



ORIGINAL RESEARCH PAPER

Zoology

STUDY OF SEASONAL VARIATION IN DIVERSITY OF ORDER DIPTERA FROM KHED TEHSIL

KEY WORDS: Diptera, Brachycera, Nematocera, Cyclorrhapha

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ABSTRACT
 Insecta is the largest class in the Animal kingdom. The True flies belong to the class insect order Diptera. In the world, about 1,24,000 species of flies are known. There is 12 Dipteran species from 8 families of order Diptera was observed in Khed Tehsil of Pune district, Maharashtra. The species diversity was higher in moist and damp places . Flies mainly inhabit on green vegetation like grass ,herbs, forest plants . The 8 species found in suborder Brachycera , 4 species from Nematocera and 1 species from Cyclorrhapha was studied in Khed Tehsil. The study carried out from August to March 2018- 2019, for recording seasonal variation in diversity of order Diptera. Most of the species like *L.cuprina*, *S.bercaea*, *S.calcitrons* and *C. quinquefasciatus* increased in August to November, while decreased in December to March.

INTRODUCTION

Dipteran flies called ' True flies 'which belongs to order Diptera. Diptera stands for two winged insects. The first pair of wings is used for flying and second pair is modified ,Club shaped small structure called 'Halters'. We know 1,24,000 dipteran species found in the world. Those species are relatively smaller in size with soft body(Jeffrey H Skevington and PT Dang 2002). Flies shows sucking and piercing type of mouthparts . Adult flies are high adaptive insects and their larvae are very active. Flies are vectors, they spread disease for eg: Houseflies spread diarrhoe, mosquitoes spread dengue, malaria, etc .Some flies are pollinators. Diptera is one of the third largest of diverse insects orders interms of species richness, habitat exploitation and habits. They feeds on blood ,dung, and decaying material . In India we observe vast diversity of dipterans .

They belongs to 87 families. The economic importance of flies shows vital role in the processing food energy of aquatic vegetation . Dipteran larvae play important role in natural 'clean-up squad' helping get rid of dung and dead animals. Flies are important food sources for many other animals. There are three subs -orders Nematocera, Brachycera, Cyclorrhapha. Nematocera typically have fairly long, fine jointed antennae. Brachycera refers to shortened antennae. Cyclorrhapha refers to circular aperture. The insects most commonly analyzed in medicological entomology. Calliphoridae (Blowflies), Sarcophagidae (Flesh flies) and Muscidae (House flies) are all key species of forensic importance found in this order (Joseph et.al., 2011).. Flies also destroy our food, especially grains and fruits.

The life cycle of a fly consist of four stages: egg, larva, pupa and adult. Since larval forms, always morphologically distinct from adults, also occupy different habitat, flies in effect live two distinct lives to adapt successfully to environmental changes. The order includes many families fly species of highly economic importance as pests of plants and vectors of dangerous diseases for man and animal. Besides transmitting diseases some of the dipteran insects are pollinators of flowers. At least 71 of the 150(Evenhnius et. al. 2008). Diptera families include flies that feed on flowers . More than 550 species of flowering plants are regularly visited by Diptera (Carson et.al.2001) that are potential pollination. The biodiversity survey was carried out in Khed Tehsil to record seasonal variation of different habitats.

True flies can be found almost anywhere. Adults of many species are strong fliers, which helps them locate supplies of food for their larvae. Fly larvae are most common in damp habitats, and flies populations are largest in humid places with lots of moisture.

MATERIALS AND METHODS

The present study was conducted at different areas of Khed Tehsil to observe diversity of Order Diptera. Khed is situated in Pune, Maharashtra, India.

Collection Of Materials:

The total 115 specimens were collected from August to February in 2018-2019, from different areas of Khed Tehsil. The Dipteran flies were mostly found in meadows, mountains plains, forest, rivers, drainage, and industrial waste, on vegetables garbage, cattles, and dogs and in poultry farms. The flies were collected by insect net and they kept in sampling bottles.

Study Area :

The Flies were collected from different areas of khed tehsil sites like Siddheshwar (Bhima River Basin) , Kedareshwar ,Chas-Kaman(Dam), Kanhewadi ,Khed Ghat, Vetale, Chikhal gaon ,Wada ,Aakharwadi , Pangari ,Kadus (Fig-1) The flies were collected in morning by using Aerial net and keep them in sampling bottles and carried out in laboratory preserve them by using dry preservation method .Identification was done by using a key Angel Chiris Entomologist, H. Oldroyd , Scott Schell and Dr. Alex Latchininsky(2007) consulting appropriate literature (Fig-1 and 2).

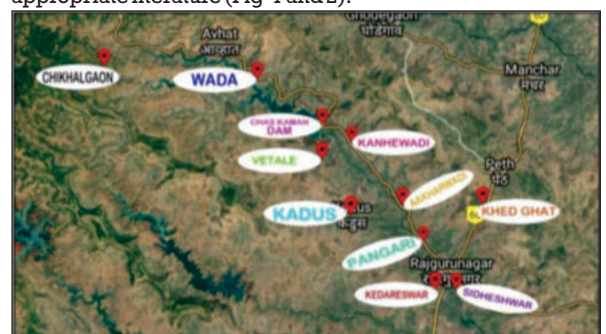


Fig-1 . Map Of Khed Tehsil Showing Different Localities.

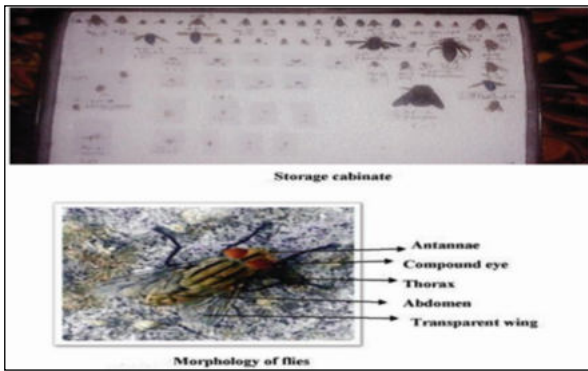


Fig-2. Insect Storage Cabinet And Morphology Of Flies

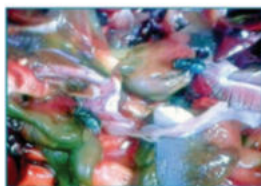
RESULTS

The Result shows the variation of dipteran flies as per the season day and time. The collection surveys conduct from August to March 2018-2019 in Khed Tehsil to record seasonal variation in different habitat. Total 115 specimens were collected according to particular family. 10 species are identified. Table no. 1 shows the collected species from the Khed Tehsil in Pune district.

Species no.	Family	Common Name	Scientific Name	Specimen
Species I	Calliphoridae	Green bottle flies	<i>Lucilia cuprina</i>	19
Species II	Sarcophagidae	Flesh flies	<i>Sarcophaga berecava</i>	13
Species III	Culicidae	Southern House mosquito	<i>Culex quinquefasciatus</i>	23
Species IV	Chironomidae	Midges	<i>Chironomus plumosus</i>	2
Species V	Muscidae	Stable flies	<i>Stomoxys calcitrans</i>	9
Species VI	Tachinidae	Green parasitic flies	<i>Gymnocheila viridis</i>	3
Species VII	Diopsidae	Stalked eyes flies	<i>Diaseopsis aethiopica</i>	10
Species VIII	Stratiomyidae	Black Soldier flies	<i>Hermetia illucens</i>	12
Species IX	Tabanidae	Horse flies	<i>Tabanus atratus</i>	7
Species X	Hippoboscidae	Dog louse flies	<i>Hippobosca longipennis</i>	17

Table no 1: List of Identified species from Khed Tehsil

Identified species



Species I: *Lucilia cuprina*



Species II: *Sarcophaga berecava*



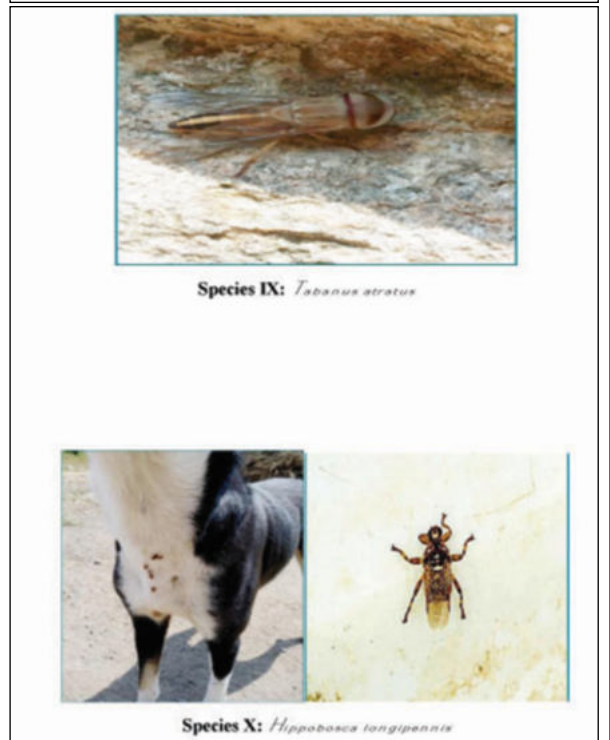
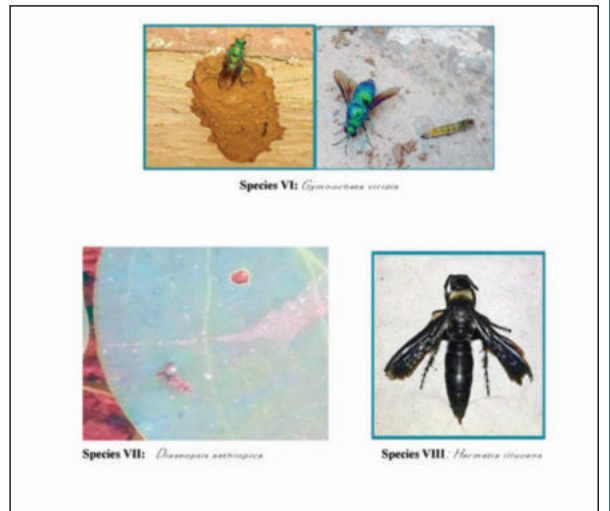
Species III: *Culex quinquefasciatus*



Species IV: *Chironomus plumosus*



Species V: *Stomoxys calcitrans*



DISCUSSION

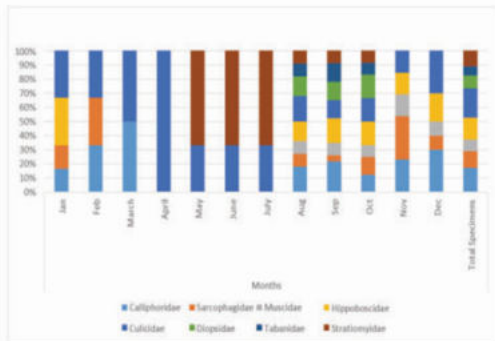
Diptera comprised of exclusively "Scavengers" insects, which live in vegetation, dirty places, garbage and drainage area and also they feed on carrion, dead plant material. In this regard, the present study is designed to contribute to diversify the biodiversity of order Diptera in Khed Tehsil. For our knowledge it is complete to study. The collection was carried out from 2018-2019 in which total 115 specimens from Khed Tehsil. Result shows that total 10 species was identify at different study sites (Table no. 1 and Fig-I-X).

Out of the species which belongs to the families Calliphoridae, Sarcophagidae, Muscidae, Culicidae and Hippoboscidae have many specimens which shows seasonal variation in August to November which increased in population and decreased in December to March, while other families, Diopsidae, Tabanidae, and Stratiomyidae are less in number due to unfavorable environmental conditions their population is less in December to March. It shows that families Calliphoridae, Sarcophagidae, Muscidae, Culicidae and Hippoboscidae are rich in diversity than rest of families. In order Diptera, many flies those are beneficial to mankind. Flies that visit flowers are very helpful in the pollination of flowering plants. Especially Tachinidae are one of the largest

and most beneficial families of diptera(Wagner, Rudiger, et.al.,2008) Some flies are allowed by gardeners because they feed on aphids which reduce number of pest in agriculture so it is beneficial to us.

Families	Months												Total Specimens
	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	
Calliphoridae	01	01	01	00	00	00	00	04	05	03	03	03	19
Sarcophagidae	01	01	00	00	00	00	00	02	01	03	04	01	13
Muscidae	00	00	00	00	00	00	00	02	02	02	02	01	09
Hippoboscidae	02	00	00	00	00	00	00	03	04	04	02	02	17
Culicidae	02	01	01	01	01	01	01	04	03	04	02	03	23
Diopsidae	00	00	00	00	00	00	00	03	03	04	00	00	10
Tabanidae	00	00	00	00	00	00	00	02	03	02	00	00	07
Stratiomyidae	00	00	00	00	02	02	02	02	02	02	00	00	12

Table no 2: Seasonal variation shows in order Diptera from January to December



Graphical representation in variation of order Diptera from January to December

CONCLUSION

In the present study diversity of Order Diptera from Khed Tehsil is studied. From the above study I conclude that, the survey is carried out from August to March 2018-19 in which 10 species identified completely. No. of species belongs to family Sarcophagidae, Calliphoridae, Muscidae, Culicidae and Hippoboscidae is dominant in Khed Tehsil. Siddheshwar (Bhima River), Khed Ghat, Fish market (Khed) and Chas Kaman (dam) shows good diversity as compare to other sites. Families like Chironomidae, Tachinidae, Stratiomyidae and Tabanidae shows less diversity. The regions were species are observed is covered with grass, trees and also dirty places which factors provide good habitat to lay their eggs in the dirty place. The existence of 10 species from Khed Tehsil, it can be very safely said that the diversity of Diptera is considerably rich according to particular family. Seasonal variation in diversity of Order Diptera is observed from August to November which includes increase in population of species like *L.cuprina*, *S.bercaea*, *S.calcitrons* and *C. quinquefasciatus* while drastic decrease in population from December to March. The survey is carried out during December to March showed declining the population of remaining species due to unfavorable environmental condition for their survival.

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