

## LIFE HISTORY OF MYCOPHAGOUS THRIPS *ELAPHROTHRIPS PROCER* (SCHMUTZ) (THYSANOPTERA: PHLAEOTHRIPIDAE)

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### ABSTRACT

In most species of mycophagous thrips fertilization of the eggs is by means of bisexual union. *Elaphrothrips procer* (Schmutz) express a specific life history and developmental stages. The life history of *Elaphrothrips procer* (Schmutz) started from egg with larva I, larva II, prepupa, pupa I, pupa II and completed into adult. Stages larva I and larva II were more active and spore feeder, whereas prepupa, pupa I and pupa II were inactive and no feeder. Female laid eggs in the leaf folds of *Butea monosperma* dry fungus infested leaves in the range of 10-40 in a group and each egg was vertically glued to the leaf and protected from direct exposure of sunlight. This paper represents some aspects of life history and developmental stages of mycophagous thrips *Elaphrothrips procer* (Schmutz).

**Key words:** *Elaphrothrips procer*, life history, mycophagous thrips.

### INTRODUCTION

Insect thrips enjoy a wide range of distribution, habits and ecological habitat. They occur on the tender, succulent parts of the plants, under the barks of dead and drying twigs, among decaying leaves of grass, feeding on fungus spores and hypae. Though most of them are phytophagous, mycophagous thrips are more common and species of *Elaphrothrips* and related genera have a specialized spore-crushing device in the foregut (Mound, 2005). Some of the larger species exhibit sub-social behaviour, with males competing with each other to protect particular egg masses, and ovoviviparity occurs in some species (Ananthakrishnan and Suresh, 1984; Crespi, 1988).

The current list of the thrips in the world contains about 7400 species and 1200 types are placed in a single order Thysanoptera (Mound, 2007) with nine families, eight of these belonging to Terebrantia and the Tubulifera includes only a single family the Phlaeothripidae. From India, more than 400 species of Thrips belonging to about 200 genera have so far been described by various authors (Ananthakrishnan, 1969). Species of Phlaeothripidae are particularly diverse in their biologies.

Studied insect were a mycophagous thrips 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 are found within the curved folds of fungal infected dry leaves of the said plant.

### MATERIALS AND METHODS

#### Collection and rearing of thrips

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. For collection of these species the methods of Ananthakrishnan (1969) was followed.

The collected specimens of *Elaphrothrips procer* (Schmutz), adult male, female, larvae and eggs were kept in large plastic bowls along with fungus infected dry leaves. Then they were transferred to the separate plastic rearing bowl to avoid overcrowding and food limitation. The newly hatched larvae were regularly fed on fungus infected dry leaves of *Butea monosperma*. For protection bowls were covered by muslin cloth. Light 12:12 and temperature (25±1<sup>0</sup>C) were maintained. Relative humidity maintained at 80% by keeping wet filter paper in the rearing bowl, some time wet cotton plug was also used.

**Field Observation and photo-micrograph:**

For field photography and documentation, images were captured directly by using Olympus digital camera (SP-550UZ). Photographs of adults, eggs, larvae, prepupa and pupa were capture and photographs of matting behaviour were also imaged.

**RESULTS AND DISCUSSION****Life History:**

The life history of *Elaphrothrips procer* (Schmutz) started from egg with two active larva,

prepupa followed by pupa I, pupa II and completed into adult. The eggs were glued vertically and occur in cluster, dull white in colour. Larvae, prepupa, pupa I and pupa II were red in colour while adults were black in colour.

The larvae resembled in many respects to adults. The larva was very active. They feed on the fungal spores as adult do. The larval instars followed by a prepupa occurring in between the larva II and pupa I. There are two pupal stages, the pupa I and pupa II. The pupa was inactive quiescent and non-feeding.

**Oviposition behaviour:**

The egg laying pattern and the number of eggs laid vary considerably, it depend upon the aggregation patterns and sub-social behaviour of the thrips.

The host specificity of *Elaphrothrips procer* (Schmutz) were not specified, but the host *Butea monosperma* from where the insects were collected, the female laid eggs in the leaf folds of *Butea monosperma* dry fungus infested leaves. The eggs were protected from direct exposure of sunlight.

The female laid eggs in the range of 10-40 in a group and each egg was vertically glued to the leaf.

The oviposition period lasts for 2 to 4 days. On an average each female lays about 30-40 eggs.

**Duration of developmental stages:**

The time taken by an embryo to hatch into larva varies from 1-2 days in ovoviparous eggs and in oviparous eggs 6-8 days. The embryo hatches into larva I.

It was observed that the larvae emerged from the viviparous female appears larger than oviparous or ovoviviparous female.

**The larva I:** feeds actively for 4-6 days and then moults to larva II. At the time of moulting the larva show movement which causes ruptures of the cuticle along the dorsal side. Through the gap the larva II was comes out.

**The larval II:** feeds for 5-7 days with continue its life and after proper growth, they moult to prepupa. The larval exuviate were grey in colour. In an average total larval period was about 10-15 days.

**The prepupa:** life was very short, only 1 to 2 days, it changes into the pupa I.

**The Pupa I:** The life duration of pupal stage of the pupa I was also short being 1 to 3 days and it moults to pupa II.

**The pupa II:** It also shows short days 2-4 and moults to the adult. During the pupa II stages the pupa undergoes metamorphic changes and adult moults. During pupation it gives out pupal exuviate which were thin whitish in colour with the posteriorly grey in coloured. A total pupal period is 4-9 days.

Just after emergence the adults were start mating and female laid egg within 6-9 days depends upon the climate conditions and food availability.

In the life history of *Elaphrothrips procer* (Schmutz) the prepupal stage has lie in between the larva II and pupa I. Therefore, the following terminology was used in *Elaprothrips procer* (Schmutz) i.e. first stage larva I, second larva II, prepupa, pupa I and pupa II. This terminology was similar with the study on *Elaphrothrips greeni* (Watane, 1985)

Eggs of many thrips are usually whitish in colour, in *Limothrips ceregium* the eggs are whitish initially and then become brownish with a paired red spots (Sharga, 1933). Even in other thrips the eggs are whitish, pinkish yellow or dark coloured (Ananthakrishnan *et al.*, 1983; Kumm, 2002). In *Elaphrothrips procer* (Schmutz) the eggs are initially dull white and later on change white to pink colour.

In *Elaphrothrips procer* (Schmutz) the eggs are initially dull white and later on change white to pink colour which support and agree with the above record. *Elaphrothrips procer* (Schmutz) females in a colony lay their eggs in cluster. When they form aggregations, the oedymorous male

guard and protect the colony and egg mass by both, thus tend to exhibit division of labour. It also observed that *Elaphrothrips brevicornis*, a West Indian species, sits over her eggs after laying them on the leaves and protects the eggs from the predators (Bagnall, 1915).

The rate of developmental stages further determines the total period of life cycle. Ecological conditions temperature humidity greatly influence the period of life-cycle of thrips. Therefore it is not advisable to correlate the life-cycle of the species reared in cold and warm climate. The entire postembryonic development, from hatching to the adult condition is competed in 30-35 days in *Limothrips ceregium* (Sharga, 1933), while in all days in *Frankliniella tritici* (Watts, 1936) and the second larval stages in all thrips so far studied (Lewis, 1973).

In the life-history of the thrips it is common that the life-span of the first larva is always shorter than that of the second one. In *Elaphrothrips greeni* total period of post-embryonic development varies between 15.5 to 23.5 days and also the second larval stage is longest (4-6 days) and the pre-pupal stage the shortest (1-1.5 days) (Watane, 1985).

Pupa I has a life of one days and pupa II 2-3 days in *Trichinothrips breviceps* (Seshadri, 1953), pupa I, 1.4 days and pupa II 3.7 days in *Haplothrips niger* (Loan and Holdaway, 1955), Pupa I, 2-3 days and pupa II 5-7 days in *Bagnalliella yuccae* (Derbeneva, 1959) and pupa I, one days pupa II 2.8 days in *Halporthrips aculeatus* (Koppa, 1970) pupa I, 1-2.5 and pupa II, 2.5-3.5 days in *Elaphrothrips greeni* (Watane, 1985).

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