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A Study of Insect Biodiversity in different regions of Durg District, Chhattisgarh, India

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ABSTRACT

Insect biodiversity is a type of biodiversity that solely focus on insect percentage because they are the most species-diverse group on Earth and play an important role in ecosystems. More than a million different species of insects have been identified, making them the most diverse and numerous animal class. Insects, in their many forms, are crucial to a flourishing agricultural sector because they promote ecosystem health in many ways, including herbivory, decomposition, being prey, being predators, and serving as pollinators. The Insect class also includes the vast majority of the most problematic pests in agricultural settings. Finding out what kinds of insects live in a certain location requires conducting a survey of insect biodiversity. Insects can favorably influence ecosystems via prey-predator interaction, soil enrichment, and bio-indicative behaviors thus, maintaining biodiversity on agricultural land is crucial from both conservational and commercial viewpoints. Therefore, more morphological, phylogenetic, ecological, and biogeographical research is required to better categorize this group.

Key words: *Insects, Biodiversity, Species abundance*

Introduction

One of the most exciting parts of biology, biodiversity includes healthy, unaltered communities of plants and animals and the processes that shape them. It was stated that insects are a crucial cog in the machinery of ecosystems. One of contemporary ecology's greatest issues is determining the true breadth of insect diversity. More than 75% of all animal species are insects, and they play a crucial role in a wide range of natural processes that keep ecosystems functioning. As members of the food web, mediators of decomposition processes, and participants in a wide range of ecological interactions (including pollination, predation, and herbivory), insects play a crucial role in keeping ecosystems healthy.

The focus of this research is on the diversity and distribution of insects across the Durg district, particularly in the areas of Maroda Sector (Bhilai) and Katul Board (Durg).

There are currently 63,760 insects (Hexapoda) species recognized in taxonomy, divided among 658 families, 27 orders, and 3 classes; three of these classes are reported from India. Ninety-four percent of all insect species belong to just eight orders: Coleoptera, Lepidoptera, Orthoptera, Diptera, Hemiptera, Odonata, Hymenoptera, and Thysanoptera. Only 6% of species can be found in the remaining 21 orders (ZSI, 2012). From the silk trade to beekeeping and the pollination of most of our fruit and a variety of other agricultural produce, insects play critical economic roles, sustaining and providing livelihoods to a wide range of people. Insects' distinctive outlining and brilliantly patterned bodies have inspired significant works of art, literature, and culture, and function as excellent teaching aids (Pyle *et al.,* 1981).

Materials and Methods

The area selected for the study of Insect biodiversity were Maroda Sector (Bhilai) and Katul Board (Durg). The window of research for the collection of data, and its analysis was 15 days, i.e. from November 15th to November 30th, 2022. The study was done with the help of pictures (taken between 9 and 11 in the morning), a bug net, and a killing jar. The insect was recognized with the aid of available literature and subject matter experts.

Results and Discussion

Shannon's index is calculated to be 1.796. Insects of a similar variety were discovered at each site. Insect densities were highest in the locations surveyed (Fig. 1a and b). Seven hundred and twenty different insect specimens representing nine different orders were obtained for this investigation. They belong to the following orders: Diptera, Hymenoptera, Lepidoptera, Odonata, Orthoptera, Araneae, Coleoptera, Hemiptera, Phasmatodea, and Phasmatodea (Tables 1 & 2). According to the findings, Hymenoptera (92.89%) were the most common type of insects in the area surveyed, followed by Diptera (15.50%), Lepidoptera (34.27%), and Odonata (33.33%). Araneae, Hemiptera, and Phasmatodea, the three most uncommon insect orders, comprised less than 3% of all known insect species (Tables 1 & 2). Only 9 orders were found; nevertheless, one of those was the spatially rarest. A total of only four Araneae specimens (0.78%) were collected during this investigation (Table 1). The order Hymenoptera contains the most unique insect species in the survey area. This is because the majority of the green vegetation was in the survey area.

The survey region was found to have diverse and

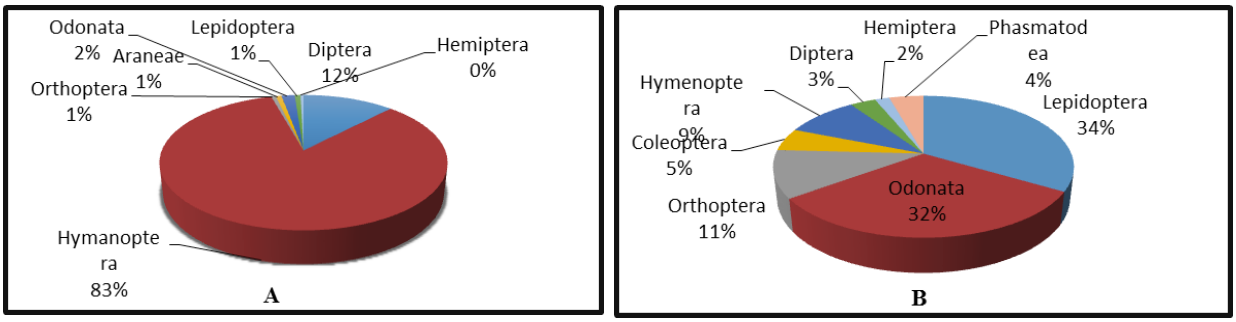

Fig. 1. Percentage (%) wise distribution of insects: (A) Maroda Sector (Bhilai) & (B) Katul Board (Durg)

Table 1. Number of insects and their Biodiversity in Durg

S. No.	Name of the insects	No. of Insects	Total No of Insects (n)	Insect Order	Percentage (%)	Relative abundance (Pi)	Ln (Pi)	Diversity index (H)
01	House fly	41	62	Diptera	12.20%	0.122	-2.103	0.256
02	Black soldier fly	02						
03	Mosquito	13						
04	Psychoda cinerea	04						
05	Psorophora ciliate	02						
06	Ant (small)	377	424	Hymenoptera	83.46%	0.834	-0.181	0.151
07	Carpenter ant	47						
08	Cricket	03	03	Orthoptera	0.59%	0.005	-5.298	0.031
09	Gray wall Jumper	02	04	Araneae	0.78%	0.007	-4.961	0.039
10	Adanson's House Jumper	02						
11	Dragan fly	09	09	Odonata	1.77%	0.017	-4.017	0.071
12	White peacock butterfly	02	04	Lepidoptera	0.78%	0.007	-4.961	0.039
13	Brown butterfly	02						
14	Green house whitefly	01	02	Hemiptera	0.39%	0.003	-5.809	0.022
15	True bug	01						
	Total Insects Recorded	**508**	**508**		**100%**			**0.61173**

Table 2. Number of insects and their Biodiversity in Bhilai

S. No.	Name of the Insects	No. of Insects	Total No of Insects (n)	Insect Order	Percentage (%)	Relative abundance (Pi)	Ln (Pi)	Diversity index (H)
1	Butterfly	14	71	Lepidoptera	33.49%	0.334	-1.096	0.367
2	Moths	57						
3	Dragon fly	67	67	Odonata	31.60 %	0.316	-1.152	0.364
4	Grass hopper	23	23	Orthoptera	10.84%	0.108	-2.225	0.241
5	Beetles	11	11	Coleoptera	05.18 %	0.051	-2.975	0.154
6	Ants	12	20	Hymenoptera	09.43%	0.094	-2.364	0.223
7	Wasps	08						
8	House Fly	04	07	Diptera	03.30%	0.033	-3.411	0.112
9	Fruit Fly	03						
10	Stink Bug	04	04	Hemiptera	01.88%	0.018	-4.017	0.075
11	Stick Insects	09	09	Phasmatodea	04.42 %	0.042	-3.170	0.134
	Total Insects Recorded	**212**	**212**		**100 %**			**1.673**

numerous insect fauna. Hymenoptera was the most prevalent insect order in this survey area. This is so due to the wide variety of plant life and animal habitats found throughout the region. The variety and quantity of insect species are influenced, though indirectly, by the diversity and richness of the surrounding plants. According to Belamkar *et al.* (2014); Sharma (2011), differences in vegetation structure between sites may be influencing insect diversity. There were also noticeable differences in the number of bug species and their abundance between the areas examined in this study. It has been found that low and high temperatures, rainfall, and vegetation cover all have an effect on insect population density (Singh, 2012; Patel, 2015). The survey areas varied topography, vegetation, and climate all have significant impacts on the range and frequency of insect species. As stated by Uniyal *et al.* (1998), these needs will include, at the very least, food and favorable weather conditions, and may also include protection from disturbance and predators.

We took a representative sample of the area over the course of 15 days at the beginning of winter. However, the monsoon season is ideal for studying insects. As a result, doing the study during the monsoon season and giving the researchers more time to collect data may result in greater bug diversity. The biodiversity and taxonomy of insects in this region can be used for any future researches in order to obtain more accurate and complete data for long-term preservation purposes.

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Conflict of interest

The authors has no conflicts of interest to declare. All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

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