



OCCURRENCE AND SPREAD OF INVASIVE THRIPS *THRIPS PARVISPINUS* (KARNY) IN NORTH INDIA

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ABSTRACT

The invasive thrips *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) is an important insect pest causing severe damage in chilli-growing areas of south India in the last two years. In the present study, its spread in north and central India in chilli and capsicum is discussed along with diagnosis, occurrence, damage symptoms. A high level of infestation (ranging from 8-12 thrips/ flower) was observed on chilli crop in Madhya Pradesh (Khargone, Khandwa, Satna, Narasinghpur, Dhar) and on capsicum hybrids in Haryana (Ambala, Panchkula and Panipat) grown under greenhouse. However, its infestation was less (1-3 thrips/ flower) in chilli crop at Chhattisgarh (Bastar, Sarangarh-Bilaigarh, Balod bazar, Durg).

Key words: *Thrips parvispinus*, infestation, Madhya Pradesh, Haryana, Chhattisgarh, chilli, greenhouse, damage, diagnosis, quarantine pest

The invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Terebrantia: Thripidae) is native to Thailand and has widespread occurrence in other South East Asian countries (Mound and Collins, 2000). Hence, it is called South East Asian thrips. As compared to other thrips species, this is larger in size, with dark brown to black coloured body. It is primarily sap sucking insect, but also feeds on pollens and resides in flowers and curled leaves of chilli, capsicum, and other crops. The international trade of planting material and changing climate are considered major factors for its rapid spread to other countries like Oceania, North America, Europe, Africa, and now India (Sugano et al., 2013; EPPO, 2022; Rachana et al., 2021). Large-scale cultivation of its major host plants (solanaceous crops and papaya), and tropical weather conditions favour its further spread and establishment in new areas (Sartiemi and Mound, 2013; Johari, 2015).

In India, *T. parvispinus* infestation was initially observed in papaya (*Carica papaya* L) in Bangalore during 2015 (Tyagi et al., 2015). Later it has been observed on other host plants viz., *Brugmansia* sp., *Tagetes* sp., *Citrullus lanatus*, *Momordica charantia*, *Chrysanthemum* sp., *Gossypium* sp., *Mangifera indica*, *Tamarindus indica*, *Dahlia rosea* and *Capsicum annum* (Rachana et al., 2021; Roselin et al., 2021). During 2021, post-rainy season, a higher level of infestation (10 to 20 thrips/ flower) was recorded

in >10 lakh acres of chilli crop in Andhra Pradesh, Telangana, and Karnataka. Thus this pest is a threat to chilli growers of other states and in February 2022, showing 40 to 80% damage in most of the chilli growing areas of Andhra Pradesh and Telangana. (Anonymous, 2021; 2022; Timmanna et al., 2022). In view of these, monitoring this pest through regular surveys has been done in different states of north and central India. This study for the first time, reports its occurrence, along with its diagnosis in different chilli growing areas of north and central India.

MATERIALS AND METHODS

During the last week of November, chilli growing farmers from north Indian states like Haryana, Chhattisgarh and Madhya Pradesh observed severe incidence of large black thrips on the flowers and leaves of chilli. After this observation, separate roving surveys were conducted by a team of scientists from the Directorate of Plant Protection, Quarantine and Storage, Faridabad, Haryana (DPPQ&S) and ICAR-Indian Agricultural Research Institute (IARI), New Delhi. Thrips-infested capsicum crop (70-90 days old crop) grown under protected condition (nethouse) of Ambala, Panipat and Panchkula districts of Haryana were visited. Thrips infested chilli crop in Khargone, Khandwa, Satna, Narasinghpur and Dhar districts of Madhya Pradesh were also surveyed; also chilli plant samples

were received from farmer fields of Bastar, Sarangarh-Bilaigarh, and Balod Bazar districts of Chhattisgarh. In all these, infestation was observed, from which infested plants were randomly selected. Terminal shoots, leaves and flowers from these were tapped on to a white paper sheet and fallen thrips were collected in vials containing 70% alcohol with a camel hair brush. For morphological identification slide mounts were prepared following the standard procedures and diagnosis was carried out under DM2500 LED compound microscope, using standard keys (Hoddle et al., 2012). The voucher specimens have been submitted to the National Pusa Collection, Division of Entomology, ICAR-IARI, New Delhi, India.

RESULTS AND DISCUSSION

Thrips samples from Madhya Pradesh, Chhattisgarh and Haryana states were confirmed as *Thrips parvispinus* Karny (Fig. 1. g, h). The important diagnostic characters observed include- female dark brown, head and thorax paler than abdomen, legs yellow; male pale brown to yellowish and smaller compared to females; with two pairs of long postero-angular, and three pairs of posterior marginal setae on the pronotum; campaniform

sensilla on metanotum absent and reticulate medially; long median setae located behind anterior margin; male thrips yellowish with posteromarginal comb absent on VIII tergite; sternal segments III to VII having small transverse pore plate and discal setae at lateral. *Thrips parvispinus* has originated from Thailand and for the first time it was reported on papaya (*Carica papaya*) from Bangalore (India). Later, within a span of five years, it became serious in most of the chilli-growing areas of south India viz., Andhra Pradesh, Telangana, and Karnataka. In the present study, more immature and adults (ranging from 3 to 12 thrips/ flower) were noticed on flowers and leaf midribs of chilli (70 to 90 days old), which is grown in open field conditions, as seen from the five districts of Madhya Pradesh and four districts of Chhattisgarh (Table 1). Infested plants showed a silvery appearance to brownish discolorations on tender leaves and fruits, crinkling and upward curling of leaves, buds and leaves become brittle at a later stage, with more flower droppings (Fig. 1c-f). These symptoms are in conformity with those of previous ones known from south India (Anonymous, 2021; Rachana et al., 2022; Timmanna et al., 2022).

Table 1. Chilli black thrips *T. parvispinus* spread in central and north India

State	Location	Infestation (thrips/ flower)	Crop/ variety	GPS Coordinates
Madhya Pradesh	Khargone	8-12	Chilli (Navtej MHCP-319, Shakti 51)	21.866°N, 75.614°E
	Khandwa	8-10	Chilli (Shakti 51, Navtej MHCP-319, AK-47)	21.832°N, 76.351°E
	Dhar	7-8	Chilli (NAVTEJ MHCP-319, AK-47)	22.598°N, 75.306°E
	Satna	8-10	Chilli (Navtej MHCP-319)	24.608°N, 80.803°E
	Narsinghpur	6-8	Chilli (Navtej MHCP-319, AK-47)	22.948°N, 79.193°E
Chhattisgarh	Bastar	4-5	Chilli	19.208°N, 81.934°E
	Baloda bazar	4-5	Chilli	21.658°N, 82.158°E
	Sarangarh- Bilaigarh	3-5	Chilli	21.621°N, 83.113°E
	Durg	3-5	Chilli	21.401°N, 81.079°E
Haryana	Sambhalkha (Ambala)	8-16	Inspiration RZ F1 Red Capsicum Bachata RZ F1 Yellow Capsicum	30.294°N, 76.906°E
	Panipat	2-3	Capsicum	29.424°N, 77.015°E
	(Magniwala) Panchkula	2-3	Capsicum	30.746°N, 76.968°E



Fig 1. a. infested capsicum crop in nethouse (Sambhalkha village, Ambala district); b) infested plant; c, d. *T. parvispinus* load on flowers; e, f. infested crop (open field, Khandwa district); g. female adult; h. Male adult

The expert team from DPPQ&S observed these on the greenhouse grown capsicum crop at Sambhalkha village of Ambala district (up to 16 thrips/ flower) in flowers and terminal leaves; however, comparatively less infestation (2 to 3 thrips/ flower) was observed in Panipat and Panchkula districts (Table 1; Fig 1). Severely infested plants showed brownish and yellowish discoloration on flowers and leaves, respectively; with stunted growth and deformed fruits. These observations corroborate with those observed in Southeast Asian countries (Sartiami and Mound, 2013; Johari, 2015). Since this pest is new to the Indian subcontinent, it is very difficult to predict its spread within India, probable reasons for its rapid spread might be the unrestricted movement of agricultural commodities and planting materials from infested nurseries (Shashank et al., 2016); availability of host plants around the year might be other reason (large scale cultivation of solanaceous and papaya crops); and subtropical weather conditions favour this (Sartiami and Mound, 2013; Johari, 2015; Baradevanal et al., 2021; Timmanna et al., 2022). The innate ability of pests viz., higher reproduction potential and aggressive feeding behaviour of *T. parvispinus*, might favour its multiplication, establishment, and further spread. Early detection with regular monitoring is the key for formulating sustainable management strategies for such invasive pests. The adoption of adhoc recommendation by DPPQ&S might help reduce its spread.

ACKNOWLEDGEMENTS

Authors thank Dr. Kumaranag K M and Mr. Rajgopal for their inputs in improving the manuscript.

FINANCIAL SUPPORT

ICAR-IARI support is acknowledged.

AUTHOR CONTRIBUTION STATEMENT

TMH and CPR conceived and designed research. TMH, CPR, SPR, VDN and NBR conducted experiments. TMH & SPR wrote the manuscript. All authors read and approved the manuscript.

CONFLICT OF INTEREST

Authors declares, there is no conflict of interest.

(Manuscript Received: December, 2022; Revised: December, 2022;

Accepted: December, 2022; Online Published: December, 2022)

Online First in www.entosocindia.org and indianentomology.org Ref. No. e22965

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