Aayushi International Interdisciplinary Research Journal (AIIRJ)
ISSN 2349-638x Impact Factor 4.574 Special Issue No. 25
UGC Approved Sr No.64259 Website :- www.aiirjournal.com Email id:- aiirjpramod@gmail.com

MORPHOLOGICAL VARIATION OF THRIPS INSECT *ELAPHROTHRIPS PROCER* (SCHMUTZ) (THYSANOPTERA:PHLAEOTHRIPIDAE)

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ABSTRACT

Detailed study of insect Elaphrothrips procer (Schmutz) was conducted from larva to adult. During developmental stages the morphological variations were observed in the stages of larva I, larva II prepupa, pupa I and pupa II. On the basis of morphology, the male thrips is stronger than female and shows developmental variation than that of the female. Male thrips shows minor and major form i.e. normal, gynaecoid forms and overgrown, oedymerous form respectively. The male is longer than female, dark in colour and having elongated tubular abdomen than female. The size of the body length of the adult male is 7107 µm and female is 4984 µm long.

Key words: *Elaphrothrips procer , developmental stages, gynaecoid, oedymerous, antenna*

INTRODUCTION

Thrips are occur on the tender, succulent parts of the plants, or under the barks of dead and drying twigs or among decaying leaves of grass. They enjoy a wide range of distribution, habits and ecological habitat. Though most of them are phytophagous, very few are predaceous feeding on mites, scales, pscoids. Some of them produce and inhibit plant galls. While mycophagous or fungus feeding thrips are more common.

Elaphrothrips procer (Schmutz) (Family-Phlaeothripidae) is a mycophagous thrips. They are found within the curved folds of fungal infected dry leaves and feeds on fungal spores and generally occurs on the fungus infected dry leaves of *Butea monosperma* plant during humid seasons of the year. They have peculiar, pearsing and sucking type of mouth parts with vestigial right mandible. Adults have two pairs of narrow fringed wings with long hairs and abdomen is long elongated with tube like anal segment.

MATERIALS AND METHODS

The thrips were collected from their host plant Butea monosperma dry fungal infected leave during the humid periods of the year when they mostly occur near the roadside of highway and field area.

The adult male, female, larvae and eggs were kept in large plastic bowls along with fungus infected dry leaves. Then they transfer to the separate plastic rearing bowl to avoid overcrowding and food limitation. For protection bowls were covered by muslin cloth. Light 12:12 and temperature (25±1^{0}C) were maintained. Relative humidity maintained at 80% by keeping wet filter paper in the rearing bowl, some time wet cotton plug also used.

Developmental stages and adults were dehydrated with ethanol grades (30%, 50%, 70%, 90%, and Absolute) then after cleared in xylol, embedded in DPX for mounting onto slides. In the case of specimens long preserved in 70% alcohol before mounting to put them in 96 % alcohol to which ethyl acetate (1 part of ethyl acetate to 10 volume of water) has been added so as to make the materials soft.

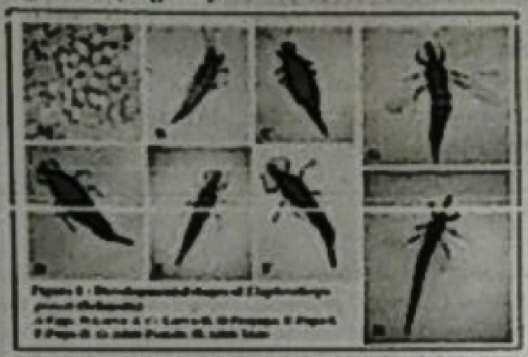
For study of external morphology, slides of whole mounts of larvae, pupae and adults were used. All observations were made under compound microscope (MLX series Magnus) and stereo zoom microscope (Magnus) for better and detailed study of the sample. Computerised micro measurements were also done by using image analysis software (Olympus).

RESULTS AND DISCUSSION

Larva and the adult have similar structure of the antennae, the antennal setae, sensorium and the mouth parts in both adapted for the fungus feeding. The integuments are sclerotinized at the head, thorax and abdominal terminal segment IX and X.

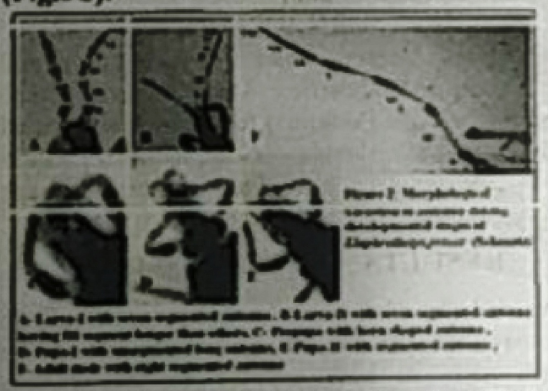
Larva I: Body is elongated, red in colour. Body measurement is about 1.85 ±0.03 µm in length. The head is cylindrical and legs are grey with red pigments. The abdominal terminal segments IX and X are dark in colour **(Fig.1B)**. The antennae are greyish in colour with total seven segments, the basal single scape, the middle single

pedicel and the distal large five jointed filaments flagellum (Fig.2A).



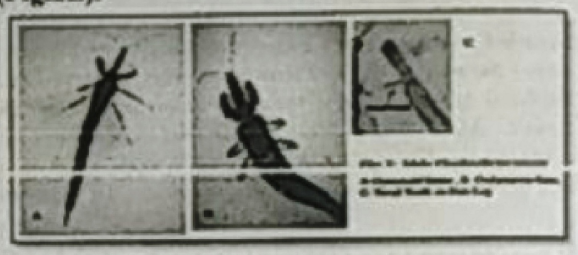
Larva II: Body is reddish in colour elongate in shape tapering towards the posterior end. The length of body is measures about 3.78±0.12mm (Fig.1C). Antennae are seven segmented (Fig.2B). The abdomen has ten segments with rudiment eleventh segment bearing the whorl of setae. The abdominal segment IX and X is dark in colour.

Prepupa: Body is bright red in colour and cylindrical in shape tapering posterior. The body measures about 2.54± 0.17 mm in length. The last abdominal segment is slightly darkish. Body is covered with a thin soft integument. The appendages show glassy texture (Fig. 1D). The antenna is short horn-like and unsegmented, situated on the frontolateral side with pairs of long thin setae at the front of each antenna. Antennae are distinctly clear and somewhat transparent (Fig.2C).



Pupa I: The body is red coloured, cylindrical, elongated in shape broader anteriorly and gradually tapering towards the posterior end. The body length measures about 4.07±0.02mm. The Head is oblong in shape. Head bears a dark pigmented spot just behind the eyes (Fig.1E). The antennae lie along the lateral side of the head capsule. Antennae segmentation is not shown (Fig. 2D). The abdominal segments are similar to that of prepupa except in size.

Pupa II: Body is cylindrical more elongated than the prepupa and Pupa I but in shape similar to that of pupa I. The body length is measures about 5.63 ±0.06 mm in length. Pupa II is similar to prepupa and pupa I except the size (Fig.1F). The antennae are situated on the lateral sides of the head capsule. Antenna is segmented and elongated. In front of the antenna there are four pairs of elongated setae (Fig.2E).



Adults: On the basis of morphology, the male thrips is stronger than female and shows developmental variation than that of the female (Fig 3 G and H). Male thrips shows minor and major form i.e. normal, gynaecoid forms and overgrown, oedymerous form respectively (Fig.3 A and Fig.3 B). The male is longer than female, dark in colour and having elongated tubular abdomen than female. The male posses tarsal tooth on foreleg (Fig. 3.C) whereas in female tarsal tooth is absent. The size of the body length of the adult male is 7107 µm and female is 4984 µm long.

Pinent *et al.*, (2003), Mound and Morris (2003), Mound (2007) identified and classified the thrips on morphological account and explain the Thysanoptera phylogeny. Priesner (1928), Pesson (1951), Snodgrass (1954), Davies (1961), Stannard (1968), Ananthakrishnan (1969), Heming (1973), Moritz, (1997) termed first pupal instar as prepupa or propupa as it represent a very a short transitional stage and indistinctly developed wings pads and relatively smaller than that of the next stage. In the life history of *Elaphrothrips procer* (Schmutz) the prepupal stage has been lie in between the larva II and pupa I. Therefore, the following terminology is used in *Elaprothrips procer* (Schmutz) *i.e.* first stage larva I, second larva II, prepupa, pupa I and pupa II similar with *Elaphrothrips greeni* Bagnall (Watane, 1985)

In the larvae of *Bactridothrips brevitubus* the antennae are six segmented (Haga, 1974) while in *Haplothrips verbasci, Frankliniella fusa* (Heming, 1975) and *Elaphrothrips greeni* the antennae are seven segmented (Watane, 1985). In *Elaphrothrips procer* (Schmutz) the antennae are seven segmented and Prothaorax is bilobed due to

presence of sclerotization, which are the common features of the thrips, *Haplothrips niger* (Loan and Holdaway, 1955); *Bactridothrips brevitubus* (Haga, 1974); *Haplothrips verbasci* (Heming, 1978) and also in *Elaphrothrips greeni* (Watane, 1985). The abdominal segments IX, X and XI are indistinct in *Bactridothrips brevitubus* (Haga, 1974), while in *Elaphrothrips greeni* (Watane, 1985) except segment XI, other segment IX and X are distinct *Elaphrothrips procer* (Schmutz) agree with the characters of abdominal segment present in *Elaphrothrips greeni*.

CONCLUSION

Elaphrothrips procer (Schmutz) shows an intermediate type of development as the young ones resemble the adults in some characters. They are hemimetabolous type, while remaining three stages tend towards the holometabolous type of development as in the pupal stages. The change from the hemimetabolous type to the holometabolous type is achieved by the interpolation of a transitional prepupal stage. Presence of eight segmented antenna in adult and seven segmented antenna in larva-I and larva-II while showing intermediate prepupal stages are became the characteristic feature of the Thysanopteran, Phlaeothripidae insects.

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