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First Report of Invasive Thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) in chilli from Alipurduar District of West Bengal, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Chilli (*Capsicum annum* L.) is one of the important commercial crops grown in almost all the states of India. However, biotic ravages caused by insect pests limit the productivity and quality of this crop. Recently thrips infestation was recorded in chilli crop in Guabar Nagar village under Alipurduar district of West Bengal. Survey was conducted and thrips specimens were collected from flowers of infested plants. The thrips was identified as *Thrips parvispinus* on the basis of molecular characterization. The submission of the said sequence to National Center for Biotechnology

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Information (NCBI) database resulted in generation of GenBank accession number PP338266. Upon confirmation of the pest as the invasive *T. parvispinus*, extended surveys were conducted in the neighbouring villages and this invasive thrips was also found in the farmers' fields of Harinathpur, Baganbari, Dhulagaon and Nabanagar villages of the Alipurduar district of West Bengal.

Keywords: Thrips parvispinus; invasive thrips; chilli thrips; West Bengal.

1. INTRODUCTION

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.

1.1 *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 [1]. In India, *T. parvispinus* was recorded for the first time back in 2015 on papaya (*Carica papaya*) in Bengaluru, Karnataka, India [2]. 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 [3]. *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 [4]. 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 [5]. The occurrence of *T. parvispinus* on different hosts throughout the different states of our country has been mentioned in the following Table 1.

2. 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 leaf curl and stunted growth in chilli due to thrips infestation.

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

State	Host	Reference
Karnataka	Papaya	Tyagi et al. [2]
Karnataka	Chilli	Basavaraj et al. [6]
Karnataka	*Brugmansia sp.*	Rachana et al. [7]
	Dahlia	Roselin et al. [8]
Karnataka	Guava	Ranjith et al. [9]
Andhra Pradesh	Chilli	Sireesha et al. [10]
M.P, Haryana and Chattisgarh	Chilli	Timmanna et al. [5]
Tamil Nadu	Cotton	Amutha and Rachana [11]
Gujarat	Chilli	Patel et al. [12]
Uttar Pradesh	Chilli	Sethy et al. [13]
Haryana	Onion	Saini et al. [14]

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 fine 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 –

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

Dorsal view **Ventral view**

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

3. MOLECULAR CHARACTERIZATION

The thrips was identified as invasive *Thrips parvispinus* (Karny) 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.

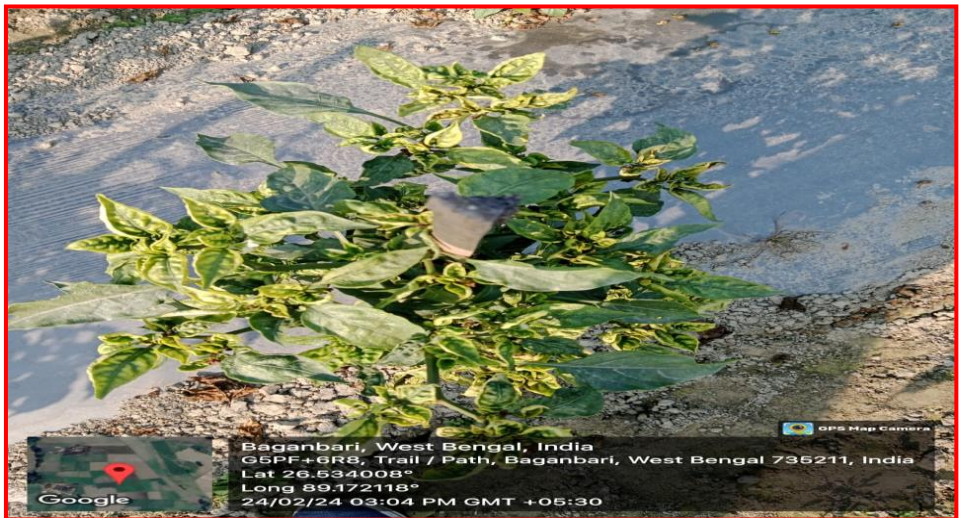
The nucleotide sequence (consensus sequence) of the submitted sample is as follows –

TTATCACTAAGAATAATCATTCGATTAAACCTACGAGTATCCATAAAACTATATGTAAGAAATGAT
CAATTTTATAATTCAATTGTAACAGCCCATGCATTCATTATAATTTTTTTTACAGTTATACCAATCA
TAATCGGTGGATTCGGAAATTGATTAGTTCCATTAATACTCGGAGCACCAGATATAGCATTCCCA
CGATTAAACAACATAAGATTTTGACTTTTACCTCCATCATTAATTTTATTAATTATAGGATTAATAA
AAGAAGGAGCAGGAACAGGATGAACAGTTTATCCACCCTTATCAACATTTTATCATGCAGGAAT
ATCAGTAGACTTAACTATCTTTTCTTTACACTTAGCAGGAATTTCATCTATTCTAGGAGCATTAAA
TTTTATTACAACTATTCTAAATTTAAAAAATGAAAATATACCAATAGAAAAAACAAGTTTATTTGTT
TGATCAGTATTTTTAACAGCAATTTTATTATTATTATCACTTCCAGTTTTAGCCGGAGCCATTACA
ATACTTTTAACAGATCGAAATTTAAACACATCTTTT

Harinathpur

Dhulagaon

Nabanagar



Baganbari

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

4. 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, the farmers of the villages reported 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.

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 chilli

Sl. No.	Site Details			Infestation status	
	Name of village	GPS Co-ordinates	Block (District)	Number of thrips/flower	Damage percentage
1.	Guabar Nagar	$26^0$58'N$89^0$13'E	Falakata (Alipurduar)	1-7	50-60%
2.	Harinathpur	$26^0$55'N$89^0$16'E		0-3	10-20%
3.	Baganbari	$26^0$53'N$89^0$17'E		1-4	25-30%
4.	Dhulagaon	$26^0$62'N$89^0$16'E		2-5	30-40%
5.	Nabanagar	$26^0$57'N$89^0$15'E		1-3	20-30%

5. CONCLUSION

From the above discussion it is evident that the deadly invasive *Thrips parvispinus* (Karny) has become a cause of concern for the chilli growers in the surveyed villages mentioned above. Till date, occurrence of this pest has been reported from various parts of our country. Now, this pest is being reported for the first time from West Bengal condition (as per available records and to the best of the authors' knowledge). Considering its damage potential, extensive surveys must be conducted covering all the districts of the state.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. 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.
2. 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.
3. NPPO. Technical booklet on monitoring, diagnosis and management of South East Asian Thrips, *Thrips parvispinus* in Chilli; 2022.
4. 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.
5. 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
6. 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.
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. Roselin P, Kuldeep S, Rachana RR. Diversity of floral thrips from Western Ghats of Karnataka. Indian J. Entomol. 2021;83(3):407–410.
9. 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.
10. 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.
11. 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.
12. 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.

13. 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.
14. 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.
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