First report of new invasive thrips, *Thrips parvispinus* (Karny) (Thripidae: Thysanoptera) in chilli fields of Umreth in Anand district of Gujarat state

Abstract

During November 2021, a new invasive thrips *Thrips parvispinus* was recorded in chilli growing areas of Telangana state. In India, this pest was first reported on papaya (*Carica papaya* L.) and later on *Brugmansia* sp. (Solanaceae) and *Dahlia rosea* Cav. (Asteraceae). Based on these reports and alert received from ICAR-NBAIR, Bengaluru, a survey was carried out on new invasive thrips in major chilli growing areas of Anand district of Gujarat state. Incidence of *T. parvispinus* was noticed during the survey. The high population of invasive thrips (14-16 thrips/flower/plant) was recorded in chilli fields of Umreth taluka of Anand district and low population (4-6 thrips/flower/plant) was recorded in chilli fields of Anand, Anklav, Borsad, Petald, Sojitra and Tarapur talukas. It is highly essential to adopt IPM based strategies for the management of this invasive pest in chilli.

Keywords: Invasive thrips, *Thrips parvispinus*, chilli, incidence, IPM strategies

Introduction

Chilli (*Capsicum annum* L.) is one of the important commercial crops in the world grown for vegetable, spice and condiments purposes. It is mainly grown for green and ripe fruits, which are important components of our routine diet. In India, chillies are grown in almost all the states of the country. Andhra Pradesh is the largest producer of chilli and contributes about 26% to the total area under chilli cultivation, followed by Maharashtra (15%), Karnataka (11%), Orissa (11%), Madhya Pradesh (7%) and other states contributing nearly 22% to the total area under chilli cultivation (Anon., 2009). The Gujarat state also has sizeable area under chilli cultivation with higher production potential. During the year 2020-21, the chilli crop was cultivated in an area of 12000 ha with the production of 22.7 metric tonnes (Anon., 2021). The major dry chilli growing districts are Mehasana, Dahod, Surendranagar and Tapi. In recent years, the Anand district has witnessed a substantial area under green chilli cultivation. Due to increase in market demand, value addition and export potential, the farmers prefer the commercial cultivation of chilli. However, several factors have been attributed for its low productivity. Of the various biotic stresses, damage and yield loss caused by insect pests are devastating. Nearly 25 insect pests have been recorded attacking chilli leaves and fruits in India, which includes thrips, mite, aphid, whitefly, fruit borer, cutworm, plant bug and other minor insect pests. The thrips, *Scirtothrips dorsalis*

Hood (Thripidae: Thysanoptera) is considered as the major threat in chilli cultivation (Patil *et al.*, 2018).

During November 2021, a new invasive thrips *Thrips parvispinus* was recorded in chilli growing areas of Telangana state (Anithakumari *et al.*, 2021). This is native to Asian tropics and reported from Indonesia, India, Thailand, Malaysia, Singapore, Taiwan, China, Philippines, Australia and the Solomon Islands (Mound and Collins, 2000). In India *T. parvispinus* was first reported on papaya (*Carica papaya* L.) in Bengaluru (Tyagi *et al.*, 2015) and later on *Brugmansia* sp. (Solanaceae) and *Dahlia rosea* Cav. (Asteraceae) (Rachana *et al.*, 2018 and Roselin *et al.*, 2021). It is a polyphagous pest reported to infest beans, eggplant, papaya, pepper, potato, shallot and strawberry (Anon., 2019). The larvae and adults cause the damage by direct feeding on the leaves and growing buds. Besides, it cause injury to ornamentals *viz*., Anthurium, Chrysanthemum, Dahlia, Dipladenia, Gardenia and Ficus.

Material and Methods

Survey of invasive pest, *Thrips parvispinus*

During the last week of December 2021 and first week of January 2022, a survey was conducted on the new invasive thrips in major chilli growing areas of Anand district of Gujarat. The thrips specimens were collected from flowers, leaves of chilli plant separately and kept in the glass vials containing 70% ethyl alcohol. The specimens were sent to ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru for identification. The identification results received from ICAR-NBAIR revealed the presence of new invasive thrips, *T. parvispinus.* The species *T. parvispinus* was found to be the dominant species in the specimens sent for identification. The other species *viz., Scirtothrips dorsalis, Thrips hawaiiensis* and *Haplothrips* (*Haplothrips*) *gowdeyi* were also documented in the specimens indicating the complex of thrips population chilli fields of villages Bechari and Hamidpura of Umreth Taluka, Dist. Anand. The details of survey, specimen collection and species identified are presented in the Table 1.

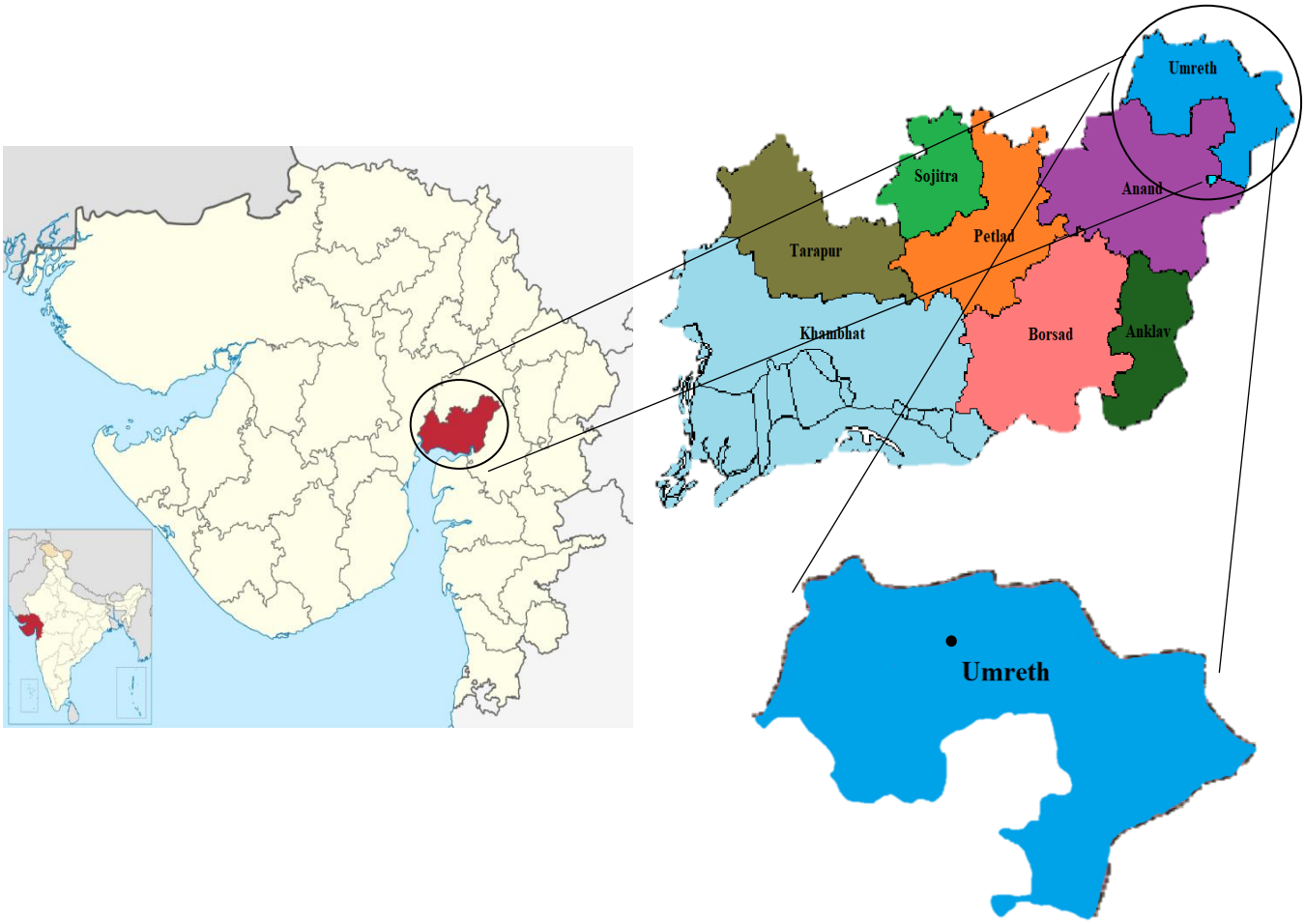


Fig 1. Schematic representation of the area surveyed for invasive thrips, *Thrips parvispinus* in major chilli growing areas of Anand district in Gujarat state

Table 1. Survey of new invasive thrips, *Thrips parvispinus* in Anand district of Gujarat state

Date	Place with GPS coordinates	Sample/Vial No.	Thrips specimens collected from	Species identified
29.12.2021	Village: Bechari Taluka: Umreth Dist: Anand Lat. 22.673631^0 Long. 73.137572^0	TA1	Flowers	*Scirtothrips dorsalis* Hood *Thrips parvispinus* (Karny)
		TA2	Leaves	*Scirtothrips dorsalis* Hood
29.12.2021	Village: Hamidpura Taluka: Umreth	TA3	Flowers	*Scirtothrips dorsalis* Hood

	Dist: Anand Lat. 22.50536^0 Long. 72.701964^0	TB1	Leaves	*Thrips parvispinus* (Karny)
3.1.2022	Village: Hamidpura Taluka: Umreth Dist: Anand Lat. 22.672898^0 Long. 73.116693^0	TB2	Flowers	*Thrips parvispinus* (Karny) *Thrips hawaiiensis* (Morgan) *Haplothrips* (*Haplothrips*) *gowdeyi* (Franklin)
		TB3	Leaves	*Thrips parvispinus* (Karny)
3.1.2022	Village: Sureli Taluka: Umreth Dist: Anand Lat. 22.642862^0 Long. 73.151246^0	TP1	Flowers	*Thrips parvispinus* (Karny)
		TP2	Leaves	*Thrips parvispinus* (Karny)

Subsequent to the incidence report of invasive thrips, *T. parvispinus* in chilli fields of Umreth taluka of Anand district, a survey was conducted in randomly selected villages in other talukas of Anand district *viz*., Anand, Anklav, Borsad, Petald, Sojitra and Tarapur. It was noted that the incidence of invasive thrips was less in these areas (4-6 thrips/flower/plant) as compared to the population documented in Umreth taluka (14-16 thrips/flower/plant) of Anand district. During the survey, the fields of solanaceous crops *viz*., tomato, brinjal and potato were also observed for the presence of invasive thrips. However, the incidence of *T. parvispinus* was not noticed in these crops.

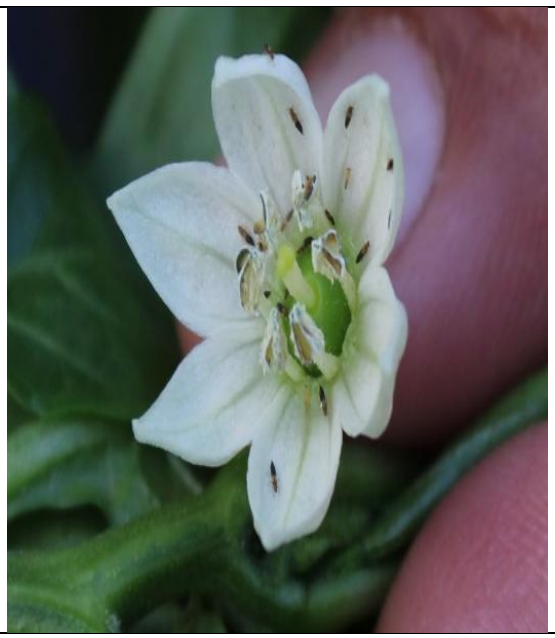
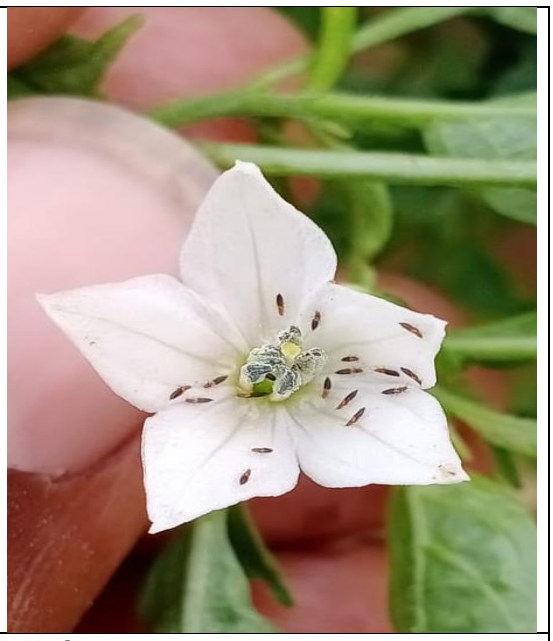
Results and Discussion

Nature of damage and symptoms

The congregation of the females was noticed on petals and below the stamens near the ovary whereas, the males were observed feeding on lower side of leaves in large numbers. The following damage symptoms were noticed during the survey

- Conspicuous deep scratches and punctures in lower side of the leaves due to extensive scrapping and sucking of the sap.
- The yellowish discoloration on upper surface of leaves

- Deformed leaf lamina with necrotic lesions
- Scrapping and brownish streaks on the petals
- Drying and withering of flowers
- Deformed fruit with reduced fruit size

A. Congregation of *Thrips parvispinus* on chilli flower


B. Deep punctures on lower side of leaves and yellowish discoluration of leaf lamina


C. Drying and witering of flowers


D. Infested fruit with conspicuous damage symptoms

Fig 2. Damage caused by new invasive thrips, *Thrips parvispinus* in chilli documented during the survey

Strategies for the management of invasive thrips

The Directorate of Plant Protection, Quarantine and Storage, Ministry of Agriculture and Farmers Welfare has issued advisory on 10.12.2021 (F.NO. 3-6/2019-20/IPM-Advisory) to prevent the spread of this invasive pest. The IPM strategies suggested in the advisory for the management of thrips on existing chilli crop are detailed here as follows

1. Intensive and regular monitoring of invasive thrips in all chilli growing areas and other host plants
2. Collect and destroy the infested crop debris.

3. Uproot the weeds (*Parthenium* spp. and *Abutilon* spp) present in the vicinity of field bunds which are acting as off season host for thrips
4. Installation of blue sticky traps @ 25-35 per acre for mass trapping in thrips infested field.
5. Apply neem cake to the beds @ 100 kg/acre in two split doses at the time of planting and 30 days after transplanting
6. Spray NSKE 5% or Neem oil 3% and other Neem formulations, *Beauveria bassiana* @ 5g and *Lecanicillium lecanii* @ 5 gm per liter of water,
7. Sprinkle water over the seedlings to check the multiplication of thrips during nursery stage.
8. Apply *Pseudomonas fluorescens*-NBAIRPFDWD@20g/l or *Bacillus albus*-NBAIRBATP@20g/l spray focusing on flowers and fruits.
9. Conserve predators such as predatory mite (*Amblyseius swirskii*), insidious flower bugs (*Orius insidiosus*)
10. Spray CIB&RC approved label claim pesticides

Conclusion

Survey carried out on new invasive thrips in major chilli growing areas of Anand district of Gujarat state revealed the incidence of *T. parvispinus*. The high population of invasive thrips (14-16 thrips/flower/plant) was recorded in chilli fields of Umreth taluka of Anand district and low population (4-6 thrips/flower/plant) was recorded in chilli fields of Anand, Anklav, Borsad, Petald, Sojitra and Tarapur talukas. Further, the IPM based strategies are crucial requirements for the management of this invasive pest in chilli.

Acknowledgment

- Authors express sincere gratitude to Hon'ble Vice Chancellor Dr. K.B. Kathiria, AAU, Anand for the constructive advice during the study. Further, we are indebted to Director of Research and Dean P.G. Studies Dr. M. K. Jhala, AAU, Anand for the encouragement and support for the study.
- Authors sincerely acknowledge the support extended by Hon'ble Director, ICAR-NBAIR and Chairman, AICRP-Biological Control Project Coordinating Cell, ICAR-NBAIR, Bengaluru during the study.
- We are highly thankful to Dr. Rachana, Scientist (Germplasm collection and characterization) ICAR-NBAIR, Bengaluru for identification of thrips species.

References

Anithakumari, D., Bhasker, K. and Suresh, V. (2021) A new invasive chilli thrips (Thrips parvispinus) in Telangana state. *Insect Environment*, *24*(4): 520-522.

Anonymous (2009). Post harvest profile of chilli. Report of Directorate of Marketing and Inspection, Ministry of Agriculture and Farmers Welfare (Department of Agriculture and Co-operation, Govt. of India) pp. 11-12.

Anonymous (2019). The Netherlands Plant Protection Organization. *Thrips parvispinus*, Quick scan, QS.Ent., 001.

Anonymous (2021). http://www.indianspices.com/sites/default/files/majorspicestatewise2021.pdf

Mound, L. A. and Collins, D.W. (2000). A South East Asian pest species newly recorded from Europe: *Thrips parvispinus* (Thysanoptera: Thripidae), its confused identity and potential quarantine significance. *Journal of European Entomology*, *97*, 197–200.

Patil, V. M., Patel, Z. P., Gurav, S. S., Patel, R. K., Thorat. S. S. (2018) Bioefficacy of various insecticides against chilli thrips (*Scirtothrips dorsalis* Hood). *International Journal of Chemical Studies*, *6*(1): 313-316.

Rachana, R.R., Roselin, P. and Varatharajan, R. (2018). Report of invasive thrips species, *Thrips parvispinus* (Karny) (Thripidae: Thysanoptera) on *Dahlia rosea* (Asteraceae) in Karnataka. *Pest Management in Horticultural Ecosystems*, *24*(2), 187–188.

Roselin, P., Kuldeep Sharma. and Rachana, R.R. (2021). Diversity of floral thrips from Western Ghats of Karnataka. *Indian Journal of Entomology*, *83*(3), 407–410.

Tyagi, K., Kumar, V., Singha, D. and Chakraborty, R. (2015). Morphological and DNA barcoding evidence for invasive pest thrips, *Thrips parvispinus* (Thripidae: Thysanoptera), newly recorded from India. *Journal of Insect Science*, *15*(1), 105.

---XXX---