



Genetic homogeneity in South American tomato pinworm, *Tuta absoluta*: a new invasive pest to oriental region

P. R. Shashank¹ · S. Twinkle¹ · K. Chandrashekar² · Naresh M. Meshram¹ · Sachin S. Suroshe¹ · A. S. R. Bajracharya³

Received: 6 May 2018 / Accepted: 26 July 2018
© Springer-Verlag GmbH Germany, part of Springer Nature 2018

Abstract

South American tomato leaf miner, *Tuta absoluta* (Meyrick, 1917) (Lepidoptera: Gelechiidae), is an important invasive pest of Tomato which invaded India and Nepal in 2014 and 2016, respectively. In the present study, samples from five localities of India and one from Nepal were used for the investigation of genetic diversity of *T. absoluta* by employing a fragment in the mtDNA gene-encoding cytochrome oxidase I (COI). Based on the partial COI gene, high genetic homogeneity was detected in *T. absoluta* populations of India and Nepal with rest of the world. Less nucleotide diversity (π 0.00137) was also detected in the populations of *T. absoluta* from different countries. This is first attempt to analyze molecular data for this new invasive species from India and Nepal.

Keywords Cytochrome oxidase · Invasive pest · India · Nepal · Tomato · *Tuta absoluta*

Introduction

Tomato (*Lycopersicon esculentum* Miller) is one of the most important vegetable crops in the world and particularly in India. In India, its production has increased 36 times from a mere 0.54 Mt in 1961 to 18.7 Mt in 2015–2016. At present, India is the second largest producer, accounting for 11.2% of the world production and the second largest in terms of acreage accounting for 18.27% (IHD 2017).

South American tomato pinworm, *Tuta absoluta* (Meyrick, 1917) (Lepidoptera: Gelechiidae), also known as the tomato leaf miner is an oligophagous pest associated with solanaceous crops. It causes reductions in yield and fruit quality to the tune of 50–100% loss in either greenhouses

or fields. Plants are damaged by direct feeding on leaves, stems, buds, calyx, young fruits, and also on ripe fruits. Furthermore, damage is also caused by the invasion of secondary pathogens which enter through the wounds made by the pest (EPPO 2005). There are several host plants infested by *T. absoluta*, the primary host is tomato, but damage has been reported on some other secondary hosts like eggplant, *Solanum melongena* L.; pepper, *Capsicum annuum* L.; potato, *Solanum tuberosum* L.; sweet pepper, *S. muricatum* L.; tobacco, *Nicotiana tabacum* L. (Vargas 1970; Pereyra and Sánchez 2006). This moth has also been reported from several solanaceous weeds, viz., *Datura ferox* L., *D. stramonium* L. and *N. glauca* Graham (Larrain 1986; Desneux et al. 2010).

T. absoluta was accidentally introduced to Spain in 2006, from where it spread North to The Netherlands and East to Iran (Desneux et al. 2010, 2011; Baniaméri and Cheraghian 2012). Following its introduction up to Afro-Eurasia in 2010, this pest was in the quarantine watch list of India. 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; 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), Gujarat (Ballal et al. 2016; Chavan et al. 2016; Per. Comm.),

Electronic supplementary material The online version of this article (doi:<https://doi.org/10.1007/s13205-018-1374-0>) contains supplementary material, which is available to authorized users.

✉ P. R. Shashank
spathour@gmail.com

¹ Division of Entomology, Indian Agricultural Research Institute, New Delhi 110012, India

² Indian Agricultural Research Institute, Regional Station, I. T. I. Road, Aundh, Pune, Maharashtra 411007, India

³ Entomology Division, National Agriculture Research Institute, Nepal Agricultural Research Council (NARC), Khumaltar, Lalitpur, Nepal