

## Short communication

### First report on infestation of invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) in chilli from West Bengal, India.

#### Abstract:

Liberalization of international trade and globalization has acted as a facilitator towards spread and colonization of invasive species in new geographical regions throughout the world. Invasive species are capable of causing huge economic loss in agriculture and horticulture and can pose threat to biodiversity as well as to biosecurity. Being a mega diverse country, India has also witnessed invasion of several alien species and many of them were found to have tremendous potential to cause damage to agricultural and horticultural crops. In last decade, Indian agriculture has faced challenges to combat invasive pests among which invasive white fly complex, fall army worm, cassava mealy bug and invasive thrips are worth mentioning. The invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Terebrantia: Thripidae) has been designated as one of the notorious pest species from South East Asia damaging numerous agricultural and horticultural crops.

Keywords: colonization, horticultural crops, international trade, invasive pests

#### Introduction

##### *Thrips parvispinus* (Karny) in India:

The invasive thrips, *Thrips parvispinus* (Karny) is native to Thailand and has already become a widespread menace due to its invasion in many South East Asian countries [3]. In India, *T. parvispinus* was recorded for the first time back in 2015 on papaya (*Carica papaya*) in Bengaluru, Karnataka, India [14]. Later, the pest was found to infest other hosts such as *Brugmansia sp.* (Solanaceae) and *Dahlia rosea Cav.* (Asteraceae). It has expanded its host range and has become a recognized polyphagous pest infesting beans, eggplant, pepper, potato, shallot and strawberry [4]. *T. parvispinus* has already been reported from nine host plants belonging to seven plant families covering a wide area under five Indian states, viz. Andhra Pradesh, Chhattisgarh, Karnataka, Kerala and Tamil Nadu [6]. This invasive black thrips has also reached northern parts of India. The chilli growing farmers of Haryana, Chhattisgarh and Madhya Pradesh have observed severe incidence on the flowers and leaves of chilli [13]. The occurrence of *T. parvispinus* on different hosts throughout the different states of our country has been mentioned in the following table –

**Table 1. Distribution and host range of invasive thrips *T. parvispinus* in India.**

State	Host	Reference
Karnataka	Papaya	Tyagi <i>et al.</i> (2015) [14]
Karnataka	Chilli	Basavaraj <i>et al.</i> (2022) [2]
Karnataka	<i>Brugmansia sp.</i>	Rachana <i>et al.</i> (2018) [7]

**Comment [WU1]:** Please make adjustments to the journal's scientific writing in accordance with existing journal guidelines.

**Comment [WU2]:** Please separate the background, methods and discussion. Create a separate sub-chapter. If there is, plus analysis, which is the foundation of a scientific manuscript.

Even though this is a short report, in scientific writing guidelines, especially journals, this must be separated.

**Comment [WU3]:** It is also necessary to state the reasons why this pest develops in each reported land. Why didn't it happen in previous years? Why now? You can study it through changes in temperature, wind direction, natural disasters, or other factors.

	Dahlia	Roselin <i>et al.</i> (2021) [9]
Karnataka	Guava	Ranjith <i>et al.</i> (2022) [8]
Andhra Pradesh	Chilli	Sireesha <i>et al.</i> (2021) [12]
M.P, Haryana and Chattisgarh	Chilli	Timmanna <i>et al.</i> (2023) [13]
Tamil Nadu	Cotton	Amutha and Rachana (2023) [1]
Gujarat	Chilli	Patel <i>et al.</i> (2022) [5]
Uttar Pradesh	Chilli	Sethy <i>et al.</i> (2023) [11]
Haryana	Onion	Saini <i>et al.</i> (2023) [10]

### Recent infestation in West Bengal, India:

Very recently, during the month of January, 2024, the invasive thrips *T. parvispinus* was found to infest chilli crops in farmers' field in the village Guabarnagar under Alipurduar district of West Bengal. Undergraduate students, conducting Rural Agricultural Work Experience (RAWE) under Student READY programme in that village informed about huge crop loss in chilli due to insect infestation.

**Fig. 1. Infestation of Chilli Thrips (*Thrips parvispinus*) in Guabar Nagar, West Bengal**

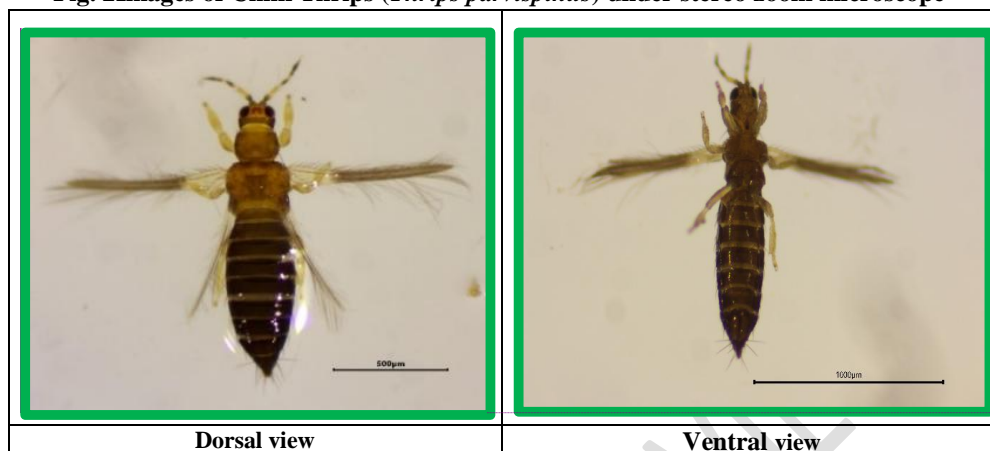


Following this, survey was conducted and thrips infestation was noticed. Both nymphs and adults were found to congregate on flowers and flower buds. Chilli plants were found to be stunted severely and leaves were curled and crinkled with reduced size. The crop suffered huge flower dropping.

Flowers, harbouring adult thrips, were collected from the infested chilli plants and these samples were carried to the laboratory of the department of Agril. Entomology, Uttar Banga Krishi Viswavidyalaya, Pundibari, Coochbehar. Thrips were collected from the flowers using camel brush and were preserved in 70% alcohol. Preliminary investigation on the morphological characters was conducted under a stereo zoom microscope (Model: Stemi 508 Make: Zeiss) and images were taken through 16 MP CMOS camera (Make: Hoverlabs). Under initial investigation, the following morphological characters were observed –

- Head wider than long
- Body brown in colour, abdomen darker in colour than head and thorax; legs yellow.
- Antennae 7 segmented, antennal segment III and basal half of IV and V yellow.
- Forewing brown with pale base.

**Fig. 2** Images of Chilli Thrips (*Thrips parvispinus*) under stereo zoom microscope



**Comment [WU4]:** Please separate the background, methods and discussion. Created a separate sub-chapter. If there is, plus analysis, which is the foundation of a scientific scientific manuscript.

Even though this is a short report, in scientific writing guidelines, especially journals, this must be separated.

**Molecular characterisation:**

The identification of the invasive thrips was confirmed on the basis of molecular characterization. Amplification of the partial mitochondrial cytochrome c oxidase sub-unit I (COI) gene was done and then sequencing process was completed. The submission of the said sequence to National Center for Biotechnology Information (NCBI) database resulted in generation of GenBank accession number **PP338266**. The sequence showed 99-100% match with species recorded or reported elsewhere and already submitted in NCBI database.

**Extended surveys:**

Upon confirmation of the pest as the invasive *T. parvispinus*, extended surveys were conducted under the project AICRP on Biological Control of Crop Pest and Diseases (Contingency centre, UBKV). Presence of this deadly invasive thrips were also detected in the neighbouring areas and similar type of damage symptoms were found in the farmers' fields of Harinathpur, Baganbari, Dhulagaon and Nabanagar villages under district Alipurduar of West Bengal. The damage percentage varied from field to field depending upon the crop protection measures adopted by the farmers but the thrips were found everywhere. Upon conversation, farmers reported severe leaf curl and yield loss in both the popularly cultivated chilli varieties, Viz. Eagle chilli and Tejaswini. They also expressed their fear of crop loss due to some unknown reason as they are not aware about this pest.

**Fig. 3. Infestation of Chilli Thrips (*Thrips parvispinus*) in villages of Falakata, West Bengal**

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The different sites surveyed, overall, under the present investigation for recording occurrence of *T. parvispinus* are as follows –

**Table 2. Location wise detail of infestation by *T. parvispinus* in chili**

Sl. No.	Site Details			Infestation status	
	Name of village	GPS Co-ordinates	Block (District)	No. of thrips/flower	Damage percentage
1.	Guabar Nagar	26°58'N89°13'E	Falakata (Alipurduar)	1-7	50-60%
2.	Harinathpur	26°55'N89°16'E		0-3	10-20%
3.	Baganbari	26°53'N89°17'E		1-4	25-30%
4.	Dhulagaon	26°62'N89°16'E		2-5	30-40%
5.	Nabanagar	26°57'N89°15'E		1-3	20-30%

**Conclusion:**

As per available records and to the best of the authors' knowledge, the deadly invasive thrips *Thrips parvispinus* being reported for the first time from West Bengal, India in this article.

**Comment [WU5]:** the percentage of damage caused by these pests can be explained. can be presented through graphs plotted with maps. Maybe it could be related to handling/handling, causing less damage. Please compile the data so that this article is interesting.

**Comment [WU6]:** strengthen the conclusion.

**References:**

1. Amutha M, Rachana RR. A new host record for the invasive thrips *Thrips parvispinus* (Karny) from India. *Indian J. Entomol.* 2023; 85(4):1009-1011.
2. Basavaraj K, Sreenivas AG, Badari Prasad PR, Rachana RR. First report of invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) infesting chilli, *Capsicum annum* L. in Kalaburagi, Karnataka, India. *J. Exp. Zool.* 2022; 25: 191-194.
3. Mound LA, Collins DW. A South East Asian pest species newly recorded from Europe: *Thrips parvispinus* (Thysanoptera: Thripidae), its confused identity and potential quarantine significance. *Eur. J. Entomol.* 2000; 97: 197-200.
4. NPPO. Technical booklet on monitoring, diagnosis and management of South East Asian Thrips, *Thrips parvispinus* in Chilli. 2022.
5. Patel NB, Bhagora JK, Raghunandan BL, Patel NM. First Report of New Invasive Thrips, *Thrips parvispinus* (Karny) (Thripidae: Thysanoptera) in Chilli Fields of Umreth in Anand District of Gujarat State. *International Journal of Environment and Climate Change.* 2022; 12(3): 73-78.
6. Rachana RR, Roselin P, Amutha M, Sireesha K, Reddy GN. Invasive pest, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) – a looming threat to Indian Agriculture. *Current Sci.* 2022; 122(2): 211-213.
7. Rachana RR, Roselin P, Varatharajan R. Report of invasive thrips species, *Thrips parvispinus* (Karny) (Thripidae: Thysanoptera) on *Dahlia rosea* (Asteraceae) in Karnataka. *Pest Manag. Hort. Ecosyst.* 2018; 24(2): 187-188.
8. Ranjith M, Nagaraju DK, Rachana RR, Ramya RS, Verma OP, Prakash R. New host record of *Thrips parvispinus* (Thysanoptera: Thripidae) in India. *Pest Manag. Hort. Ecosyst.* 2022; 28(1): 33-37.
9. Roselin P, Kuldeep S, Rachana RR. Diversity of floral thrips from Western Ghats of Karnataka. *Indian J. Entomol.* 2021; 83(3), 407–410.
10. Saini S, Kushal R, Ankit S, Saini AK, Lal M, Tyagi K, Rachana RR. Expanding host range and geographical distribution of *Thrips parvispinus* (Karny): Onion as new host from Northern India. 2023; DOI: <https://doi.org/10.21203/rs.3.rs-2956517/v1>
11. Sethy S, Srinivasa N, Arya V, Sunda S. First report of invasive thrips, *Thrips parvispinus* (Karny) infestation on chilli from Eastern part of India. *Eco. Env. & Cons.* 2023; 29S: 498-503.
12. Sireesha K, Prasanna BVL, Lakshmi VT, Reddy RVSK. Outbreak of invasive thrips species *Thrips parvispinus* in chilli growing areas of Andhra Pradesh. *Insect Environ.* 2021; 24(4): 514-519.
13. Timmanna H, Prashantha C, Shashank PR, Nigam VD, Birla N. Occurrence and spread of invasive thrips *Thrips parvispinus* (Karny) in North India. *Indian J. Entomol.* 2023; 85(1): 160-163. DoI: 10.55446/IJE.2022.987.
14. Tyagi K, Kumar V, Singha D, Chakraborty R. Morphological and DNA barcoding evidence for invasive pest thrips, *Thrips parvispinus* (Thripidae: Thysanoptera), newly recorded from India. *J Insect Sci.* 2015; 15 (1): 10.