UTTAR PRADESH JOURNAL OF ZOOLOGY

41(9): 123-127, 2020
ISSN: 0256-971X (P)

A PRELIMINARY STUDY OF DIVERSITY OF BUTTERFLIES AROUND GOVIND SAGAR LAKE IN DISTRICT UNA, HIMACHAL PRADESH

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Author DL designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author KS performed the collection of the specimens. Author VK managed the identification of specimens and literature searches. All authors read and approved the final manuscript.

Article Information

Editor(s):
(1) Dr. Telat Yanik, Professor, Atatürk University, Turkey.
Reviewers:
(1) Luis L. Vázquez, Instituto de Investigaciones de Sanidad Vegetal, Cuba.
(2) Felipe Francisco Barbosa, Federal University of Rio de Janeiro, Brazil.

Received: 22 May 2020
Accepted: 28 July 2020
Published: 31 July 2020

Short Research Article

ABSTRACT

Papilionoidea is a diverse insect group having economic, cultural and aesthetic values. Himachal Pradesh have varied climatic conditions ranging from tropical in Shivalik foothills to the arctic in the Trans-Himalayan region. These conditions are conducive for diversity of butterflies which further are good indicators of environment health. This preliminary study was conducted to explore butterfly fauna around Govind Sagar Lake in district Una, Himachal Pradesh from 2017-2018. A total of 25 butterfly species belonging to 17 genera and 5 families of order Lepidoptera namely Nymphalidae, Pieridae, Papilionidae, Lycaenidae and Hesperiidae were collected. Nymphalidae represented by 11 species was found to be most dominant followed by Pieridae (9 species), Papilionidae (3 species), Lycaenidae (1 species) and Hesperiidae (1 species). Representative percentage composition of these 5 families showed Nymphalidae constituting around (44%) of total butterfly fauna, followed by Pieridae (36%), Papilionidae (12%), Lycaenidae (4%) and Hesperiidae (4%). This is the first investigation to study the butterfly diversity, distribution and abundance from habitats around the lake in district Una.

Keywords: Lepidoptera; butterfly diversity; Govind Sagar Lake; Bhakra Dam; Himachal Pradesh.

1. INTRODUCTION

Papilionoidea (true butterflies) are distributed on every continent except Antarctica, commonly distinguished from moths by their diurnal activity and their clubbed antennae. Worldwide butterflies are estimated to be represented by around 28,000 species [1]. The Indian subcontinent bearing a diverse terrain,

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climate and vegetation hosts about 1,504 species of butterflies [2]. They play important roles in ecosystem, acting as pollinator, source of food for insectivorous birds and as an ecological indicator. Butterflies are sensitive to climate change and habitat loss, and their abundance or change in population dynamics could be good parameter to study environment health [3]. Butterflies being indicators are also used to identify ecologically important landscapes for conservation purpose [4].

Butterflies are distributed in every suitable environment, ranging from forests to deserts and plains to valleys and hills [5]. Himachal Pradesh is spread from Shivalik foothills to arctic biomes at higher altitudes of Trans-Himalayan mountains. The distribution of butterfly species is influenced by vegetation nature, habitat diversity and other ecological interactions in these habitats [6,7]. Butterflies are established as indicator species as they are highly sensitive to change in environment and anthropogenic impact [8], thus fluctuation in butterfly population dynamics is indication of disturbance of habitat conditions [9,10]. Govind Sagar Lake is a large manmade lake formed as a result of the world-famous Bhakra Dam on the river Sutlej. This is world's highest gravity dam, its reservoir being 90 km long and encompassing an area of approximately 170 sq. km have small part spread in district Una of Himachal Pradesh. The habitats around lake has registered anthropogenic interference due to attraction of tourists and our study would be helpful for future assessment of these habitats. This is preliminary study to explore diversity and distribution of butterfly from habitats around Govind Sagar Lake in Una, during July 2017-June 2018, however some workers have reported butterfly diversity from neighbouring habitats [11,12,13,14].

2. MATERIALS AND METHODS

2.1 Study Area

The present study is based around Govind Sagar Lake in Una, Himachal Pradesh. Four representative sites were chosen for collection namely 1) Lathiani (31.31N,76.24E) 2) Kodra (31.28N,76.27E) 3) Mandli (31.30N,76.23E) and 4) Raipur (31.29N,76.24E) (Fig. 1). This district is located in south-western Himachal in the outer Himalayas.

2.2 Methods

The collection was done from months of July2017-June2018 covering a year. Collection was done twice a month and visits to all the sites were all at random without fixed date schedule. The butterflies were collected with an insect net (length 30'' diameter 12'') by sweeping method. Collected adults were fixed in killing bottles by using Ethyl acetate. The specimens were stretched and preserved in fumigated insect box following Arora (1990). Not all species were captured and few of them were photographed. Identification of butterflies was done with the help of relevant literature [11,12,13,14,15,16,17,18,19].

3. RESULTS

In the present study, 25 butterfly species belonging to 5 families and 17 genera have been recorded (Table 1). Butterfly larvae may be acting as agricultural pest but we did not come across such data from the previous studies in region. The family Nymphalidae appears to be most species rich (n=11, 44%) in 8 genera, followed by family Pieridae (n= 9, 36%) with 6 genera, family Papilionidae (n=3, 12%) with 1 genus and with lowest species richness family Lycaenidae (n= 1, 4%) and Hesperiidae (n= 1, 4%), (Fig. 2). This is the first study from habitats around Govind Sagar Lake, Una.

Fig. 1. Map of Govind Sagar showing collection sites (marked orange) for current study

Table 1. A checklist of butterflies from habitats around Govind Sagar Lake, District Una, Himachal Pradesh recorded during July 2017- June 2018

Serial number	Scientific name	Common name	Family
1.	*Catopsilia pomona* (Fabricius, 1775)	Common Emigrant	Pieridae
2.	*Cepora nerissa* (Fabricius, 1775)	Common Gull	Pieridae
3.	*Colias fieldii* (Menetries, 1855)	Dark Clouded Yellow	Pieridae
4.	*Danaus chrysippus* (Linnaeus, 1758)	Plain Tiger	Nymphalidae
5.	*Delias eucharis* (Drury, 1773)	Common Jezabel	Pieridae
6.	*Euploea core* (Cramer, 1780)	Common Crow	Nymphalidae
7.	*Eurema andersoni* (Moore, 1886)	One Spot Grass Yellow	Pieridae
8.	*Eurema blanda* (Boisduval, 1836)	Three Spot Grass Yellow	Pieridae
9.	*Eurema hecabe* (Linnaeus, 1758)	Common Grass Yellow	Pieridae
10.	*Junonia almana* (Linnaeus, 1758)	Peacock Pansy	Nymphalidae
11.	*Junonia hierta* (Fabricius, 1798)	Yellow Pansy	Nymphalidae
12.	*Junonia lemonias* (Linnaeus, 1758)	Lemon Pansy	Nymphalidae
13.	*Junonia orithya* (Linnaeus, 1758)	Blue Pansy	Nymphalidae
14.	*Neptis hylas* (Linnaeus, 1758)	Common Sailer	Nymphalidae
15.	*Papilio demoleus* (Linnaeus, 1758)	Lime	Papilionidae
16.	*Papilio machaon* (Linnaeus, 1758)	Common Yellow Swallowtail	Papilionidae
17.	*Papilio polytes* (Linnaeus, 1758)	Common Mormon	Papilionidae
18.	*Phalanta phalantha* (Drury, 1773)	Common Leopard	Nymphalidae
19.	*Pieris brassicae* (Linnaeus, 1758)	Large Cabbage White	Pieridae
20.	*Pieris canadia* (Linnaeus, 1768)	Indian Cabbage White	Pieridae
21.	*Polyura athamas* (Drury, 1773)	Common Nawab	Nymphalidae
22.	*Pseudozizeeria maha* (Kollar, 1844)	Pale Grass Blue	Lycaenidae
23.	*Symbrenthia lilaea* (Hewitson, 1864)	Common Jester	Nymphalidae
24.	*Udaspes folus* (Cramer, 1775)	Grass Demon	Hesperiidae
25.	*Ypthima huebneri* (Kirby, 1871)	Common Fourring	Nymphalidae

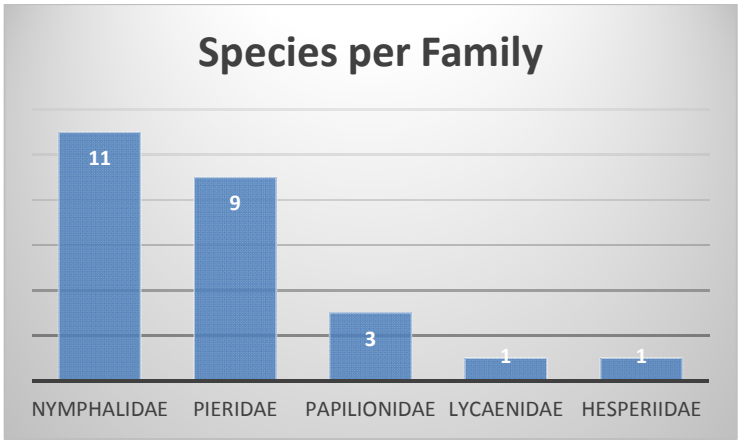

Fig. 2. Species per butterfly family

4. DISCUSSION AND CONCLUSION

Current study reveals butterfly diversity to be low in comparison to previous study from neighbouring districts [13], however previous reports from this region for comparison are not available. Chandel et al. [13] in a recent study from neighbouring district, have shown species richness to be highest for Nymphalidae followed by Papilionidae, Pieridae, Lycaenidae and Hesperiidae. Butterfly species distribution in a definite area is mainly based on the diversity of plants, habitats, topography, climate and anthropogenic impact [2,20,21]. Anthropogenic interference in area under investigation could be the reason underlying lower butterfly diversity, however to make elaborate comparisons of butterfly diversity continuous surveys and monitoring of this area are suggested. Many workers have reported butterfly faunal diversity from other regions of Himachal Pradesh [11,12,13,14,22,23]. Our study being the first from this area could prove informative for any future documentation on butterfly diversity studies.

ACKNOWLEDGEMENTS

Authors are thankful to D.A.V. College Management Committee for providing resources for carrying out this research work.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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