

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

At least 2 or 3 seasons are required to confirm the invasive thrips. This survey is very short time. It should be repeated again and again for the confirmation of the results.

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 most 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

Comment [u1]: Four parts of abstract should be stated clearly and sequentially.

Comment [u2]: Recommendation required ?

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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 (NPPO 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**.

Comment [u3]: Materials and methods required

Survey

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.

Comment [u4]: Detailed data collecting method like types, procedures etc required

Pictorial views of data collecting methods are to be added in materials and methods parts

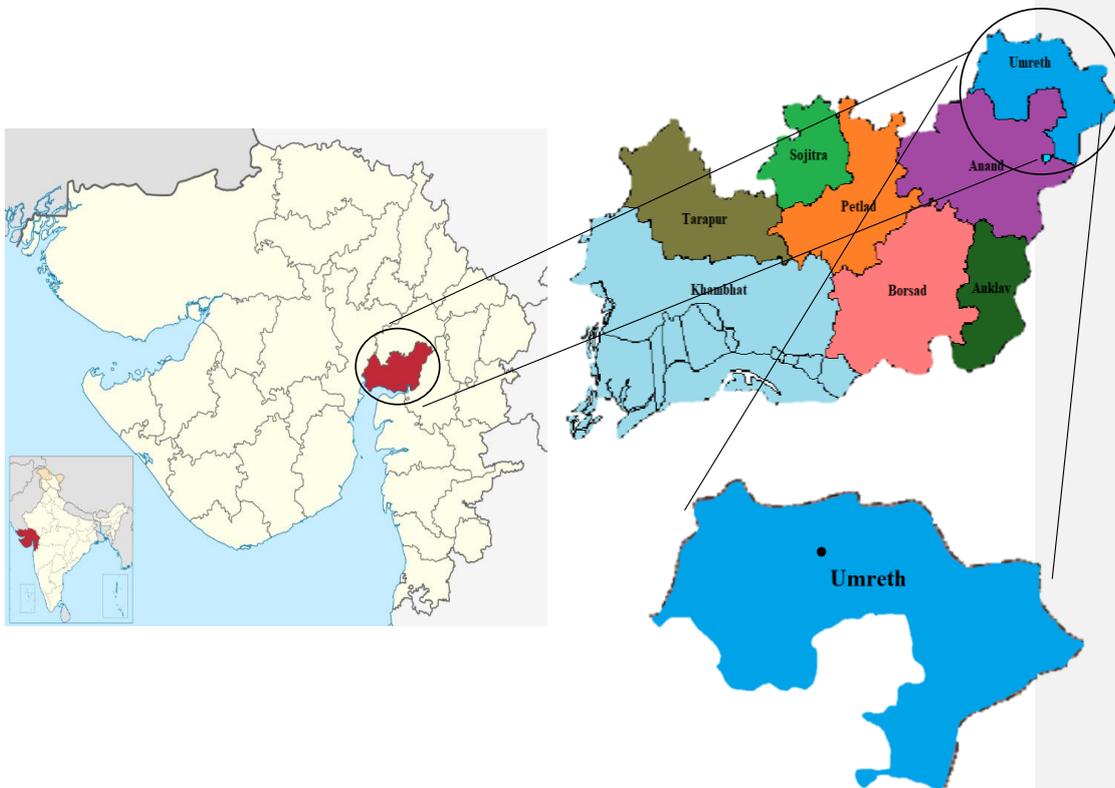


Fig 1. Schematic representation of the area surveyed for invasive thrips, *Thrips parvispinus* in major chilli growing areas of Anand district in Gujarat state

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	<i>Scirtothrips dorsalis</i> Hood <i>Thrips parvispinus</i> (Karny)
		TA2	Leaves	<i>Scirtothrips dorsalis</i> Hood

29.12.2021	Village: Hamidpura Taluka: Umreth Dist: Anand Lat. 22.50536 ⁰ Long. 72.701964 ⁰	TA3	Flowers	<i>Scirtothrips dorsalis</i> Hood
		TB1	Leaves	<i>Thrips parvispinus</i> (Karny)
3.1.2022	Village: Hamidpura Taluka: Umreth Dist: Anand Lat. 22.672898 ⁰ Long. 73.116693 ⁰	TB2	Flowers	<i>Thrips parvispinus</i> (Karny) <i>Thrips hawaiiensis</i> (Morgan) <i>Haplothrips</i> (<i>Haplothrips</i>) <i>gowdeyi</i> (Franklin)
		TB3	Leaves	<i>Thrips parvispinus</i> (Karny)
3.1.2022	Village: Sureli Taluka: Umreth Dist: Anand Lat. 22.642862 ⁰ Long. 73.151246 ⁰	TP1	Flowers	<i>Thrips parvispinus</i> (Karny)
		TP2	Leaves	<i>Thrips parvispinus</i> (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.

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 discoloration of leaf lamina

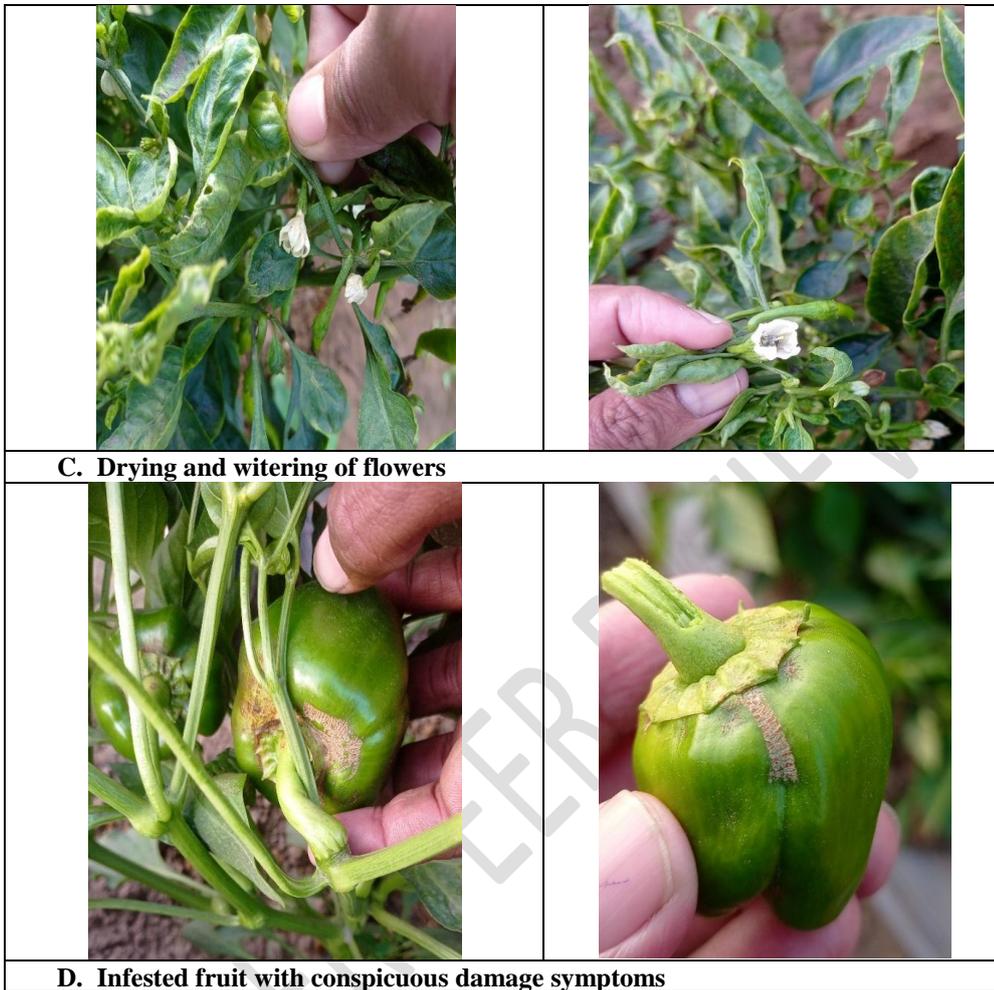


Fig 2. Damage caused by new invasive thrips, *Thrips parvispinus* in chilli documented during the survey

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*-NBAIRB ATP@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/findings and recommendation are to be stated.

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Comment [u5]: Updated references are required

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