

# First report of invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) in brinjal (*Solanum melongena* L.) from Gujarat, India

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## Abstract

The current investigation focused on assessing the prevalence of thrips infestation on vegetables in the southern region of Gujarat. The study recorded the presence of *Thrips parvispinus* (Karny) specifically in brinjal fields during the survey conducted in 2022–23. *T. parvispinus* infestation was observed on both flowers and fruits of the brinjal plants. The impact of this infestation was evident as infested flowers were observed to drop prematurely, and lesions were observed on the rinds of the fruits. This discovery of *T. parvispinus* (Karny) infesting brinjal marks the first documented occurrence of this novel invasive thrips species affecting brinjal cultivation in Gujarat, India. This finding highlights the need for further research and management strategies to address the threat posed by this invasive pest to brinjal crops.

**Key words:** *Thrips parvispinus*, brinjal, invasive thrips, *Solanum melongena*, vegetables

## Introduction

Thysanoptera is an order of insects that has two suborders: Terebrantia and Tubulifera. Due to the existence of plant viral vectors and agriculturally significant pests, the suborder Terebrantia is the most commercially significant suborder within Thysanoptera (Rachana *et al.*, 2020). Thrips are minute insects belong to the order Thysanoptera. Their pre-pupal stage, which occurs between the larval and pupal stages, fringed wings and a protruding bladder-like structure at the tarsal end are their characteristics. This order of insects has a remarkably diverse range of eating preferences; they can be herbivorous, fungivorous, pollinivorous or predatory (Mound, 2005a).

One such notorious pest species originating from Southeast Asia is *Thrips parvispinus*, posing a substantial threat to a diverse array of agricultural and horticultural crops. *T. parvispinus*, categorized as a thrips of quarantine significance within the “Thrips orientalis group” (Mound, 2005b), has been identified as a major pest affecting a wide range of unrelated plant families across regions spanning from Thailand to Australia (Mound and Collins, 2000).

Reports have emerged concerning the presence of the species on greenhouse Gardenia plants in Greece, papaya crops cultivated in Hawaii, as well as food crops from various countries, encompassing green beans, potatoes, eggplant, and chili (Murai *et al.*, 2009). Initially documented by Tyagi *et al.* (2015) on papaya from Bangalore, India, the species’ presence was subsequently observed on *Dahlia rosea* blooms in Puttur, Karnataka, as reported by Rachana *et al.* (2018). Patel *et al.* (2022) later confirmed the species’ presence on chili flowers in Umreth, Gujarat.

The discovery of an invasive insect infesting a vital agricultural host plant sparks grave concern and alarm among quarantine

officials. With previous reports of this species affecting economically significant host plants in Karnataka and the latest finding on an agriculturally crucial host in Tamil Nadu, there’s a growing apprehension about its gradual spread across states. Therefore, it’s imperative to implement preventive measures to contain the spread of the invasive thrips to other regions of India. Continuous monitoring of *T. parvispinus* in various parts of the country is essential, considering its potential to pose a significant threat within our borders. Given its polyphagous nature, completely eradicating the risk of this thrips species migrating to economically valuable crops presents a formidable challenge.

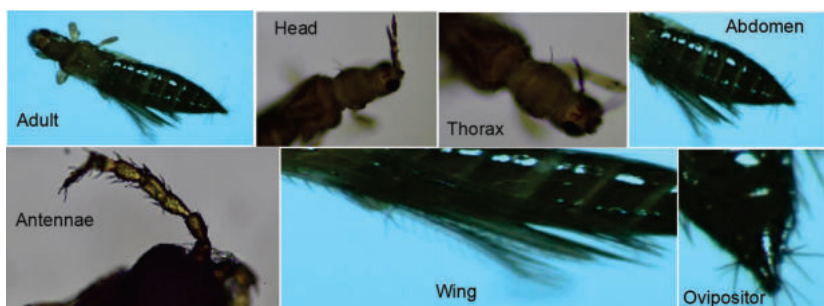
This paper aims to highlight *T. parvispinus* as an emerging threat infesting new host crops in Gujarat. This meticulous approach ensured comprehensive data gathering for further analysis and understanding of thrips distribution and infestation patterns across the surveyed districts of Gujarat.

## Material and Methods

The investigation into the inventory of thrips infestation on vegetables in the southern region of Gujarat, India, encompassed several districts including Surat, Bharuch, Navsari, Dang, Valsad, Narmada, and Tapi during the period of 2022-23 (Table 1). The survey methodology involved a random selection of areas within South Gujarat where vegetable cultivation is prominent. Thrips specimens were collected from the flowers and fruits of brinjal plants by gently tapping them onto white paper sheets. These collected thrips were then carefully preserved in 70% high-grade ethyl alcohol to facilitate their subsequent identification. Detailed records were maintained during the collection process, noting down pertinent information such as the host plant species, collection location, and date of collection.

Table 1. *Thrips parvispinus* reported from different areas of South Gujarat

Name of Place	Latitude	Longitude	Altitude (MSL)
Village: Orna Ta.: Kamrej Dist.: Surat	21°15'05.7"N	73°03'42.3"E	32 m
Village: Mota Ta.: Kamrej Dist.: Surat	21°10'27.8"N	73°04'07.1"E	33 m
Village: Dastan Ta.: Palsana Dist.: Surat	21°09'14.8"N	73°01'07.0"E	22 m
Village: Tundi Ta.: Kamrej Dist.: Surat	21°07'22.3"N	73°01'41.0"E	28 m
Village: Gangpur Ta.: Palsana Dist.: Surat	21°08'05.1"N	73°03'16.7"E	29 m

Fig. 1. Morphological characteristics of *T. parvispinus* collected from brinjal fieldsFig. 2. Infestation of *T. parvispinus* on brinjal flowers. Arrow indicate mite infestationFig. 3. Infestation of *T. parvispinus* on brinjal fruits Arrow indicate mite infestation

## Result and discussion

The pest species was identified based on morphological characteristics observed in adult specimens (Fig. 1). These characteristics include a dark brown body, with the head and thorax appearing lighter than the abdomen. The antennae were found to be composed of seven segments, while the forewings exhibited a brown coloration with a sharply pale base. Additionally, the legs were noted to be yellow in color. The identification of the pest as *Thrips parvispinus* (Thysanoptera: Thripidae) was determined using a combination of reference keys provided by Tyagi *et al.* (2015), Sridhar *et al.* (2021), DPPQS (2022), Hulagappa *et al.* (2022), and Palanisamy *et al.* (2023). These references collectively provided the necessary criteria for accurately identifying and confirming the species of thrips observed in the study. Infestation of thrips in brinjal started during flowering stage (Fig. 2). During flowering stage, thrips which feed on the pedicles and stigma of flowers, inflicted severe damage and were active during the flowering and bud development stages. Severe infestation resulted in flower dropping and no fruit formation. If fruit formed, they became distorted, uneven shape and also lesions seen on fruit rinds (Fig. 3) which reduce its market value. Despite the fact that *T. parvispinus* is already recognized, the species was first identified in India on papaya from Bangalore by Tyagi *et al.* (2015). Rachana *et al.* (2018) then reported the same on *Dahlia rosea* blooms in Puttur, Karnataka. The same was later found by Patel *et al.* (2022) on the chilli flower in Umreth, Gujarat. Ranjith *et al.* (2022) recorded larvae and adult of *T. parvispinus* were found feeding on guava flowers for the first time in India. Also, Kumar *et al.* (2023) reported it from brinjal and Ibrahim *et al.* (2023) reported it on Mango from Kerala. This discovery underscores the importance of conducting additional research and implementing effective management strategies to mitigate the risk posed by this invasive pest to brinjal crops in the area.

In the investigation period of 2022-23, *Thrips parvispinus* (Karny) was identified in brinjal flowers and fruits in southern Gujarat, India. This finding marks the first reported instance of an infestation of the invasive thrips species, *T. parvispinus*, on brinjal (*Solanum melongena* L.) in Gujarat. The detection of this invasive thrips species on brinjal plants is significant as it indicates a potential threat to the cultivation of this important vegetable crop in the region. This discovery emphasizes the significance of maintaining ongoing vigilance and monitoring efforts to track the spread of invasive pests and to mitigate their impact on agricultural production in Gujarat.

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