Ballal *et al.* 2016, Chavan *et al.* 2016) (Per. Comm.). The leaf and fruit damage was ranged from 0.5 to 60 per cent in different locations (Shashank *et al.* 2015, Ballal *et al.* 2016). In view of its potential for economic damage, the monitoring of pinworm in tomato growing states is very much necessary to contain its spread.

During visit to Centre for Protected Cultivation and Technology (CPCT), ICAR- Indian Agricultural Research Institute, New Delhi in June, 2016, authors noticed leaf mines and blotches on tomato planted under polyhouse. The polyhouse manager thought the damage might be due to serpentine leaf miner, *Liriomyza trifolii* (Burgess). Pheromone traps procured from Pest Control of India (PCI) Pvt Ltd were set up in the polyhouse (4 traps/1000 m^2) planted with eleven commercial varieties of tomato. The tomato crop was in final stage of harvest, so pheromone traps were kept for only ten days during June, 2016. Trapped moths were collected and counted daily. Mean catchs per ten days was 110 ± 27.5 (Mean ± SD). The identity of moth was carried out by the first author and voucher specimens were retained in Department of Entomology, ICAR-IARI, New Delhi. The details about the survey of pinworm borer carried out under protected cultivation at ICAR-IARI are given in Table 1.

Within two years after its first report (October 2014) from Maharashtra this pest is now present in New Delhi. At this point of time, it is very difficult to predict the exact route of spread within India. The possible reasons may be the un-restricted movement of agricultural commodities

Table 1 Survey of *T. absoluta* infestation on tomato grown under protected cultivation at CPCT, ICAR-IARI, New Delhi (June 2016)

Tomato Variety	Leaf mine (Blotch %)		% fruit damage by *Tuta absoluta*
	Liriomyza sp.	*Tuta absoluta*	
GS-600	100	20	0
Pusa cherry 1	100	0	0
Wild Texas cherry tomato	57.14	14.28	0
Hybrid 1	100	25	0
Hybrid 2	100	50	0
Hybrid 3	100	40	0
Hybrid 4	100	33.33	0
Tomato variety 1	100	0	0
Yellow pear	100	11.11	0
NPH 1663	100	50	0
Cherry hybrid 1	100	0	0

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across the states and dispersal of pest due to heavy wind currents. In spite of sustained efforts from different ICAR institutes, State Agricultural Universities and Directorate of Plant Protection, Quarantine and Storage to restrict spread of this pest; it is slowly and steadily occupying the Northern India. So, there is an urgent need to undertake studies on its biology, distribution, host range, extent of damage, conservation of natural enemies and host plant resistance for forming Integrated Pest Management (IPM) module for suppression of this pest. It is important to create awareness among stakeholders about the impending threat of *T. absoluta* and the importance of continuous monitoring to prevent its further spread.

SUMMARY

The tomato leaf miner or pinworn, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) is a native to South America. In October 2014 this pest was first detected infesting tomato fields in Pune, Ahmednagar, Dhule, Jalgaon, Nasik and Satara districts of Maharashtra, India Later on pest was recorded from Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Gujarat. Within two years after its first report from Maharashtra this pest is now present in New Delhi. At this point of time, it is very difficult to predict the exact route of spread within India.

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