



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2022; 11(3): 1298-1302

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www.thepharmajournal.com

Received: 30-12-2021

Accepted: 28-02-2022

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Status of invasive species of thrips, *Thrips parvispinus* (Karny) infesting chilli grown in middle Gujarat

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Abstract

The rapid roving survey on occurrence of notorious invasive pest, *Thrips parvispinus* (Karny) (Thysanoptera: Terebrantia: Thripidae) infesting chilli was carried out after its report from southern states (Andhra Pradesh, Telangana state and Karnataka) of the country. Based on this survey, the black thrips found present in almost all villages of Anand, Vadodara, Kheda, Chhotaudepur, Panchmahal, Mahisagar districts except Ahmedabad, Botad and Dahod under middle Gujarat Agro climatic conditions. The number of black thrips ranged from 0 to 8.75 thrips/flower. Among the different districts surveyed, the higher incidence was observed in Chhotaudepur (6.25-8.75 thrips/flower) followed by Anand (5.36-8.27 thrips/flower), Vadodara (4.85-7.77 thrips/flower), Kheda (3.33-4.67 thrips/flower), Panchmahal (0.75-1.75 thrips/flower) and Mahisagar (0.00-1.00 thrips/flower). It was also observed that non pungent chilli variety was infested more with *T. parvispinus* compared to medium and high pungent varieties.

Keywords: Invasive, chilli, survey, *Thrips parvispinus*

Introduction

Chilli is considered as one of the important commercial spice and vegetable crop and is widely used universal spice and named as “wonder spice”. It is grown almost throughout the country in *kharif* and *rabi* seasons. Chilli crop was grown under 38,000 ha area with 563 MT production and 14.82 MT productivity per hectare during year 2020-21 (Anon., 2021) [2]. In Gujarat, chilli is mainly cultivated in the districts of Banaskantha, Mehsana, Surendranagar, Tapi, Mahisagar, Vadodara, Botad and Dahod with an annual production of 22051 tonnes of green chillies during 2019-20 and a cultivation of dry chilli in about 11299 hectares.

Cultivation of chilli faces several major constraints like abiotic and biotic stresses. The yield potential and total production of chilli crops are low due to poor yielding varieties and the high occurrence of insect-pests and diseases, especially thrips. Earlier only one major species of thrips *i.e.*, *Scirtothrips dorsalis* (Hood) was found infesting chilli and causing economic loss but during this year another invasive thrips, *Thrips parvispinus* (Karny) causing serious damage to flowers and fruits of chilli was observed. This pest causes severe damage to the plant by sucking on flowers as well as leaves leading towards whittling (Kalshoven 1981) [3]. It is a polyphagous pest, infesting beans, eggplant, papaya, pepper, potato, shallot and strawberry. It was reported on papaya in Hawaii, *Gardenia* sp. in Greece, vegetable crops like capsicum, green beans, potato, and brinjal from other countries (Murai *et al.*, 2009) [4]. Occurrence of this species in India has been first reported by Tyagi *et al.* (2015) on papaya from Bangalore. Yield losses due to attack of *T. parvispinus* on chili plantation could reach 22.8% (Sastrosiswojo 1991) [7]. The thrips cause large scale shedding of flowers, malformation of fruits and fruit drop in chillies, leading to severe yield loss.

Recently an outbreak of invasive thrips species, *T. parvispinus* is observed in chilli growing areas of southern India. Chilli flower thrips were first noticed in Chilakaloripeta and Pratipadu mandals of Guntur district of Andhra Pradesh during January, 2021 and subsequently its spread was noticed in all chilli growing areas of Andhra Pradesh (Sireesha *et al.*, 2021) [8]. This invasive thrips was also observed in all the chilli growing districts *viz.*, Warangal, Mahabubabad, Khammam and Suryapet of Telangana state during November, 2021 (Anitha *et al.*, 2021) [1]; and occurrence of this thrips in major chilli growing districts *viz.*, Chitradurga, Bellary, Gadag, Koppal and Raichur of Karnataka was recorded during November and December, 2021 (Nagaraju *et al.*, 2021) [5].

Materials and Methods

The rapid roving survey was conducted by scientists of Department of Agricultural Entomology, B. A. College of Agriculture in collaboration with Main Vegetable Research Station, AAU, Anand to know the occurrence of *T. parvispinus* in different villages of middle Gujarat during 24th January to 4th February 2022. For the purpose, total 09 districts covering 19 talukas and 48 villages were surveyed. For recording observations, three flowers per plant were selected and observations on number of thrips present were recorded. For confirming the species, total of 34 specimens were collected by tapping method from flowers of chilli crop using a white paper underneath the canopy to collect fallen thrips. Thrips thus fallen on white paper were collected using fine hair brush and transferred to a labelled vial containing 70% alcohol location wise. These specimens were sent for

identification to Division of Insect Systematics, ICAR-NBAIR, Bangalore. Further, specimen collected from Main Vegetable Research Station, AAU, Anand was also sent to Department of Biotechnology, AAU, Anand.

Results and Discussion

The survey revealed that black thrips, *T. parvispinus* is present in almost all villages of Anand (5.08-8.25 thrips/flower), Vadodara (4.85-7.77 thrips/flower), Kheda (3.33-4.67 thrips/flower), Chhotaudepur (6.25-8.75 thrips/flower), Panchmahal (1.17-2.80 thrips/flower), Mahisagar (~1.00 thrips/flower) districts except Ahmedabad, Botad and Dahod districts falling under middle Gujarat Agro climatic conditions. The data on occurrence of this new invasive species of thrips in chilli are presented in Table 1

Table 1: Status of an invasive black thrips, *T. parvispinus* under middle Gujarat conditions

District	Taluka	Village	Variety of Chilli	Black thrips/ flower	
Anand	Borsad	Davol	G-4	3-4	
		Bodal	Nisha	3-6	
			Omega	5-6	
			Capsicum	3-5	
			Not known	3-4	
	Anand	AAU, Campus	AVNPC 131	2-8	
		Ode	Indra	17-25	
		Rasnol	Nisha	5-8	
			G-4	3-4	
			Picador	6-9	
	Umreth	Dagjipura	Nisha	5-8	
		Picador	6-12		
Mean				5.08-8.25	
Vadodara	Karjan	Koliyad	Not known	10-15	
		Karjan	Not known	5-10	
		Palej	Not known	5-10	
		Kasampur	Not known	Not found	
		Utiya	Capsicum	3-4	
		Vadodara	Fatepura	Not known	4-5
			Chapad	Not known	5-10
	Por		Not known	3-4	
	Padra	Padra	Not known	7-12	
	Savali	Savali	Sitara-332	8-10	
			Sitara-332	4-6	
		Vadiya	Sitara-332	6-8	
		Rajupura	Not known	2-4	
		Ghemalpura	Not known	1-3	
Mean				4.85-7.77	
Kheda	Mahudha	Alina	Picador	5-6	
		Finav	Picador	2-3	
		Singhali	Desi rani	3-5	
		Nani Khadol	Not known	Not found	
		Barol	Not known	Not found	
		Kaiyaj	Picador	Not found	
	Mehmedabad	Navchetan	Nisha	Not found	
Mean				3.33-4.67	
Ahmedabad	Dholka	Arnej	Not known	Not found	
Botad	Botad	Samdhiyada-1	Not known	Not found	
		Samdhiyada-2	Not known	Not found	
		Samdhiyada-3	Not known	Not found	
		Lathidol	Not known	Not found	
		Ugamedi	Not known	Not found	
		Kariyani	Not known	Not found	
	Barwada	Barwada	Kailash	Not found	
			213	Not found	

Mean			Not found	
Panchmahals	Godhra	Bagedod	Not known	2-3
		Rupanpura	G-4	1-2
			G-4	0-1
	Kalol	Narapura	G-4	0-1
		Ranchhodpura	Not known	4-7
	Morava	Rasalpura	Non known	Not found
		Vadodar	Non known	Not found
Gajipur		Non known	Not found	
Mean			1.17-2.80	
Dahod	Devghadbariya	Dangariya	Non known	Not found
		Ruvabari	Non known	Not found
Mean			Not found	
Chhotaudepur	Dabhoi	Simaliya	Nisha	2-4
		Karnet	Not known	4-8
		Diwalipura	Nisha	15-17
	Pavi-Jetpur	Jabugam	Not known	4-6
Mean			6.25-8.75	
Mahisagar	Santarampur	Amba	Not known	0-1
Mean			0-1	

Moreover, it is also observed that this thrips is predominantly present in flowers of chilli plant. Due to the infestation of black thrips, flowering gets reduced, shedding of flowers, fruits become malformed, button shaped (in case of bell pepper) and surface of fruit shows scratchy/ rugged appearance. As per the report of Anitha *et al.* (2021) [1], due to infestation of *T. parvispinus* the infested flowers wither and there is no fruit set. The fruits attained abnormal shape. If population of black thrips is not controlled, it may lead to serious loss to chilli farmers. Even as per a farmer's opinion, the yield of green chilli fruits was reduced from 30-35 quintals/ *vigra* to only 10-15 quintals/ *vigra* due to attack of this pest. Upon critical observation, flowers on top canopy found to be infested with lower thrips population as compared to flowers in the middle and lower crop canopy. Co-existence of yellow thrips along with black thrips in flowers was also

observed in most of the chilli varieties except bell pepper (non pungent) variety; in which very high population of black thrips was observed. During this survey it was noticed that even though farmers are applying insecticides every week to manage this pest, the nuisance remained unresolved. Sireesha *et al.* (2021) [8] stated that exposure to heavy insecticides in chilli has resulted in the resurgence of this pest. Alongside insecticides some progressive farmers have also installed yellow as well as blue sticky traps in their fields. Sireesha *et al.* (2021) [8] has also recommended the installation of blue and yellow sticky traps @ 30 traps per acre on community basis to reduce the adult population and also monitoring of black thrips. Thus, it is now confirmed that an invasive thrips, *Thrips parvispinus* (Karny) is now existing infesting chilli crop in all most major districts of middle Gujarat.



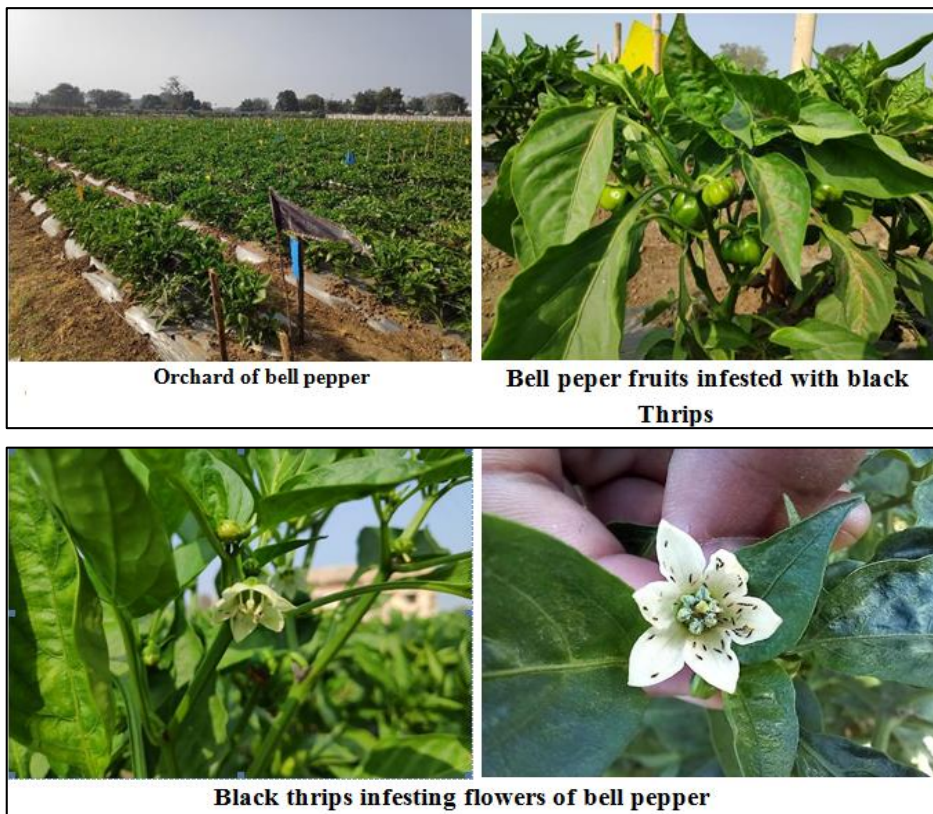


Fig 1: Morphology, damage and incidence of black thrips in chilli





Black thrips infested long pepper fruits

Fig 2: Damage symptoms and loss due to black thrips on chilli/bell pepper fruits



Samadhiyala, Botad

Dagajipura, Umreth

Ranchhodpura, Godhra

Rasnol, Anand

Fig 3: Survey carried out in middle Gujarat for black thrips incidence

Acknowledgment

Authors take an opportunity to thank Dr. K. B. Kathiria, Hon`ble Vice chancellor, AAU, Anand; Dr. M. K. Jhala, Director of Research & Dean (PG studies), AAU, Anand and Dr. Y. M. Shukla, Principal & Dean (Agri.), B. A. College of Agriculture, AAU, Anand for constant inspiration and guidance during the course of investigation. The authors are also grateful to Dr. Rachna R. R., Scientist, Germplasm collection and characterization, ICAR- NBAIR, Bangalore, Karnataka and Dr. Amar Sakure, Assistant Research Scientist, Department of Agricultural Biotechnology, B. A. College of Agriculture, AAU, Anand for confirming the identity of invasive thrips, *T. parvispinus*.

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