



## Study of Thrips Associated with Pulses and Chillies Crop Ecosystems in Khammam District and their Identification

J Venkateswara Rao, V Ramasubba Rao, C Sandhya Rani and V Srinivasa Rao

Dept. of Entomology, Agricultural College, Bapatla 522 101, Andhra Pradesh

### ABSTRACT

The present study is on thrips associated with pulses and chillies crop ecosystems in Khammam district and their identification. In the present study five species of thrips belonging to four genera of the family Thripidae were identified from different chillies & pulses crop ecosystems in different areas of Khammam district they are i) *Scirtothrips dorsalis* Hood on chillies, redgram, greengram and blackgram ii) *Thrips palmi* Karny on redgram and blackgram. iii) *Thrips hawaiiensis* (morgan) on redgram iv) *Frankliniella sulphurea* schmutz on chillies v) *Megalurothrips usitatus* (Bagnall) on redgram. Among the above, the following two species have been recorded for the first time in Andhra Pradesh.

1. *Frankliniella sulphurea* schmutz on chillies
2. *Thrips hawaiiensis* (Morgan) on redgram.

**Key words :** Chillies, *Frankliniella sulphurea*, Thrips, *Thrips hawaiiensis*.

Andhra Pradesh alone commands 46% of the Chilli production in India. Chilli is ravaged by more than 20 species of insects at various stages of its growth. The important pests are thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae) is a serious pest of *Capsicum annum* L., in India, responsible for leaf curling (Ananthkrishnan, 1971). It multiplies appreciably at a faster rate during dry weather periods and causes 30-50 percent yield loss in South India (Varadharajan, 1994). It has been estimated that severe infestation of thrips on chilli results in loss to an extent of 60.5 to 74.3 per cent (Patel and Gupta, 1998). Severe infestation causes heavy curling of leaves and stunting of crop; buds and flowers are also damaged. Yield loss due to thrips attack range from 25 to 50 per cent (David, 2001). Hence the present study conducted study of on thrips associated with pulses and chillies crop ecosystems in Khammam district their identification (during the year 2005-2006).

### MATERIAL AND METHODS

Thrips were collected in the AGA solution (mixture of 10 parts of 60% ethyl alcohol with one part of glycerine and one part of acetic acid). This helps to keep specimen soft and distended from

which better slide preparations are obtained and the material can be kept preserved in the AGA solution for long period. But for the best results the insects should be mounted as early as possible after they become extended fully so as to minimize change in the colour of the insects.

For microscopic examination permanent mounts were prepared as follows 1) Separated  $\frac{1}{4}$  of the specimens for colour study. 2) Punctured any one of the inter segmental membrane of the abdomen for the remaining specimens with out causing damage to the segments. 3) Treated in 10% NaOH solution for 30 minutes to several hours depending on the species. 4) Given two washes in distilled water. 5) Passed the specimens through a series of grades of alcohol (50%, 70%, 90%) by keeping them for 5 minutes in each grade. 6) Given two changes in 100% ethanol for 10 minutes each. 7) Transferred into a bilayer of absolute alcohol and terpeneol. 8) Placed the specimen in centre of a slide with little terpeneol. Added a little natural Canada balsam. Arranged the specimen in the desired position. Removed the terpeneol by a filter paper. Added more Canada balsam and covered the specimen by a cover slip. 9) Kept the slide for 24 hours outside at room temperature, then in incubator for 10-15 days. The slides prepared by

adopting the above procedure were identified by Dr. Bhatti J.S, Professor (Thysanopterist) Department of Zoology, University of Delhi – 11007.

## RESULTS AND DISCUSSION

In the present study five species of thrips belonging to four genera of the family Thripidae were identified from different chillies and pulse crop ecosystems in different areas of Khammam district they are

*1. Scirtothrips dorsalis* Hood, on chillies, redgram, greengram and blackgram.

### Key for identification / Diagnosis :

Pale yellowish to cream in colour; ocellar setal pair III situated between posterior ocelli; 2 pairs of median post ocular setae present, metanotum medially with elongate reticles or striations in anterior third, median setae not at anterior margin. Forewing with 4 marginal setae, second vein with few setae, cilia straight. Abdominal tergites with median dark patch, tergites and sternites with dark antecostal ridge. Mound and Palmer (1981) described the host range, distribution and recognition of the ten species of Scirtothrips (Thysanoptera, Thripidae) recorded as pests. (Plate 1)

### Specimen Collected

Five females, madhira, Redgram, 9-XI-2005, J.V Rao; 1 female Waira, Redgram, 20-XI-2005, J.V. Rao; 6 females, Madhira, Blackgram, 13-1-2006, J.V Rao; 10 females, 4 males, Errupalem, Chillies, 13-1-2006, J.V.Rao; 200 females, 2 males, 3 larvae, Kothogudem, Chillies, 20-XI-2005, J.V. Rao.

### *2. Thrips palmi* Karny (Plate 2)

#### Key for identification / Diagnosis :

Female medium to small, pale yellow Antennae 7. Segmented; ocellar setae III situated outside ocellar triangle. Forewing first vein with 7 basal and 2-3 distal setae; scale with 5 setae, apical seta longer than subapical, sternites and pleurotergites without discal setae. Palmer (1992) reported 91 species of thrips known to occur in the oriental pacific regions. He gave diagnosis and biological notes for all species including 7 new species. In the present study *Thrips palmi* karny was collected on redgram and blackgram. This

species was not reported earlier from Andhra Pradesh and hence, it is a new record on redgram in Andhra Pradesh.

### Specimen collected

Five females, 1 male, madira, Redgram, 9-XI-2005, J.V. Rao; 3 females, Waira, Redgram, 20-XI-2005, J.V.Rao; 2 females, Bhadrachalam, Redgram, 20-XI-2005, J.V. Rao; 10 females, 5 females, madhira, Blackgram, 13-1-2006, J.V. Rao.

### *3. Thrips hawaiiensis* Morgan (Plate 3)

#### Key for identification / Diagnosis :

Pale yellow brown, medium size, with orange yellow head and thorax. Antennae 7 to 8 segmented; ocellar setae III situated outside ocellar triangle; postocular setae I and II well develop and subequal. Forewing first vein with 7 basal and 3 distal setae; scale with 5 setae, apical setae longer than subapical. Abdominal sternites III – VIII with discal setae, tergite VIII postero marginal comb complete but microtrichea often short irregular. This species was not reported earlier on redgram in Andhra Pradesh and hence, it is a new record on redgram from Andhra Pradesh. Bhatti (1980) reviewed the species of the genus thrips and provided a key to the species of thrips found in Hawaii.

### Specimen Collected

One Female, Madhira, Redgram, 9-XI-2005, J.V. Rao.

### *4. Frankliniella sulphurea* Schmutz (Plate 4)

#### Diagnosis / Key for identification :

Yellow in colour, abdomen with pale shadings and pale ridges. Antennae 8-segmented. Head not prolonged in front of eyes. Eyes with anterolateral facets subequal in size with 5 pigmented facets. Antennae 8-segmented, pedicel of segment III with a subbasal ring. Sense cone of segment VI with elongate base. Major sense cones on segment VI arising from greatly elongate base. Companiform sensillae absent on metanotum. Forewing with 14-19 setae on radius (upper vein). Cubitus (lowervein) with 11-15 setae. Posterior margin of tergum VII without comb of microtrichia, of at most with 1-3 stunted external microtrichia on either side. This species was not reported

Plate 1. *Scirtothrips dorsalis* Hood: A Overall view of the insect; B. Antennae; C. Head; D. Pteronota; E. Dorsal view of the posterior abdomen.

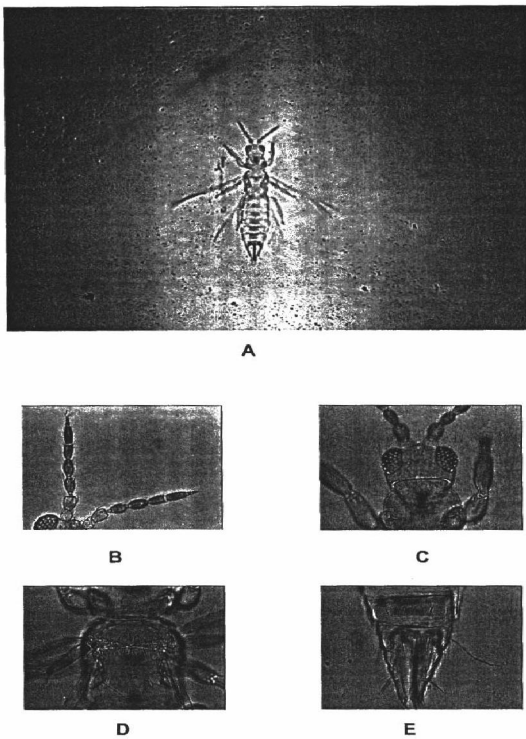


Plate 2. *Thrips palmi* Karny: A Overall view of the insect; B. Antennae; C. Pteronota;

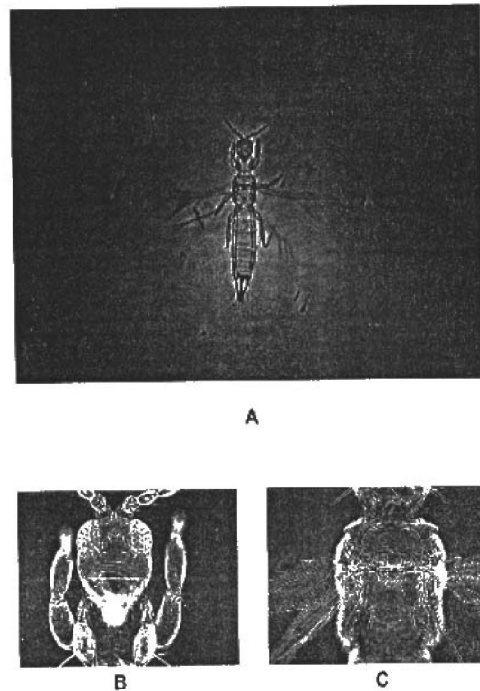


Plate 3. *Thrips hawaiiensis* Morgan: A Overall view of the insect; B. Antennae; C. Head; D. Clavus of fore wing; E. Dorsal view of the posterior abdomen.

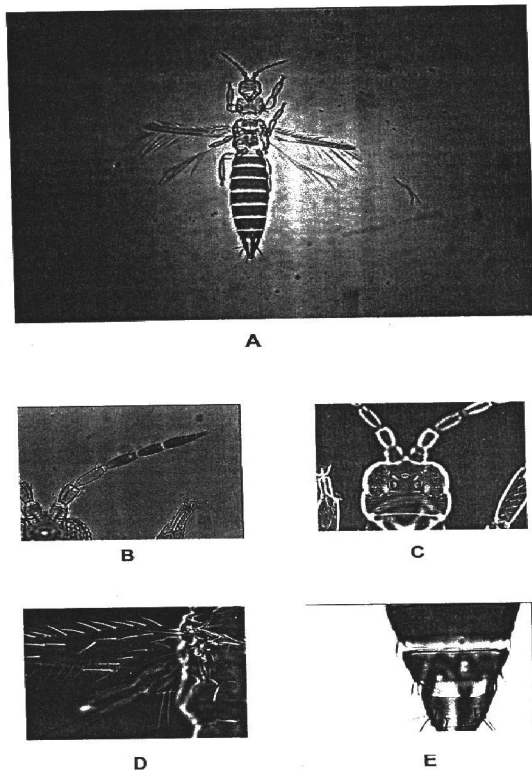


Plate 4. *Frankliniella sulphurea* Schmutz: A Overall view of the insect; B. Antennae; C. Eyes (5 pigmented facets); D. Wings;

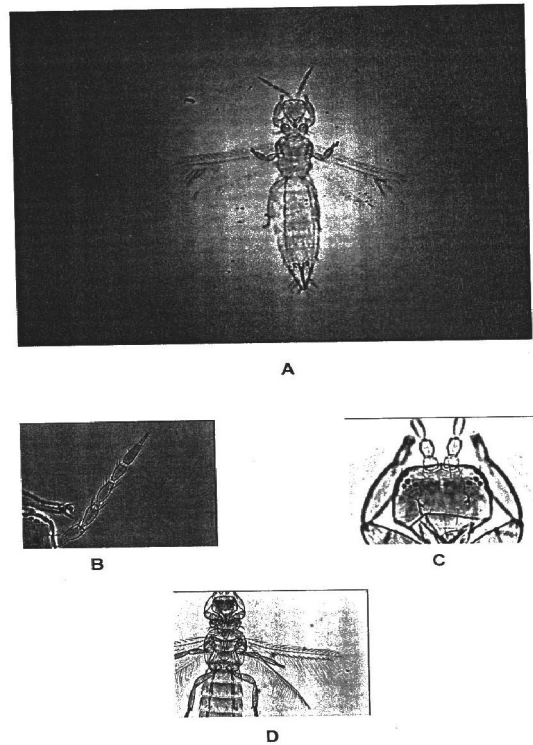
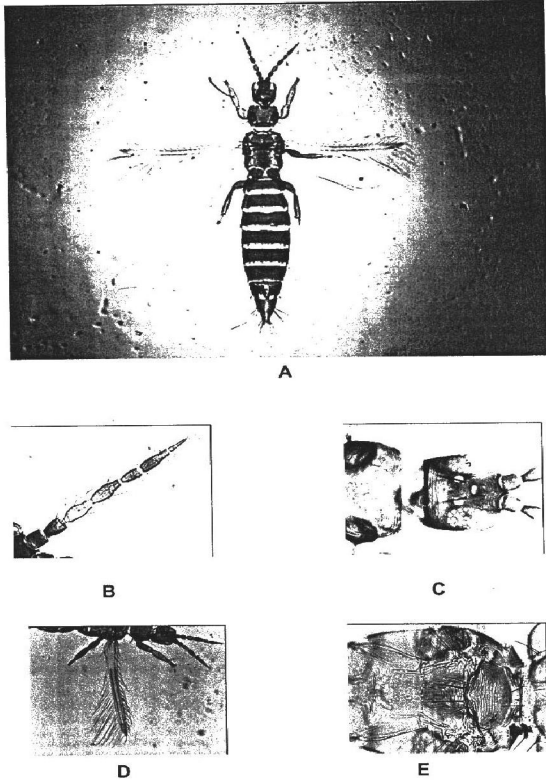


Plate 5. *Megalurothrips usitatus* Bagnall: A Overall view of the insect; B. Antennae; C. Head; D. Wing; E. Pteronota.



earlier from Andhra Pradesh and hence, it is a new record on chillies from Andhra Pradesh. Zimmerman (1948) described *Frankliniella fusca* Hinds, *Frankliniella sulphurea* Schmutz, *Frankliniella williamsi* Hood and provided a key for separation of these three species.

#### Specimens Collected

1 Female, Bhadrachalam, Chillies, 20-XI-2005, J.R. Rao.

#### 5. *Megalurothrips usitatus* Bagnall (Plate 5)

##### Diagnosis / key for identification :

Large dark brown species with banded wings. Antennae eight segmented, a forked sense on each of segments III and IV; head with three pairs of ocellar setae; pronotum with two pairs of long postero angular setae; forewings with a gap in the row of first vein setae. Amin and Palmer (1985) studied the four common thrips pests

*Megalurothrips usitatus* Bagnall, *Scirtothrips dorsalis* Hood, *Frankliniella Schultzei* and *Caliothrips Indicus* Bagnall and provided a 'key' for all the four based on the taxonomic characters and feeding injury symptoms.

#### Specimens Collected

52 Females, 2 Males, 3 Larvae, Vaira, Redgram, 20-XI-2005, J.V.Rao, 117 Females, 1 male, Madhira, Redgram, 20-XI-2005, J.V Rao.

#### LITERATURE CITED

- Amin P W and Palmer J M 1985** Identification of Groundnut Thysanoptera. *Tropical pest management*, 31(4): 286-291.
- Ananthkrishnan T N 1971** Thrips (Thysanoptera) in agriculture, horticulture and forestry – Diagnosis, bionomics and control. *Journal of Scientific and Industrial Research*, 30: 113-146.
- Bhatti J S 1980** Species of the genus Thrips from India (Thysanoptera). *Systematic Entomology*, 5:109-166.
- David B V 2001** Elements of Economic Entomology. *Popular Book Depot., Chennai, India pp*, 263.
- Mound L A and Palmer J M 1981** Identification, distribution and host plants of the pest species of *Scirtothrips* (Thysanoptera : Thripidae). *Bulletin of Entomological Research*, 71: 467-479.
- Palmer J M 1992** Thrips (Thysanoptera) from Pakistan to the pacific : a review. *Bull. Br. Mus. Nat. Hist. (Ent.)* 61(1). 1-76.
- Patel U N and Gupta HCL 1998** Evaluation of losses and management of thrips infesting chillies. National Seminar on "Entomology in 21<sup>st</sup> Century" *Biodiversity, Sustainability, Environmental safety and Human health*, at Udaipur pp.99.
- Varadharajan S 1994** Studies on host plant resistant and biology of chilli thrips *Scirtothrips dorsalis* Hood (Thysanoptera; thripidae). *M.Sc(Ag.) Thesis Annamali University, Annamalinagar pp*, 150.
- Zimmerman E C 1948** Apterygota to Thysanoptera. University of Hawaii press, *Honolulu, PP*. 387-454.