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Insect Biodiversity of Mahapoli Village of Bhiwandi Taluka, District Thane

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Abstract- The diversity and ecological importance of insects makes them very valuable for studies of biodiversity. Insects play a huge role inlives of man. Survey of Insect Biodiversity are undertaken to find out the organisms exist in a given area. The survey was carried out in Mahapoli village for the study of the ecological significance of the Insects. Insects may be found in nearly all environments, although only a small number of species reside in the oceans, a habitat dominated by another arthropod group, crustaceans. Insect bring both joy and sorrow. Their importance to human welfare transcends the grand battles. Most of us hate them, but some of us love them. Indeed at times they even inspire us. It is necessary to protect them.

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Insect Biodiversity of Mahapoli Village of Bhiwandi Taluka, District Thane

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I. Introduction

Insects are the largest and most diverse class of animals on earth. Insects which account for over half of all living described organisms (Wilson, 1988; Chapman, 2006) have a very significant role in the ecosystem by affecting the diversity, abundance and distribution of plant communities. According to Wiggins (1983) and Finnamore(1996a)there are about 751,000 known species of insects, which are about three-fourths of all species of animals on the planet. Insects are extremely diverse and important to ecosystems. Ourpresent ecosystems would not function without insects said by Wiggins et al.,(1991).

Many insects are valuable to humans, for example by their pollinating activities. Berenbaum et al., (2006) noted that bees are of the most economically important groups of insects as a result of pollination of agricultural crops. Furthermore, some of the insects also provide us with honey, silk and other commercial value products; they serve as food for bird, fish and beneficial animals; they perform valuable services as scavenger, and they have been useful in medicine and scientific research was investigated by Triplehorn et al., (2005). But, some of them are harmful and become pests in agricultural crops and stored products, and some insects transmit diseases to human and other animals. Schwalter(2006)investigated insect ecology is the scientific study of how insects, individually or as a community, interact with the surrounding environment or ecosystem. Insects have immense capacity of adaptations to extreme environments than any other animal groups. As in lowland ecosystems, even at high altitudes, insects are the dominant animals. Insects successfully dominant almost every conceivable habitat and flourish at the highest limits of existence of animal life. According to Holldobler, Wilson (1994) many other insects are considered ecologically beneficial as predators and a few provide direct economic benefit. According to author insects play one of the most important roles in their ecosystems, which includes many roles, such as soil turning and aeration, dung burial, pest control, pollination and wildlife nutrition(Gullan2005). Dossey(2010) stated that recently insects have also gained attention as potential sources of drugs and other medicinal substances. Sherman et al., (1987) investigated that adult insects, such as crickets and insect larvae of various kinds, are also commonly used as fishing bait. Because of their many roles, they are familiar to the general public. However, their conservation is a challenge.

II. The Objectives

The following objectives were set forth for the present study:

- To assess the diversity of insects.
- To determine the status and distribution of different insects groups in the village particularly.

III. The Study Site – Mahapoli Village

The present study was undertaken in the Mahapoli village. Mahapoli is a village panchayat located in the Thane district of Maharashtra state, India. The district is situated between 18° 42' and 20°20' north latitudes and 72°45' and 73°48'east longitudes. The latitude 19.4010673 and longitude 73.0847979 are the geo-coordinate of the Mahapoli. It is located around 56.40kmaway from Mumbai.

IV. Climatic Conditions in Mahapoli

The micro climate of area is sum of the metrological and topographical condition that determines the average state of surrounding. The precipitation in Mahapoli is moderate throughout the year and abundant during the monsoon month (June to September). The winter month starts from October to January.

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V. Material and Methods

This study was conducted at Mahapoli Village from the 5th February until 20th February 2017. Data collection was done by taking the photographs of insectsfrom 9.00 am to 7.00 pm.

VI. Result and Discussion

According to the calculations, Shannon index is equal to 1.796. During field visits, similar types of insects were found at each location. At stations 1, 6 and 15 there were maximum population of insects (fig.1 and 2). In this study, a total of 377 individual of insects from 9 Orders were collected. They are from the Order of Diptera, Hymenoptera, Lepidoptera, Odonata, Orthoptera, Coleoptera, Hemiptera and Blattodea (Table 1 and 2). From 32 collected Families. Of these, only 9 Families were recorded at all zone sites. The results show that Hymenoptera (32.63%) were the most dominant insects in the village, followed by Diptera (30.50%) and Odonata (11.67%). The rarest insect Order were Dermaptera, Hemiptera and Blattodea that is, lower than 3% (Table 2). However, one of the 9 identified Orders was spatially rarest Order. It is Dermaptera, with collection of only four specimens (1.06%) throughout this study (Table 2). Of the collected insects, the Order Hymenoptera has the highest diversity in the village. This is because majority of the trees were in zone.

Table 1: Insect diversity

Insects order / Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ni
Diptera	11	9	3	7	0	8	22	17	6	3	0	13	1	9	6	115
Hymenoptera	27	1	0	0	2	31	4	7	12	0	0	1	5	4	29	123
Lepidoptera	2	4	1	1	1	5	3	1	1	0	2	1	3	2	2	29
Odonata	7	3	3	2	2	1	4	5	5	1	0	1	3	4	3	44
Orthoptera	1	1	4	2	2	2	0	2	3	1	3	0	2	2	1	26
Coleoptera	2	1	1	1	0	0	2	2	2	1	2	1	1	1	1	18
Hemiptera	0	0	1	0	0	0	2	1	1	0	0	0	1	1	0	7
Blattodea	1	0	0	5	0	0	0	1	0	2	0	0	0	0	2	11
Dermaptera	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	4
Total	51	19	14	18	7	48	37	36	31	8	7	17	17	23	44	377

Table 2: Diversity indices

Order	Total No of the Insects (ni)	Total No of the Family	Percentage (%)	Pi	Diversity index (H)	D	Evenness index (E)
Diptera	115	2	30.50	0.411	0.365	0.168	
Hymenoptera	123	3	32.63	0.326	0.365	0.106	
Lepidoptera	29	8	7.69	0.076	0.195	0.005	
Odonata	44	4	11.67	0.116	0.249	0.134	
Orthoptera	26	3	6.89	0.068	0.182	0.004	
Coleoptera	18	5	4.77	0.048	0.145	0.002	
Hemiptera	7	4	1.86	0.18	0.072	0.032	
Blattodea	11	1	2.92	0.029	0.102	0.0008	
Dermaptera	4	2	1.06	0.037	0.121	0.001	
Total	377	32	100	-	H=1.796	D=0.452	E=0.8010

Results of this study show that this village has high diversity and abundance of insect fauna. The majority of insects found in this village were Hymenoptera. This is because the most area of village has diverse vegetation and habitats. The vegetation's diversity and richness indirectly affect insect species diversity and abundance. Abdullah et al., (2009) noted that the structure of vegetation between the different sites could be affecting the existing of insect diversity. This study also showed that insect species diversity and abundance are significantly different among sites. We recorded 51 insects at site 1, 48 at site 6 and 44 at site 15 during the investigation period. The vegetation structure at site 1, 6 and 15 mostly consists of higher plants and different kinds of trees. According to Nummelin (1996) and Wardle et al., (1997) low and high temperature, rainfall and vegetation cover have been reported to influence the population density of insects. The village has diverse topography, vegetative features and climate which directly affect the diversity and occurrence of insect species. These needs will comprise, at the very least, food and suitable climatic conditions, and may also include shelter from disturbance and natural enemies said by Uniyal et al., (1998).

We sampled the area for the period of less than one month during winter season. We feel that our visits were less as compared to those required for insect

diversity studies. Rainy season is considered as best season for insect study. Therefore there is a possibility of getting more diversity of insect if the study is done during the monsoon season and study time is increased. Hopefully, there will be a further research study on the insect biodiversity and taxonomy in this area, in order to get better and comprehensive information on those aspects to be documented for future reference.

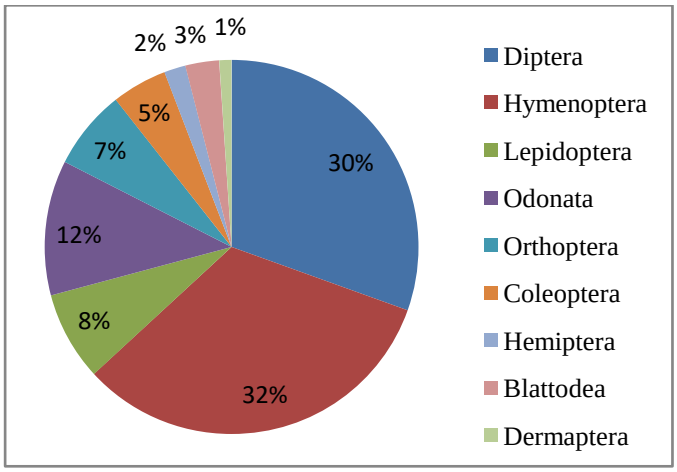

Fig. 1: Percentage (%)wise distribution of insects

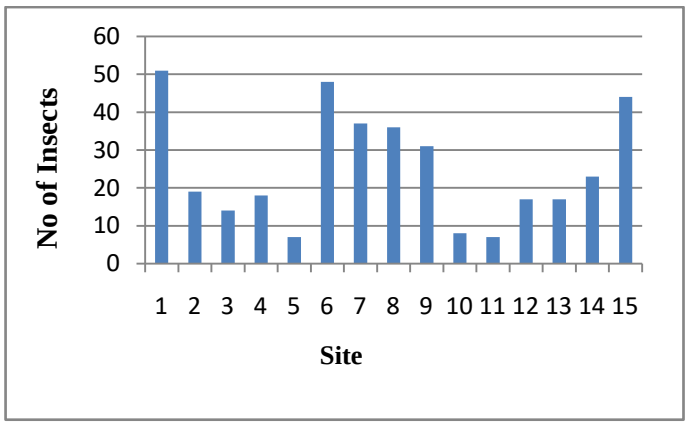

Fig. 2: Site wise distribution of insects

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