Insect Word: Diversity Of Insects Thrips

S. M. Nagrale
Department of Zoology, Shri R.L.T.College of Science, Akola (M.S.)

Abstract

Thrips are minute insects which are usually a few millimeters long. It has fringed, banded wings as well as asymmetrical sucking and piercing mouthparts in which only the left-hand side mandible is developed. They enjoy a wide range of distribution, habits and ecological habitat most of them are phytophagous, very few are predaceous feeding on mites, scales, pscoids and ericoccids respectively. While mycophagous or fungus feeding thrips are more common. Order Thysanoptera divided into two suborders i.e. Terebrantia and Tubulifera. The thrips shows many peculiarities in their behavior and life history.

Key words: *Thrips, fringed wings, mycophagous, phytophagous*

Introduction:

Thrips are minute insects which are usually a few millimeters long. In spite of their small size, unattractive colouration and obscure habit, thrips are endowed with remarkable structural peculiarities unobserved among the other insects. The majority of the species has fringed, banded wings as well as asymmetrical sucking and piercing mouthparts in which only the left-hand side mandible is developed

They are distributed worldwide predominating in tropical, subtropical, and temperate regions. They enjoy a wide range of distribution, habits and ecological habitat. They occur on the tender, succulent parts of the plants, or under the barks of dead and drying twigs or among decaying leaves of grass, feeding on fungus spores and hypae. Some of them produce and inhibit plant galls, while others are inquilines living inside galls of thrips or other insects. Though most of them are phytophagous, very few are predaceous feeding on mites, scales, pscoids and ericoccids respectively. While mycophagous or fungus feeding thrips are more common. They feed on the spore of wheat rust and coffee leaf rust and little other plant infected fungus. A large number of species are considered pest, because they feed on plant with commercial value, while some acts as a vectors of plants virus and bacterial diseases. While some act as predators of crop pests and also serve as weed control agents.

In **1744 De Geer** first described these insects as Physapus, based on their several unique and striking features, such as the nature of wing with long, fine fringes along their margins, possessing characteristic feeding apparatus, with a striking asymmetry of the component mouth parts, the vestigial right mandible, the protrusible bladder like structure at the end of tarsus or physopoda, and the occurrence of a prepupal stage during metamorphosis.

In **1836 Haliday** ranked these insects to the Order Thysanoptera, and Linnaeus placed the species in a genus called as Thrips. The species, however, posses some common characteristics such as fringed wings and bladder feet, which have made them inclusion in the order Thysanoptera, derived from the Greek word meaning *thysanos* (fringe) and *pterons (*wing). The common name thrips is also derived from the Greek, meaning wood louse. Other common names for thrips include thunderflies, thunderbugs, storm flies, thunderblight and corn lice.

Classification Diversity:

Order Thysanoptera divided into two suborders i.e. **Terebrantia and Tubulifera**. Thrips belonging to Terebrantia posses a distinct saw like ovipositor, fore wings with a system of veins and sometime cross veins, a distinct chaetotaxi and 2 to 8 segmented maxillary palp and the maxillary stylate confined to the mouth cone. Tubulifera are so called because the 10th abdominal segment is drawn into a tube and in the species of this suborder the ovipositor is internal and flexible structure. The four wings without a system of veins, cross veins and setae, the fringes nearly straight, never wavy, maxillary palp always two segmented and maxillary stylate always retracted far back into head. Sigmoid setae are also present on the abdominal tergites to hold the wings while at rest.

The current list of the thrips in the world contains about 7400 species and 1200 types are placed in a single **order Thysanoptera** with nine families, eight of these belonging to **Terebrantia** (**Uzelothripidae, Merothripidae, Aeothripidae, Melanthripidae, Adiheterothripiade, Faurillidae, Heterothripidae, Thripidae.**) and **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

The **suborder Tubulifera** comprises a single family, the **Phlaeothripidae** with about 3500 described species, whereas the **suborder Terebrantia** comprises about 2400 species in eight families

Phlaeothripidae comprise two subfamilies. The smaller subfamily, **Idolothripinae,** includes fungal feeding species which commonly exhibit remarkable structural polymorphisms, both within and between sexes, presumably monophyletic, whereas **Phlaeothripinae** is presumably paraphyletic with respect to the larger group Species of Phlaeothripidae are particularly diverse in their biologies. In the Phlaeothripinae, are essentially fungus feeders, presumably on fungal hyphae. Whereas Idolothripinae are all considered to feed on fungal spores having a specialized spore-crushing device in the foregut

The morphosystematics of sub family Idolothripinae comprise about 700 species in 160 genera, which have been examined extensively. In contrast, the relationships amongst the 2800 species and 370 genera of sub family Phlaeothripinae remain unclear. Phlaeothripidae thrips shows various stages of wing polymorphism. Macropterous forms have long, fully developed wings whereas micropterous forms, which are rare, have shorter but fully developed wings and brachypterous forms always have wing pads representing the fore wings but there may be no trace left of the hind wings.

Morphological Diversity

In Thysanoptera, particularly in Tubuliferan thrips oedymerism and gynaecoidism types of structural variation occur. Males tend to have a wider range of atypical developmental variation than do the females. Perhaps the female is less subject to extraordinary body development; in order that she may be better able in disseminate eggs for the assured continuance of the species. Regardless of the reasons, females are more often normal and winged. Individuals are said to be minor forms if they are no more developed than is the minimum for the species. This is the normal form, the gynaecoid form. A heavier, stouter-bodied individual can be termed major form. In particular the head, fore legs and prothorax are greatly enlarged and appendages or stout spines may develop on various parts of the body including the abdomen. These are the bizarre forms, the oedymerous forms.

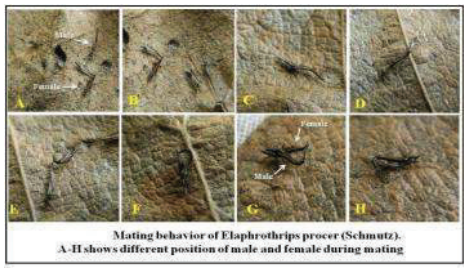

Fig : life history of *Elaphrothrips procer* (Schmutz)
A-Eggs, B-Larva –I, C- Larva-II, D-Prepupa, E-Pupa-I, F-Pupa-II, G-Adult Female, H-Adult Male

Behavioral And Life History

The thrips shows many peculiarities in their behaviour and life history. These thrips are found in leaf litter, on dead branches, and on dead hanging leaves, and the species on dead branches and in bunches of dead leaves sometimes produce colonies of hundreds of individuals. Thrips are most diverse in tropical areas, particularly the wet tropics, and only a few species occur in temperate parts of the world, and very few in arid areas. 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.


A) *Elaphrothrips procer* colony on fungus infected dry leaf of *Butea monosperma*, B) Female *along with eggs*

Most of the fungivorous thrips live in aggregations. Eggs, young and adults may be observed together, yet there does not seem to be any social organization. Perhaps in some of these groups communication may be made by sounds undetectable by the human ear. They are very susceptible to environmental changes and can survive only particular climatic or microclimatic situation and requiring proper conditions of the temperature and humidity. Their abundance could be correlated with the types of plant formation and food viability. Some time they undergo hibernation or aestivation during their developmental stages. Some species of thrips also occurs on dead, decaying vegetation and on the leaf litter surface.


Mating behavior of Elaphrothrips procer (Schmutz).
A-H shows different position of male and female during mating

Some species of thrips express a specific matting behavior. In mating the male grasps the female around the pterothorax and mounts her. He then trails his abdomen to one side. When in this position both twist the terminal segments of the abdomen sideways for copulation. Except for a limited number of genera in the Megathripinae (Idolothripinae), the larvae hatch from deposited eggs. Few genera related to Idolothripinae do not lay eggs but give birth to active young.

References

1) **Ananthakrishnan, T.N. 1964.** A contribution to our knowledge of the Tubulifera (Thysanoptera) from India. *Opusc. Entomol. Suppl.* 25: 1-20
2) **Anathakrishnan, T.N. 1968.** Thysanopterologica Indica-V. *Oriental Ins.,* 2 (1): 41-58.
3) **Anathakrishnan, T.N. 1969.** Indian Thysanoptera. CSIR Zoological Monograph No.1.
4) **Ananthakrishnan T. N. 1973a.** *Mycophagous Tubulifera of India* (Thysanoptera: Insecta). *Occl. Publ. No.2, Entomol. Res. Unit. Loyola college, Madr*as. 144.
5) **Ananthakrishnan, T.N. 1984.** Bioecology of Thrips. Indira Publishing House, Oak Park, Michigan.
6) **Anathakrishnan, T.N. and Sen, S. 1980.** Taxonomy of Indian Thysanoptera. *Zoological Survey of India* (Handbook Series). 1: 1-234.
7) **Chapman, R.F. 1998.** *The Insects, Structure and Function*. University Press, Cambride.
8) **Kumm, S. 2002.** Reproduction, progenesis, and embryogenesis of thrips (Thysanoptera, Insecta), Developmental Biology, University of Halle-Wittenbreg, Halle.
9) **Lewis, T. 1997.** Thrips as crop pests. CAB International Owon, New York.
10) **Mound, L.A. 1997.** Biological Diversity. In: Lewis, T. Thrips as Crop Pests. CAB International Oxon, New York.
11) **Mound, L.A. 2005.** Thysanoptera: Diversity and Interactions. *Annu. Rev. Entomol.* 50: 247-269.
12) **Mound, L.A. 2007a.** New Australian spore feeding Thysanoptera (Phlaeothripidae: Idolothripinae) *Zootaxa,* 1604: 53-68
13) **Mound, L.A. 2007b.** Thysanoptera (Thrips) of the World-checklist. http:// www.ento.csiro.au/thysanoptera/worldthrips.html.