Technical Booklet- IPM-01/2022

Management strategies for invasive thrips (*Thrips parvispinus*) in Chilli (ad-hoc)

सत्यमेव जयते

Government of India
Ministry of Agriculture & Farmer's Welfare
Department of Agriculture Cooperation & Farmer's Welfare
Integrated Pest Management Division
Directorate of Plant Protection Quarantine & Storage
Welfare, NH-IV, Faridabad

1. Introduction

Thrips parvispinus (Karny) is a cosmopolitan pest species and has been reported from Thailand, Australia and Europe. The last two decades witnessed a drastic extension in the geographic distribution of *T. parvispinus* and it is now known to occur in France, Greece, Hawaii, Mauritius, Reunion, Spain, Tanzania and the Netherlands, besides India. It is a polyphagous species and has been reported infesting beans, eggplant, papaya, chilli, pepper, potato, shallot and strawberry. In addition, it inflicts injury to ornamentals, viz. Anthurium, Chrysanthemum, Dahlia, Dipladenia, Gardenia and *Ficus*. In India, this species was first reported on Papaya from Bengaluru in 2015 and considering its potential to acquire pest status, regular monitoring of this pest was carried in other parts of India after its first record.

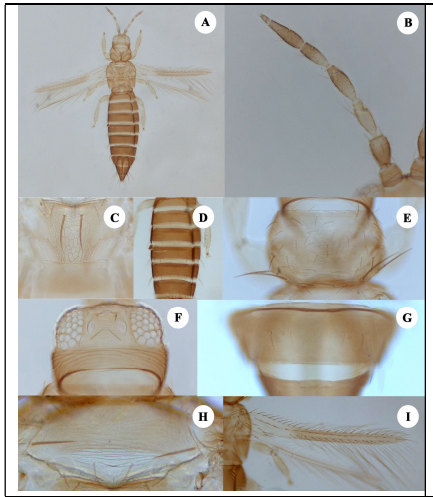
Infestation of this invasive pest was reported in chilli growing areas of Andhra Pradesh, Telangana and Karnataka and caused significant damage during Rabi season 2021-22. Survey was conducted by the expert team constituted by DAC & FW comprising of experts from DPPQ&S, ICAR, SAU and State Department of Horticulture/Agriculture of the concerned states for assessment of infestation of thrips in chilli growing areas. Based on the recommendations of survey team, ad-hoc management strategies for invasive South East Asian thrips (*Thrips parvispinus*) in chilli is given below.

2. Identification of invasive pest, *Thrips parvispinus* and common chilli thrips, *Scirtothrips dorsalis* Hood

2.1 Key to distinguish the two species

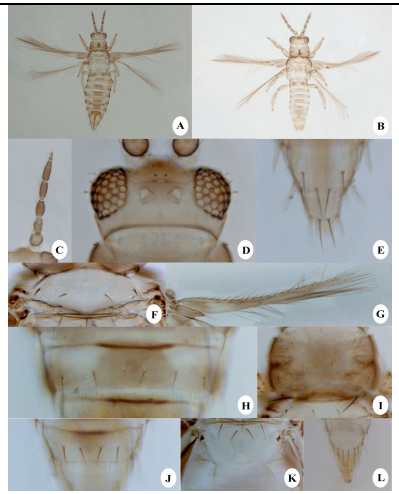
1. Antennae 8 segmented; forewing second vein with 2 distal setae; lateral third of tergites with closely spaced rows of minute microtrichia…….....***Scirtothrips dorsalis***

2. Antennae 7 segmented; forewing second vein with complete setae row; lateral third of tergites without closely spaced rows of minute microtrichia.….....***Thrips parvispinus***



Thrips parvispinus

A, Female; B, Antenna; C, Metanotum; D, Discal setae on abdominal sternites II-VII; E, Pronotum; F, Head, dorsal; G, Abdominal tergite VIII; H, Mesonotum; I, Forewing.



Scirtothrips dorsalis

A, Female; B, Male; C, Antenna; D, Head; E, Female abdominal tergites IX-X; F, Mesonotum; G, Forewing; H, Female abdominal tergite VII; I, Pronotum; J, Female abdominal tergite VIII; K, Metanotum; L, Male abdominal tergites IX-X.

2.2 Nature of Damage of *Scirtothrips dorsalis* and *Thrips parvispinus*

Scirtothrips dorsalis larvae and adults damage crop by sucking sap mainly from undersurface of the leaves and developing fruits which causes crinkling and upward curling and drying of leaves, flower dropping, stunted growth and scrapping of chilli fruits and it is the major problem of un-irrigated field during dry weather condition.

Thrips parvispinus adults mainly colonize on flowers and underside of leaves whereas larvae suck sap from undersurface of the leaves. Infestation causes heavy flower drop and thereby reducing fruit production. Its infestation increased during heavy rainfall of North East monsoon in contrast to other thrips species.

Damage symptoms of *Scirtothrips dorsalis*

*Damage symptoms of *Thrips parvispinus*

3. Management strategies for the standing crop

1. Regular monitoring of thrips infestation in chilli and on other host plants near the field.
2. Collection and destruction of severely infested plants and uprooting weeds (*Parthenium hysterophorus, Cleome viscosa, Prosopis* sp., *Lantana camara, Calotropis* sp., *Tecoma* sp., *Abutilon* sp. and wild *Solanum* sp.) present in the vicinity of field bunds which act as off season and alternate host for thrips. The plant debris after uprooting, either be buried or burnt in order to avoid further spread of the pest population.
3. Nipping and destruction of infested top/apical shoots.
4. Erection of blue sticky traps @ 25-30 per acre for mass trapping in thrips infested fields.
5. Spraying of botanical based pesticides like Neem Seed Kernel Extract (NSKE) 5% or Neem oil 3% @ 2 ml/L, Pongamia oil @ 3 ml/L, *Vitex negundo* extract @ 50-80 ml/L, *etc.* or microbial

based insecticides like *Beauveria bassiana* @ 4.00 g or ml/L (spore load - $1x10^8$ cfu/g or ml), *Pseudomonas fluorescence* – NBAIRPFDWD @ 20g/L or *Bacillus albus* – NBAIR-BATP @ 20 g/L uniformly covering whole plant.

6. Spraying the crop with strong jet of water to make the conditions unfavorable for growth and multiplication of thrips.
7. Conserve predators such as predatory mite (*Amblyseius swirskii*) and insidious flower bugs (*Orius insidiosus*) etc.
8. To avoid phyto-toxic effects on plants as well as flower and fruit drop, farmers should rely on target specific insecticides (only if necessary) instead of insecticide mixtures.
9. Use only CIB & RC approved label claim insecticides for thrips management in chilli as given in Annexure below
10. Farmers may take up crops like maize/ sorghum/any millets or pulses (suitable to the locality) after uprooting the severely infested chilli crop.

Integrated Pest Management (IPM) approaches for thrips management for coming season (new crop)

1. Deep summer ploughing to destroy the resting (pupae) as well as residual stages of thrips.
2. Advance cropping season and avoid staggered planting.
3. Growing resistant or early/short duration varieties if available in order to escape the peak incidence of thrips.
4. Clean cultivation – maintaining weed free bunds and borders of the crop fields since many weeds act as alternate hosts for thrips.
5. Seed treatment with label claim systemic insecticides.
6. Application of well decomposed farm yard manure (FYM) or compost @ 1 t/Ac, enriched with *Metarhizium anisopliae* or *Pseudomonas fluorescens* @ 2 kg/t along with recommended

doses of farm yard manure (10 to 12 t/Ac).

7. Soil application of 200 Kg of Neem cake and 500 Kg of vermi-compost per acre to induce resistance against thrips
8. Balanced fertilization with enhanced potash application along with nitrogen and phosphorous fertilizers to induce plant resistance against the pest.
9. Mulching with silver coloured polythene sheets of 25–30 micron thickness to reduce pupation of thrips in the soil.
10. Border cropping with 2-3 rows of tall growing crops like sorghum/ maize / bajra / fodder grasses etc. sown thickly as a barrier for thrips movement.
11. Intercropping chilli with maize / sorghum and cowpea @ 10:3:1 as a barrier and reservoir for natural enemy multiplication, leading to biological control of thrips
12. Frequent inter cultivation (earthing up/raking of soil) operations to destroy soil inhabiting pupae of thrips
13. Mechanical destruction of severely infested plants by uprooting and burying or burning.
14. Erecting blue sticky traps @ 25–30 traps/Ac at crop canopy height for both monitoring and mass trapping purpose.
15. Adopting sprinkler irrigation system instead of flood irrigation, since the jet of water spray from sprinklers disrupts the growth and multiplication of thrips
16. Conservation of natural enemies by avoiding spraying of chemical pesticides to the extent possible. Instead, spray botanical based pesticides like Neem Seed Kernel Extract (NSKE) 5% or Neem oil 3% @ 2 ml/L, Pongamia oil @ 3 ml/L, *Vitex negundo* extract @ 50-80 ml/L, etc. or microbial based insecticides like *Beauveria bassiana* @ 4.00 g or ml/L (spore load - $1x10^8$ cfu/g or ml), *Pseudomonas fluorescence* – NBAIRPFDWD @ 20g/L or

Bacillus albus – NBAIR-BATP @ 20 g/L uniformly covering whole plant.

17. Final resort is need based and judicious application of label claim insecticides as given in **Annexure** below

Annexure: CIB & RC approved registered Insecticides for thrips in Chilli

Insecticide	Dosage per ha	Waiting period (in days)
Acephate 95 % SG	790 gm in 500 litre	07
Acetamiprid 20 % SP	50-100 gm in 500-600 litre	03
Carbofuran 03 % CG	33.3 kg	--
Cyantraniliprole 10.26% OD	600 gm in 500 litre	03
Dimethoate 30 % EC	600 ml in 500-1000 litre	--
Emamectin benzoate 05% SG	200 gm in 500 litre	03
Emamectinbenzoate1.90%EC	375 ml in 500 litre	14
Ethion 50 % EC	1.5-2 litre in 500-1000 litre	05
Fenpropathrin 30 % EC	250-340 ml in 750-1000 litre	07
Fipronil 05 % SC	800-1000 gm in 500 litre	07
Fipronil 80 % WG	50-62.5 gm in 500 litre	5
Imidacloprid 70 % WS	1-1.5 kg	--
Imidacloprid30.50%m/m SC	125-150 gm in 500 litre	5
Imidacloprid 17.80 % SL	125-250 ml in 500-700 litre	40
Lambdacyhalothrin4.90%CS	500ml in 500 litre	5
Lambda-cyhalothrin05% EC	300 ml in 400-600 litre	5
Methomyl 40 % SP	0.75-1.12 kg in 500-1000 litre	5-6
Oxydemeton-methyl25% EC	I litre in 500-1000 litre	--
Spinosad 45 % SC	160 gm in 500 litre	3
Spirotetramat15.31%w/wOD	400 gm in 500 litre	5
Thiacloprid 21.70% SC	225-300 gm in 500 litre	5
Thiamethoxam 30 % FS	This is used as seed dresser	
Tolfenpyrad 15 % EC	1 litre in 500 litre	7
Diafenthiuron 47 % + Bifenthrin 09.40 % w/w SC	625 ml in 500 litre	7
Emamectin Benzoate 01.50 % + Fipronil 03.50 % SC	500-750 gm in 500 ltr.	3
Emamectin benzoate5 % w/w + Lufenuron 40 % w/w WG	60 gm in 500 litre	3
Flubendiamide 19.92 % + Thiacloprid 19.92 % w/w SC	200-250 ml in 500 ltr	5
Fipronil 07 % + Hexythiazox 02 % w/w SC	1 litre in 500 litre	7
Hexythiazox 3.5% + Diafenthiuron 42% WDG	650 gm in 500 litre	7
Indoxacarb 14.5 % + Acetamiprid 7.7 % w/w SC	825-875 ml in 500 ltr.	5
Profenofos 40 % + Fenpyroximate 2.5 % w/w EC	1 litre in 500 litre	7

Prepared by:

DPPQ members

1. *Shri O. P. Verma*, Joint Director (PP), IPM Division, Faridabad
2. *Dr. A. Siddiqui*, Joint Director (E), CIPMC, Hyderabad
3. *Dr. D.K. Nagaraju*, Deputy Director (E),
4. *Shri Manoj Puri Goswami*, Deputy Director (E), CIPMC, Vijayawada

ICAR members

1. *Dr S.C. Dubey*, Assistant Director General (Plant Protection and Biosafety), ICAR, New Delhi
2. *Dr. Rachana R.R.*, Scientist, (Agricultural Entomology) ICAR-NBAIR, Bengaluru
3. *Dr. Raghavendra K.V.*, Scientist, (Agricultural Entomology) ICAR-NCIPM, New Delhi

SAU/ SHU members

1. *Dr. P. Rajashekar*, Principal Scientist & Head and University Head (Entomology), ANGRAU, Guntur (A.P.)
2. *Dr. K Vijayalaxmi*, Entomologist & Associate Dean, Agriculture College, Palem, PJTSAU, Hyderabad (T.S.)

* Images from Dr Rachana R.R., ICAR-NBAIR, Bengaluru

Published by:

Dr. Ravi Prakash, Plant Protection Adviser, Directorate of Plant Protection, Quarantine & Storage, NH-IV, Faridabad-121001