



Diversity of Butterfly in Tarai Region of Kumaon Zone, India

Bharati^{1*}, Rajkumar Singh² and Shankar Kumar³

¹SSJDVSSS GPGC, Ranikhet, Almora, India

²Department of Zoology, Lal Bhadur Shastri GPGC, Halduchaur, Nainital, India

³Department of Mathematics, SSJDVSSS GPGC, Ranikhet, Almora, India
bharti.singh4548@gmail.com

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Abstract

Butterflies belong to the class *Lepidoptera*, which is the second largest order of class insect. Butterflies are one of the most important species of earth's biodiversity due to its immense role in food chain, indicator of healthy ecosystem, and as pollinator. India is home of 1504 species of butterflies. Due to human activities Tarai region is diversified in term of flora dominantly such as *Triticum aestivum*, *Oryza sativa*, *Musa acuminata*, *Magifera indica*, *Trifolium alexandrinum*, Brassica family, Citrus family, *Sal robusta*. Butterflies are also indicator of climatic and ecological changes hence butterflies are now studied as Bio indicator of healthy ecosystem. The purpose of the study was to describe diversity of butterfly in tarai region of kumaon zone.

Keywords: Butterfly, Diversity, Lepidoptera, Kumaon zone, Tarai region.

Introduction

Butterflies belong to the class *Lepidoptera*, which is the second largest order of class insect. Butterflies are one of the most important species of earth's biodiversity. Tarai region of kumaon zone is one of the diversified areas of kumaon zone. Due to human activities Tarai region is diversified in term of flora dominantly such as *Triticum aestivum*, *Oryza sativa*, *Musa acuminata*, *Magifera indica*, *Trifolium alexandrinum*, Brassica family, Citrus family, *Sal robusta* etc. Butterflies are interlinked with host plant¹. Abundance of Butterflies indicates diversified fauna. Butterflies play major role in environment as pollinators, about 80% pollination is done by butterfly. This transportation of pollen induces genetic variation in plant species and gives better chance at survival against different diseases².

Increased butterfly populations may indicate an increase in plant diversity too. Due to sensitivity to variable environmental condition, they are also known for indicate healthy ecosystem. As a wildlife indicator, butterflies tell us almost everything we need to know about the health of an ecosystem². In ecosystem, plant and animal species live in sites with similar combinations of soil, topography, climate and geography². Butterflies also called flagship species because of its effect on others animals. The aim of the work is to explore the diversity of butterfly in Tarai region of kumaon zone (Uttarakhand).

Materials and Methods

Study area: The present work was conducted in tarai region of kumaon zone. The latitude of Tarai region of kumaon zone is 29.201491° N and the 79.196732° E longitude. Tarai region of kumaon zone diversified plant region.

It was located at the lowland region in southern Nepal and northern India that lies south of the outer foothills of the Himalayas, the siwalik hills, and north of the Indo-Gangetic plain. The different dominantly vegetation such as *Triticum aestivum*, *Oryza sativa*, *Musa acuminata*, *Magifera indica*, *Trifolium alexandrinum*, Brassica family, Citrus family, *Sal robusta*.

Sampling method: Random survey has been done in March (2022) to July (2024). The point and line transect method was used for butterflies observation. Observation was done randomly in every month. All transect were observed between 10:00am to 2:00 pm.

Morphological character observed for identify butterfly species such as colour pattern, and size, were considered in identification of species of butterflies. Photos of butterflies were taken by using Canon EOS 200DII camera and identification was done as suggested by Kehimkar^{3,4}, Singh A.P.⁵ and Sondhi, S. & K. Kunte⁶. No samples were collected during this study.

Data analysis: Shannon-Wiener diversity Index.

The species diversity was calculated using Shannon Wiener Index (H)

$$H(S) = -\sum_{p=1}^S pI \log pI$$

Where: pI = fraction of total population made up of species I, S= total number of species encountered, p = proportion of species.

Results and Discussion

A total of 313 individuals of 40 species of butterflies belonging to five families were recorded during the study period. Out of these, 12 species (30% of total species) belonged to the families Pieridae and 7 species (17.5 % of total species) to Lycaenidae, 17 species (42.5% of total species) to Nymphalidae, 2 species

(5% of total species) to Papilionidae and 2 species (5% of total species) to family Hesperidae, (Figure-1, Table-1). Shannon-Wiener diversity Index of -1.323 indicates the medium butterfly diversity in Tarai region of Kumaon zone. Maximum abundance of species was observed of Nymphalidae followed by Pieridae, Lycaenidae, Papilionidae, Hesperidae.

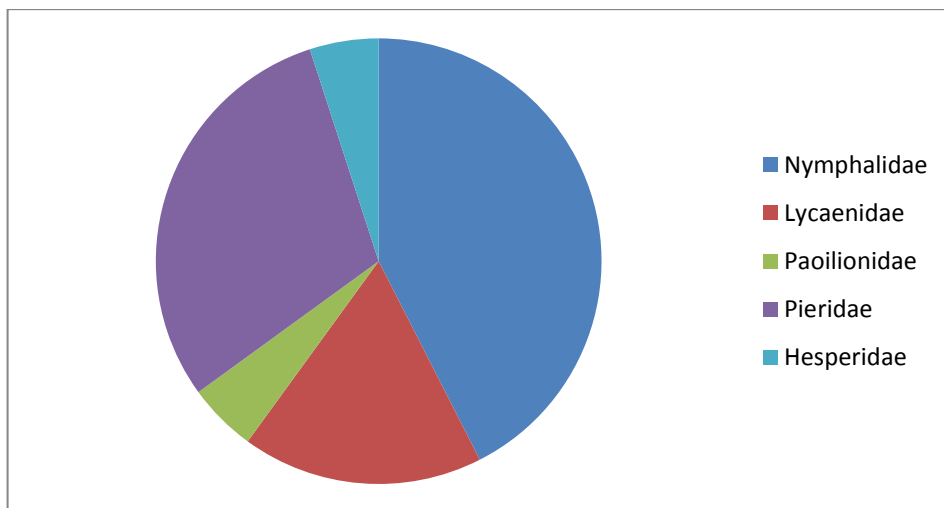


Figure-1: Pie chart of Butterfly families were observed in Tarai region of kumaon zone.

Table-1: Percent distribution of relative number of individuals and species of different families of butterfly observed during work.

Family	Total no. of species	% of species	Total no. of individual	% of individual
Pieridae	12	30%	85	27.15%
Lycaenidae	7	17.5%	60	19.16%
Nymphalidae	17	42.5%	98	31.30%
Papilionidae	2	5%	40	12.77%
Hesperidae	2	5%	30	9.58%
total	40	100%	313	99.96%

Table-2: Shannon-Wiener Diversity indices of butterfly diversity in Tarai region of kumaon zone.

Species	No. of species (p)	pI	ln(pI)	Pi*ln(pI)
Pieridae	12	0.3	-1.20	-0.36
Lycaenidae	7	0.175	-1.74	-0.304
Nymphalidae	17	0.425	-0.85	-0.361
Papilionidae	2	0.05	-2.99	-0.149
Hesperidae	2	0.05	-2.99	-0.149
	40			-1.323

Table-3: Diversity indices of butterfly in Tarai region of kumaon zone.

No. of species	Diversity indices
No. of species	40
No. of individuals	313
Abundance	313
Shanon diversity index	-1.323

Table-4: Checklist of butterflies found in Tarai region of kumaon zone.

Scientific Name	Family	Common Name
<i>Junonia lemonias</i>	Nymphalidae	Lemon Pansy
<i>Junonia orithya</i>	Nymphalidae	Blue Pansy
<i>Junonia almana</i>	Nymphalidae	Peacock Pansy
<i>Euthelia aconthea</i>	Nymphalidae	Common baron
<i>Hypolimnas bolina</i>	Nymphalidae	Common eggfly
<i>Neptis hylas</i>	Nymphalidae	Common Sailer
<i>Vanessa caschmirensis</i>	Nymphalidae	Indian tortoiseshell
<i>Junonia iphita</i>	Nymphalidae	Chocolate pansy
<i>Phalantha phalantha</i>	Nymphalidae	Common Leopard
<i>Vanessa cardui</i>	Nymphalidae	Painted lady
<i>Junonia iphita</i>	Nymphalidae	Blue Tiger
<i>Danaus chrysippus</i>	Nymphalidae	Plain Tiger
<i>Danaus genutia</i>	Nymphalidae	Stripped Tiger
<i>Euploea core</i>	Nymphalidae	Common Indian Crow
<i>Melanitis leda</i>	Nymphalidae	Common evening brown
<i>Catopsilia pyranthe</i>	Pieridae	Mottled Emigrant
<i>Leptosia nina</i>	Pieridae	Psyche
<i>Belenois aurota</i>	Pieridae	Pioneer
<i>Delias eucharis</i>	Pieridae	Common Jezebel
<i>Erionota thrax</i>	Hesperiidae	Banana skipper
<i>Cepora nerissa</i>	Pieridae	Common gull
<i>Parnara spp.</i>	Hesperiidae	Parnara Swift
<i>Pieris brassicae</i>	Pieridae	Large cabbage white
<i>Pieris canidia</i>	Pieridae	Indian Cabbage White
<i>Eurema laeta</i>	Pieridae	Spotless grass yellow
<i>Eurema hecabe</i>	Pieridae	Common Grass Yellow

<i>Eurema Blanda</i>	Pieridae	Three Spot Grass Yellow
<i>Junonia atlites</i>	Nymphalidae	Grey pansy
<i>Pareronia hippia</i>	Pieridae	Indian Wanderer
<i>Ariadne merione</i>	Nymphalidae	Common castor
<i>Eurema brigitta</i>	Pieridae	Small grass yellow
<i>Papilio polytes romulus</i>	Papilionidae	Common Mormon
<i>Papilio demoleus</i>	Papilionidae	Common Lime
<i>Poritia hewitsoni</i>	Lycaenidae	Common gem
<i>Catochrysops strabo</i>	Lycaenidae	Forget-me-not
<i>Lampides boeticus</i>	Lycaenidae	Pea blue
<i>Pseudozizeeria maha</i>	Lycaenidae	Pale grass blue
<i>Jamides celeno</i>	Lycaenidae	Common Cerulean
<i>Neopithecops zalmora</i>	Lycaenidae	Quaker
<i>Castalius rosimon</i>	Lycaenidae	Common Pierrot

Conclusion

Butterflies are now studied as living component to ecosystem, because these are indicator of healthy ecosystem. Result shows medium diversity of butterfly found in Tarai region of Kumaon zone. Maximum abundance of species was observed of Nymphalidae followed by Pieridae, Lycaenidae, Papilionidae, Hesperidae.

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