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First Report of *Thrips parvispinus* Karny Infestation on Mungbean in Gujarat, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The current study on mungbean thrips in the northern region of Gujarat, India, has identified four species: *Thrips parvispinus* (Karny), *Megalurothrips usitatus* (Bagnall), *Megalurothrips* sp., and *Thrips palmi* Karny. These species were discovered and identified from mungbean flowers during the 2021–22 and 2022–23 investigation periods. Notably, *Thrips parvispinus* (Karny), an invasive species, was found infesting mungbeans in Gujarat and India for the first time. Thrips are notorious pests that attack various crops, causing significant damage and economic losses. Inventory data helps researchers study thrips behavior, lifecycles, hosts, and control methods, which is crucial for developing resistant crops and refining pest control. Regular updates enable monitoring of thrips populations, allowing early detection and timely intervention to prevent widespread infestations.

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Keywords: Invasive thrips; Thrips parvispinus; Vigna radiata; mungbean; Megalurothrips usitatus.

1. INTRODUCTION

Pulses hold a significant role in Indian agriculture, being both the largest producer and consumer of these crops globally. They offer a high-quality protein, nearly three times that of cereals [1]. This makes them a cost-effective protein source, crucial in addressing malnutrition. Mungbean or green gram comprising about 24 per cent protein, contain roughly two thirds of soyabean protein, twice of wheat and thrice the protein found in rice. The protein is abundant in lysine, an essential amino acid which is lacked in cereal grains [2].

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 [3]. Thrips are minute insects belonging 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. The asymmetrical mouthparts with the remaining right mandible were yet another distinctive feature. This order of insects has a remarkably diverse range of eating preferences; they can be herbivorous, fungivorous, pollinivorous or predatory [4].

The discovery that an invasive insect is present on a host plant that is crucial to agriculture causes serious concern and panic for quarantine officials. *T*. *parvispinus* gradually spreading across states, as indicated by previous reports of this species on various economically significant host plants in Karnataka and the most recent report on an agriculturally significant host in Tamil Nadu. One of the notorious pest species from South East Asia, *T*. *parvispinus*, causes a significant threat to a wide range of agriculture and horticulture crops. *T. parvispinus*, a thrips of quarantine relevance belonging to the "Thrips orientalis group" [5] has been described as a significant pest on numerous unrelated plant families from Thailand to Australia [6].

2. MATERIALS AND METHODS

The investigation on inventory of thrips on pulses in the Northern part of the Indian state of Gujarat includes the districts of Aravali, Banaskantha, Gandhinagar, Mehsana, Patan and Sabarkantha during 2021-22 and 2022-23. The survey was conducted at random and consisted of visiting regions of North Gujarat wherever pulses are cultivated. The thrips were collected from the flowers and tender leaves of mungbean by tapering on white paper. At least 40-50 thrips were collected and preserved in 70 percent ethyl alcohol for identification. When the thrips were being collected from their host, the host name, the location of the collection and the date were registered. For additional identification, the specimens were sent to the National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru, an affiliate of the Indian Council of Agricultural Research (ICAR) [7].

3. RESULTS AND DISCUSSION

Mungbean or green gram is a significant pulse crop in India. Both the seedling and blooming phases of mungbean are infested with thrips. As the seedlings emerge from the earth during the seedling stage, thrips infest the growth point, inhibiting the seedlings from growing if the infestation is severe. Flowering thrips, which feed on the pedicles and stigma of flowers, inflict severe damage and active during the flowering and pod development stages. Severe infestation results in blossom drops and no pod production (Fig. 1 A and B).

Although history of *T. parvispinus* as a pest has never been reported earlier. The purpose of this paper includes outlining *T. parvispinus* as a mungbean pest in India for first time and to highlight the key traits that are able to be used for recognizing the species when it is collected from that host [8].

The identification result obtained from ICAR-NBAIR indicated that the discovery of a new invasive thrips, *Thrips parvispinus* (Karny), infesting mungbean reported from Sardarkrushinagar- Dantiwada, district Banaskantha, Gujarat (Table 1). The other species *viz*., *Megalurothrips usitatus* (Bagnall), *Megalurothrips* sp., and *Thrips palmi* Karny were also identified indicating the complex thrips population in mungbean from different districts of North Gujarat (Aravali, Banaskantha, Gandhinagar, Mehsana, Patan and Sabarkantha). All the thrips species is also identified at molecular level also [9].

Table 1. Thrips species reported from North Gujarat in Mungbean

Sr. No.	Location	Scientific name	classification
1.	Location: Latitude: 24.3219 Longitude: 72.3008	*Megalurothrips usitatus* (Bagnall) *Thrips parvispinus* (Karny)	Thysanoptera: Terebrantia: Thripidae
2.	Location: Latitude: 24.4611 Longitude: 71.6729	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
3.	Location: Latitude: 23.8341 Longitude: 71.5860	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
4.	Location: Latitude: 23.6397 Longitude: 72.7043	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
5.	Location: Latitude: 23.3755 Longitude: 72.6877	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
6.	Location: Latitude: 23.3442 Longitude: 72.6854	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
7.	Location: Latitude: 24.3176 Longitude: 72.2752	*Megalurothrips usitatus* (Bagnall) *Megalurothrips* sp. *Thrips palmi* Karny	Thysanoptera: Terebrantia: Thripidae
8.	Location: Latitude: 24.3215 Longitude: 72.3035	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
9.	Location: Latitude: 23.1244 Longitude: 73.2099	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
10.	Location: Latitude: 24.2292 Longitude: 73.0151	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae
11.	Location: Latitude: 24.1247 Longitude: 73.0128	*Megalurothrips usitatus* (Bagnall)	Thysanoptera: Terebrantia: Thripidae

Fig. 1A. General view of mungbean field


Fig. 1B. Mungbean flower infected by *Thrips parvispinus*

Despite the fact that *T. parvispinus* is already recognised, the species was first identified in India on papaya from Bangalore by Tyagi *et al*. [10]. Rachana *et al*. [11] then reported the same on *Dahlia rosea* blooms in Puttur, Karnataka. The same was later found by Patel *et al*. [12] on the chilli flower in Umreth, Gujarat. In a survey [13] conducted in different states specifically targeting mungbean and uradbean thrips. Many thrips species were morphologically identified and reported like *Megalurothrips usitatus* (Bagnall), *Scirtothrips dorsalis* Hood, *Thrips palmi* Karny and *Thrips* sp. From Panjab; *Megalurothrips* sp., *T*. *palmi* and *Thrips* sp. from Tamil Nadu; *M*. *distalis* , *Thrips* sp. and *T*. *palmi* were observed in Uttarakhand; *M*. *usitatus*, *M*. *distalis* , *Scirtothrips* sp., *Thrips* sp. and *S*. *dorsalis* were discovered from West Bengal; *M*. *usitatus* , *Megalurothrips* sp. and *T*. *palmi* were recorded from Sardarkrushinagar, Dantiwada in Gujarat; *Thrips* sp., *T*. *palmi* , *S*. *dorsalis* and *Scirtothrips* sp. were recorded in Karnataka and *M*. *typicus* (Bagnall), *M*. *usitatus* (Bagnall) and *T*. *palmi* Karny were found in Andhra Pradesh [14].

4. CONCLUSION

The paper deal with identified invasive, *Thrips parvispinus* (Thripidae) recorded from green gram or mungbean from Sardarkrushinagar, Dantiwada, which is new record in Gujarat and India especially in pulse crops.

DECLARATION

We, the undersigned authors of new host record of invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) on mungbean in Gujarat, declare that we have fully participated in the research work and writing of this manuscript. We confirm that the content presented in this paper is original and has not been published elsewhere. Furthermore, we affirm that there are no conflicts of interest, financial or otherwise, that could influence the objectivity or integrity of our work.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Upadhayay RG, Sharma S, Drawal NS. Effect of Rhizobium inoculation and graded levels of P on the growth and yield of greengram. Legum. Res. 1999;22:277-279.
2. Haytowitz OB, Matthews RH. Composition of foods: legumes and legume products. United States Department of Agriculture. Agricultural Hand Book. 1986;8-16.
3. Rachana RR, Rayer SG, Giraddi RS, Kalappanavar IK, Alagundagi SC. New records of Terebrantia thrips from Karnataka, India. J. Entomol. Zool. Stud. 2020;8(4):2189-2192.

4. Mound LA. Thysanoptera: diversity and interactions. Annu. Rev. Entomol. 2005[a]; 50:247-269.
5. Mound LA. The Thrips orientalis group from South-east Asia and Australia: Some species identities and relationships (Thysanoptera; Thripidae). Aust. J. Entomol. 2005[b];44(4):420-424.
6. Mound LA, Collins DW. A South 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.
7. Murai T, Watanabe H, Toriumi W, Adati T, Okajima S. Damage to vegetable crops by *Thrips parvispinus* Karny (*Thysanoptera: Thripidae*) and preliminary studies on biology and control. J. Insect Sci. 2009; 10:166.
8. Khan NM, Mujtaba G, Khan MAB, Sher A, Abbasi WM. Johnson Grass (Sorghum halepense) Interference, its Effect on Crops Yield and Soil attributes under Different Cropping Systems and Management Practices. Asian Res. J. Agric. [Internet]. 2024 Feb. 19 [cited 2024 May 21];17(1): 56-72.
Available:https://journalarja.com/index.php/ARJA/article/view/410
9. Piploda S, Jat BL, Yadav AK, Priyanka, Dalal PL. Seasonal Correlation in Prevalence of Termite on Wheat Crop and Weather Parameters. J. Exp. Agric. Int. [Internet]. 2024 Apr. 12 [cited 2024 May 21];46(5):774-81.
Available:https://journaljeai.com/index.php/JEAI/article/view/2431
10. Tyagi K, Kumar V, Singha D, Chakraborty R. Morphological and DNA barcoding evidence for invasive pest thrips, Thrips parvispinus (*Thysanoptera: Thripidae*), newly recorded from India. J. Insect Sci. 2015;15(1):105.
11. Rachana RR, Roselin P, Varatharajan R. Report of invasive thrips species, *Thrips parvispinus* (*Thysanoptera: Thripidae*) on Dahlia rosea (Asteraceae) in Karnataka. Pest Manage. Hortic. Ecsyst. 2018;24 (2): 175-176.
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. Int. J. Environ. 2022;12(3):73-78.
13. Anonymous, All India Coordinated Research project on Kharif Pulses. Annual Report on Mungbean, Urdbean, Cowpea, Cluster bean for Spring/Summer/Rice fallow and Rajmash for Kharif cultivation. ICAR-Indian Institute of Pulses Research, Kanpur. 2023;255-258.
14. Boughdad A, Haddi K, El Bouazzati A, Nassiri A, Tahiri A, El Anbri C, Eddaya T, Zaid A, Biondi A. First record of the invasive spotted wing Drosophila infesting berry crops in Africa. Journal of Pest Science. 2021;94:261-71.

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