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Gunjan

PG Student Department of
Zoology, Abhilashi University,
Chail Chowk, Mandi, Himachal
Pradesh, India

Harshlata

Assistant Professor Department
of Zoology, Abhilashi University,
Chail Chowk, Mandi, Himachal
Pradesh, India

Vijay Bharti

Assistant Professor Department
of Zoology, Abhilashi University,
Chail Chowk, Mandi, Himachal
Pradesh, India

Dr. Neetu Sharma

Associate Professor Department
of Zoology, Abhilashi University,
Chail Chowk, Mandi, Himachal
Pradesh, India

Butterfly Biodiversity (Nougraun village, Chail Chowk, Mandi, H.P.)

Gunjan, Harshlata, Vijay Bharti and Dr. Neetu Sharma

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Abstract

The present study was conducted in Chail chowk of Distt. Mandi (Himachal Pradesh) to observe various insect species found in the village. Chail chowk, which lies near the Shikari Devi wildlife sanctuary, has a suitable climatic condition and weather that support great diversity of insect's species. During the present study, 46 species of butterflies belonging to 5 families are recorded. The most abundant family is Nymphalidae followed by Pieridae, Papilionidae, Lycaenidae and Hesperidae. Analysis of these species for abundance revealed that 26 species belongs to the family Nymphalidae, family Pieridae represents 9 species, family Papilionidae represents 4 species, family Lycaenidae represents 4 species and family Hesperidae represents 3 species. The percentage composition of species is maximum in Nymphalidae (58%) followed by Pieridae (18%), Papilionidae (9%), Lycaenidae (9%) and Hesperidae (6%). Butterflies are found in a wide range of environments and perform a variety of vital ecological services. They can be used as biological control agents to eradicate natural pests in agricultural settings. Butterflies act as predators, hunting, attacking, killing, and eating hazardous species. Beneficial insects aid in the maintenance of a healthy, well-functioning biological system. Presence of butterflies in environment is important in order to make an ecological balance. As butterflies are very important part of our ecosystem and a few records are studied in Chail chowk village, hence an effort is made to record the diversity of insects in the Chail chowk village. This paper provides a checklist of various butterfly species found in Chail chowk village.

Keywords: Biodiversity, Lepidoptera, butterflies, species, Chail Chowk, and Himachal Pradesh.

Introduction

Butterflies come under the order Lepidoptera^[19]. Butterfly fauna is the best indicator in insects because it is abundant, its generation is brief, it moves well, and it is highly sensitive to environmental changes^[14]. Butterflies and moths have similar anatomy and suck nectar with long proboscis. However, they differ in the amount of time they spend flying around in quest of food. Butterflies eat throughout the day, while moths eat at night and at dusk. The flowers visited by these two types of insects are noticeably different in colour due to the change in feeding period. Butterfly visitors are often brightly coloured, but moth visitors are frequently whitish. There are some characteristics that are possessed^[14].

Butterflies are best known insects and they recognized by their physical appearance, their dazzling colours, wonderful shape and dignified flight give satisfaction to everyone^[13]. Butterflies are considered as flagship species and they are beautiful and most tantalizing creatures, among the Arthropod group. Butterflies are considered as very astute to the factors that affects the environment including temperature, solar radiation, humidity, air temperature, rainfall, wind speed and are the most valuable to the availability of larval host plant^[5]. Order Lepidoptera is the third largest insect order, among all the insects. In India, there are 1502 species of butterflies were documented, while in Himachal Pradesh only 288 species have been reported^[2]. There are more than 28,000 species of butterflies studied worldwide. They help in the pollination of plants, maintain nutrients cycle, disperse seeds, maintain the structure and fertility of soil, control the population of other organisms, and act as a major food source for other fauna. In comparison with their attractiveness, butterflies can also use to monitor environmental conditions^[11]. Butterflies are taken into consideration as good bioindicators of environmental health. Butterflies have always captivated everyone with their admirable color, exquisiteness and intricacy. To support various kinds of ecosystem services for the human well-being, conservation of butterflies is important^[17].

Corresponding Author:**Gunjan**

PG Student Department of
Zoology, Abhilashi University,
Chail Chowk, Mandi, Himachal
Pradesh, India

Life cycle of butterflies is divided into four stages that are egg, caterpillar or larvae, the pupa or chrysalis, and adult. They are holometabolous and have camouflage activity. Due to their diurnal habitats they are best known insects and they recognized by their physical appearance, their dazzling colours, wonderful shape and dignified flight give satisfaction to everyone [13]. Butterfly species have fascinating life cycles that often align with seasonality. As temperature rise and rainfall increases, these environmental cues signal resources availability. However, human made forest edges disrupt the delicate balance by altering microclimatic conditions. This disruption can jeopardize the synchrony between insects and the optimal conditions necessary for their emergence, which contrasts with the natural ecotones where such synchrony is maintained [16].

For the survival and reproduction of both larvae and adults, herbs play important role and also provide them shelter. On the basis of availability of plant resources and habitat quality butterflies are largely dependent on that [28]. The proper management of agroecosystem also helps in the conservation of butterflies and other species present in biodiversity [3]. Particular type of habitat is followed by the most of the butterflies and maximum butterflies are seasonal. They also help in the maintenance of food chain with respect to birds and other predatory animals [23]. Deforestation, industrialization, habitat destruction for urbanization, and agricultural activities are responsible for the decline of butterflies population, because of these activities the change occurs in the environmental conditions like humidity, rainfall, and temperature. These changes in environment and unfavorable condition of weather can affect the suitability of habitat and that leading to the extinction of butterflies. These conditions create threats to the butterflies survival in worldwide [18]. Global human population size is increases due to this the anthropogenic changes have an influence on butterflies in which butterflies depends through the loss of plant species, and direct the loss of habitat are the main reasons. They are very sensitized to climate breakdown [22].

Some analysis shows direct negative effects on the biodiversity because the intensification of agricultural activities. These activities also reduces the landscape permeability and vanishing of small-scale habitats for most of the species [9]. For the conservation of biodiversity, it is necessary to know and understand, why and how species differ in their response to landscape structure. On the different spatial scales the processes that influence the species distribution [1]. Persistence of most grassland butterflies is increases with the high cover of forest, and for dispersal they provide important corridors [27]. Between the total butterfly species richness and the proportion of forest there is a positive correlation [15]. The climatic change as well as negative impacts of monotonisation and eutrophication of the landscape, independently from the management concepts are affecting all the habitats [8]. Consistent global warming increasing evidence of distribution pattern of butterfly species throughout the earth. Relationships between habitat and butterfly diversity as well on record from different parts of the Indian subcontinent [20].

Any research efforts that target the conservation of butterfly species will automatically save many other species in the area. To protect this flagship group from further population declines, and potential species extinctions studies examining their diversity, habitat sustainability, and nectar plant choices are necessary [31]. For the conservation of butterfly we need to

understand the factors which affect the loss of biodiversity, emergence, maintenance is important for implement and evidence based conservation for protection measures and prioritization the conservation [4].

Materials and Methods

Study area

The current study focuses on the butterfly richness in Nougraun village, Chail Chowk which comes under Chachyot tehsil of Mandi district in Himachal Pradesh, India. It is situated 34km away from district headquarter. Geographically it has an area of 200.45 hectares of landmass. Himachal Pradesh situated between 32° 22'40 to 33° 12'40 North latitude and 75° 47'55 to 79° 04'22 East longitude. Altitude ranging from 350m to 6,975m above the mean sea level according to Surveyor General of India the state occupied 55,673 square km of area. Mandi is located in 31°72' North latitude and 76°92' East longitude. Elevation of 764 meters and 2,507 feet. Chail chowk is a village located in the Chachyot Valley, Mandi district of Himachal Pradesh, India. Latitude is 31.72355 North, and Longitude is 77.66765 East, and Altitude is of 1278.00m/ 4192.91 feet. Climatic condition differ in thus area is due to their extreme variation in the altitude. Chail Chowk lies on the midlands of the Himalayan Range.

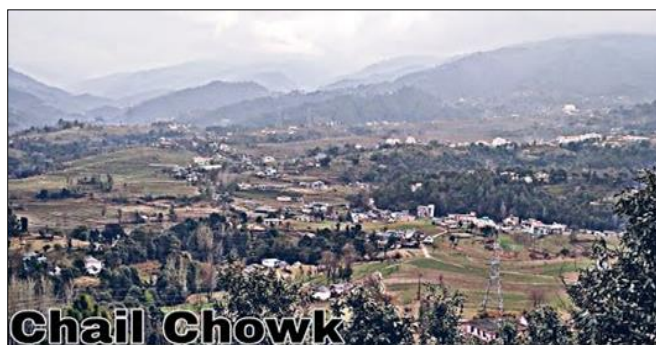


Fig 1: Collection site Nougraun village, Chail Chowk, Mandi hills of Himachal Pradesh considered during the present study.

Methodology

Likewise s study was conducted from February to April 2024 in Nougraun village, Chail Chowk and the available butterfly was documented. During the field visit many species of butterflies were found and photography has been done by using a simple mobile camera which ranges from 50MP, f/1.8, 26mm (wide), PDAF, 8MP, 119°, (ultrawide). Butterflies were recognized from images taken during the field work. An insect net was used in order to collect butterflies by Sweeping method. Butterflies were removed gently after became enclosed in the bag by a rapid twist of the handle. The collected specimens were killed with the help of killing bottle. In this technique, cotton soaked with ethyl acetate was kept at the base of glass jar. In laboratory, butterflies were put in a relaxing chamber. All the specimens of butterflies were pinned with white Nickel plated pins. The dried specimens were transferred to air tight insect boxes containing powdered naphthalene.

Identification of butterflies

The identification of the material has been made on the basis of morphological characters such as wing maculation, legs, dry examination of wing venation and wing shape etc. All scientific names are consistent with the [30] catalogue. Some

species of butterflies were identified from relevant literature [7, 6, 32, 10, 21, 26, 29, 12, 24, 25].

Observations

Images of different species of butterfly observed in naugraun village chail chowk (Study Area).



I.
Scientific Name: *Neptis sappho*
Common Name: Common glider
Family: Nymphalidae



II.
Scientific Name: *Pieris canidia*
Common Name: Cabbage white
Family: Pieridae



III.
Scientific Name: *Minois dryas*
Common Name: Dryad
Family: Nymphalidae



IV.
Scientific Name: *Junonia oenone*
Common Name: Blue pansy
Family: Nymphalidae



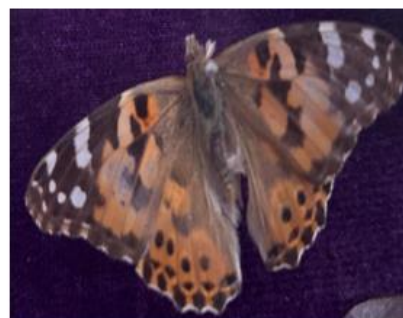
V.
Scientific Name: *Colias eurytheme*
Common Name: Orange sulphur
Family: Pieridae



VI.
Scientific Name: *Neptis hylas*
Common Name: Common sailor
Family: Nymphalidae



VII.
Scientific Name: *Gonepteryx rhamni*
Common Name: Common brimstone
Family: Pieridae



VIII.
Scientific Name: *Vanessa cardui*
Common Name: Painted lady
Family: Nymphalidae



IX.
Scientific Name: *Kaniska canace*
Common Name: Blue admiral
Family: Nymphalidae



X.
Scientific Name: *Phalanta phalantha*
Common Name: Spotted rustic
Family: Nymphalidae



XI.
Scientific Name: *Celastrina argiolus*
Common Name: Holly blue
Famili: Lycaenidae



XII.
Scientific Name: *Aglais urticae*
Common Name: Small tortoiseshell
Family: Nymphalidae



XIII.
Scientific Name: *Pieris oleracea*
Common Name: Mustard white
Family: Pieridae



XIV.
Scientific Name: *Stibochiona nicea*
Common Name: Popinjay
Family: Nymphalidae



XV.
Scientific Name: *Papilio paris*
Common Name: Paris peacock
Family: Papilionidae



XVI.
Scientific Name: *Pieris brassicae*
Common Name: Large cabbage white
Family: Pieridae



XVII.
Scientific Name: *Junonia genoveva*
Common Name: Mangroove buckeye
Family: Nymphalidae



XVIII.
Scientific Name: *Tagiades japetus*
Common Name: Pied flat
Family: Hesperidae



XIX.
Scientific Name: *Acraea issoria*
Common Name: Yellow coster
Family: Nymphalidae



XX.
Scientific Name: *Phoebis sennae*
Common Name: Cloudless sulphur
Family: Pieridae



XXI.
Scientific Name: *Vanessa indica*
Common Name: Indian red admiral
Family: Nymphalidae



XXII.
Scientific Name: *Pieris rapae*
Common Name: Small cabbage white
Family: Pieridae



XXIII.
Scientific Name: *Sephisia Chandra*
Common Name: Eastern courtier
Family: Nymphalidae



XXIV.
Scientific Name: *Lasiommata maera*
Common Name: Large wall brown
Family: Nymphalidae



XXV.
Scientific Name: *Acytolepis puspa*
Common Name: Common hedge blue
Family: Lycaenidae



XXVI.
Scientific Name: *Cyrestis cocles*
Common Name: Marbled map
Family: Nymphalidae



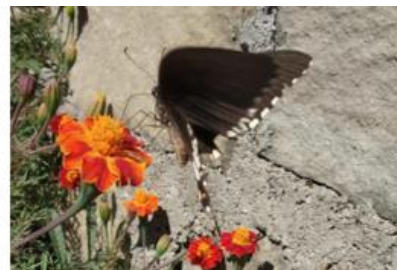
XXVII.
Scientific Name: *Vindula arsinoe*
Common Name: Cruiser
Family: Nymphalidae



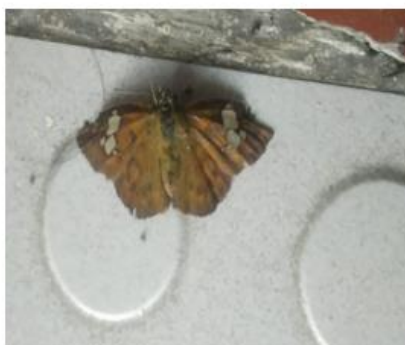
XXVIII.
Scientific Name: *Junonia hedonia*
Common Name: Brown pansy
Family: Nymphalidae



XXIX.
Scientific Name: *Neptis jumbah*
Common Name: Chestnut streaked sailer
Family: Nymphalidae



XXX.
Scientific Name: *Papilio polytes*
Common Name: Common mormon
Family: Papilionidae



XXXI.
Scientific Name: *Pyrginae*
Common Name: Spread winged skippers
Family: Hesperidae



XXXII.
Scientific Name: *Euthalia aconthea*
Common Name: Common baron
Family: Nymphalidae



XXXIII.
Scientific Name: *Actinote anteus*
Common Name: Common actinote
Family: Nymphalidae



XXXIV.
Scientific Name: *Euploea midamus*
Common Name: Blue spotted crow
Family: Nymphalidae



XXXV.
Scientific Name: *Tanaecia jahnu*
Common Name: Darjeeling plain earl
Family: Nymphalidae



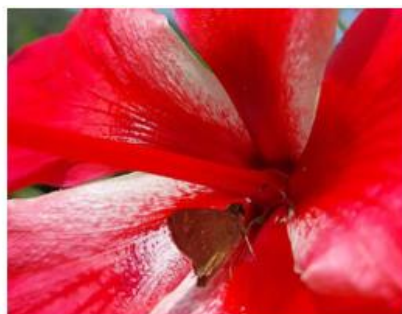
XXXVI.
Scientific Name: *Junonia iphita*
Common Name: Chocolate soldier
Family: Nymphalidae



XXXVII.
Scientific Name: *Neptis columella*
Common Name: Short banded sailer
Family: Nymphalidae



XXXVIII.
Scientific Name: *Aporia crataegi*
Common Name: Black veined white
Family: Pieridae



XXXIX.
Scientific Name: *Lerema accius*
Common Name: Clouded skipper
Family: Hesperidae



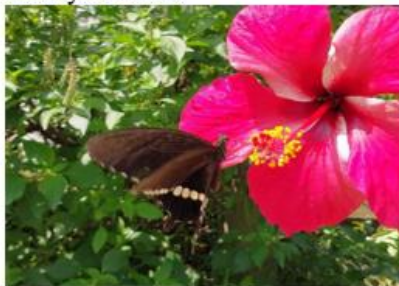
XL.
Scientific Name: *Papilio clytia*
Common Name: Common mime
Family: Papilionidae



XXI.
Scientific Name : *Colias philodice*
Common Name: Clouded sulphur
Family: Pieridae



XXII.
Scientific Name: *Arhopala phryxus*
Common Name: Oakblues
Family: Lycaenidae



XLIII.
Scientific Name: *Papilio helenus*
Common Name: Red helen
Family: Papilionidae



XLIV.
Scientific Name: *Vegrans egista*
Common Name: Cramer
Family: Nymphalidae



XLV.
Scientific Name: *Talicauda nyseus*
Common Name: Red pierrot
Family: Lycaenidae



XLVI.
Scientific Name: *Danaus chrysippus*
Common Name: Plain tiger
Family: Nymphalidae



XLVII.
Scientific Name: *Pieris cheiranthi*
Common Name: Canary island large white
Family: Pieridae

Results

In this study, total 47 species were identified belonging to the five different families from Nougtraun village, Chail Chowk, Mandi distt. (H.P.). Photographs of butterflies were taken

during the field work are shown in Fig-1. The most diverse family of butterfly was found to be Nymphalidae with 26 species, followed by family Pieridae with 10 species, family Papilionidae with 4 species, family Lycaenidae also with 4

species, and the least diversity of butterfly was observed from family Hesperidae with 3 species. The present study clearly demonstrate that family Nymphalidae were the most diverse butterflies in fields of Nougaur village, Chail Chowk area of Mandi distt. H.P. The large body of butterflies aids the

sticking of pollen to the legs and proboscis, when they visit flowers for nectar. The pollen sheds during their visit to another flower and falls in the pistil. Thus, it ensures effective pollen transfer during each visit. This makes butterflies very effective pollinator of crops.

Table 1: Checklist of Butterfly fauna of family Nymphalidae along with their Scientific name, Common name in Nougaur village, Chail Chowk of Mandi Dist (H.P.).

Sr. No.	Scientific Name	Common Name	Family
I.	<i>Neptis sappho</i>	Common glider	Nymphalidae
II.	<i>Minois dryas</i>	Dryad	Nymphalidae
III.	<i>Junonia oenone</i>	Blue pansy	Nymphalidae
IV.	<i>Neptis hylas</i>	Common sailor	Nymphalidae
V.	<i>Vanessa cardui</i>	Painted lady	Nymphalidae
VI.	<i>Kaniska canace</i>	Blue admiral	Nymphalidae
VII.	<i>Phalanta phalantha</i>	Spotted rustic	Nymphalidae
VIII.	<i>Aglaia urticae</i>	Small tortoiseshell	Nymphalidae
IX.	<i>Stibochiona nicea</i>	Popinjay	Nymphalidae
X.	<i>Junonia genoveva</i>	Mangrove buckeye	Nymphalidae
XI.	<i>Acraea issoria</i>	Yellow coster	Nymphalidae
XII.	<i>Vanessa indica</i>	Indian red admiral	Nymphalidae
XIII.	<i>Sephisia Chandra</i>	Eastern courtier	Nymphalidae
XIV.	<i>Lasioommata maera</i>	Large wall brown	Nymphalidae
XV.	<i>Cyrestis cocles</i>	Marbled map	Nymphalidae
XVI.	<i>Vindula arsinoe</i>	Crusier	Nymphalidae
XVII.	<i>Junonia hedonia</i>	Brown pansy	Nymphalidae
XVIII.	<i>Neptis jumbah</i>	Chestnut streaked sailer	Nymphalidae
XIX.	<i>Euthalia aconthea</i>	Common baron	Nymphalidae
XX.	<i>Actinote antea</i>	Common actinote	Nymphalidae
XXI.	<i>Euploea midamus</i>	Blue spotted crow	Nymphalidae
XXII.	<i>Tanaecia jahnu</i>	Darjeeling plain earl	Nymphalidae
XXIII.	<i>Junonia iphita</i>	Chocolate soldier	Nymphalidae
XXIV.	<i>Neptis columella</i>	Short banded sailer	Nymphalidae
XXV.	<i>Vegrans egista</i>	Cramer	Nymphalidae
XXVI.	<i>Danaus chrysippus</i>	Plain tiger	Nymphalidae

Table 2: Checklist of Butterfly fauna of family Pieridae along with their Scientific name, Common name in Nougaur village, Chail Chowk of Mandi Dist (H.P.).

I.	<i>Pieris canidia</i>	Cabbage white	Pieridae
II.	<i>Colias eurytheme</i>	Orange sulphur	Pieridae
III.	<i>Gonepteryx rhamni</i>	Common brimstone	Pieridae
IV.	<i>Pieris oleracea</i>	Mustard white	Pieridae
V.	<i>Pieris brassicae</i>	Large cabbage white	Pieridae
VI.	<i>Phoebis sennae</i>	Cloudless sulphur	Pieridae
VII.	<i>Aporia crataegi</i>	Black veined white	Pieridae
VIII.	<i>Pieris rapae</i>	Small cabbage white	Pieridae
IX.	<i>Colias philodice</i>	Clouded sulphur	Pieridae
X.	<i>Pieris cheiranthi</i>	Canary island large white	Pieridae

Table 3: Checklist of Butterfly fauna of family Papilionidae along with their Scientific name, Common name in Nougaur village, Chail Chowk of Mandi Dist (H.P.).

I.	<i>Papilio paris</i>	Paris peacock	Papilionidae
II.	<i>Papilio polytes</i>	Common mormon	Papilionidae
III.	<i>Papilio clytia</i>	Common mime	Papilionidae
IV.	<i>Papilio helenus</i>	Red helen	Papilionidae

Table 3: Checklist of Butterfly fauna of family Lycaenidae along with their Scientific name, Common name in Nougaur village, Chail Chowk of Mandi Dist (H.P.).

I.	<i>Acytolepis puspa</i>	Common hedge blue	Lycaenidae
II.	<i>Celastrina argiolus</i>	Holly blue	Lycaenidae
III.	<i>Talicauda nyseus</i>	Red pierrot	Lycaenidae
IV.	<i>Arhopala phryxus</i>	Oakblues	Lycaenidae

Table 5: Checklist of butterfly fauna of family hesperiidae along with their scientific name, common name in Nougraun village, Chail Chowk of Mandi distt. (H.P.).

I.	<i>Tagiades japedus</i>	Pied flat	Hesperiidae
II.	<i>Pyrginae</i>	Spread winged skippers	Hesperiidae
III.	<i>Lerema accius</i>	Clouded skipper	Hesperiidae

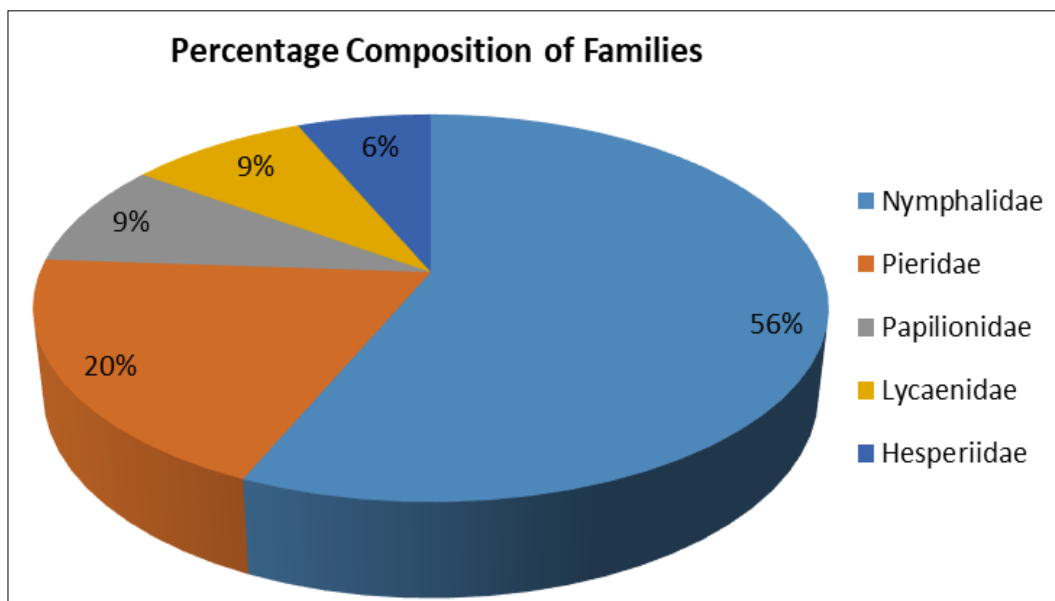
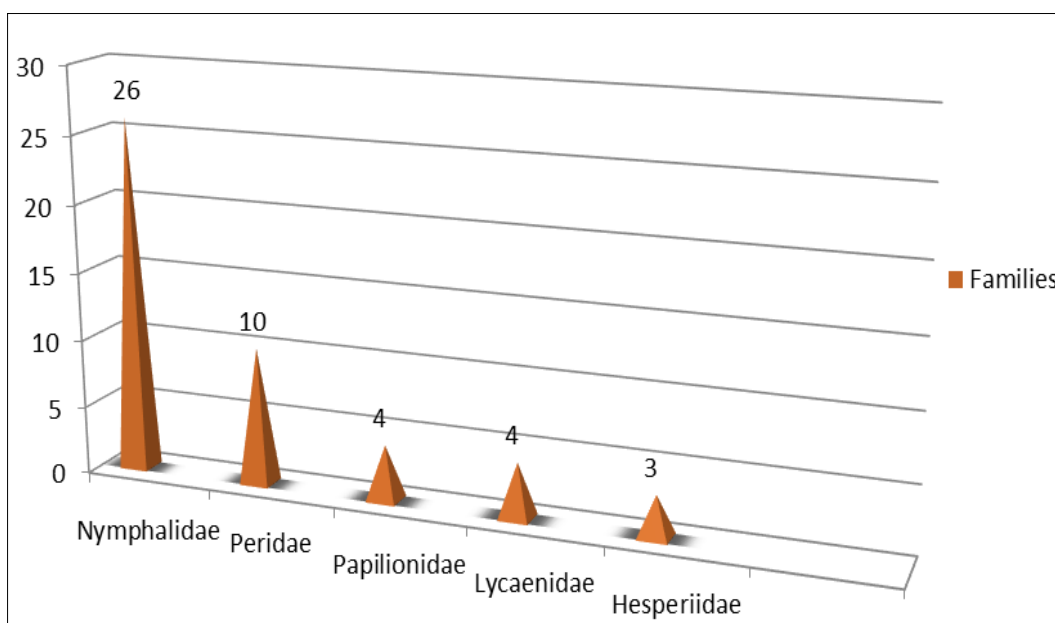


Chart 1: Pie chart showing the percentage composition of butterfly families in the Nougraun village, Chail Chowk of Mandi Dist (H.P.)

Relative Occurrence of Families



Graph 1: Relative dominance of butterfly families in the Nougraun village, Chail Chowk of Mandi distt. (H.P.)

Table no. 6: Abundance and diversity of butterfly family from Nougraun village, Chail Chowk of Mandi Dist (H.P.).

Sr. No.	Butterfly Family	No. of Species
1	Nymphalidae	26
2	Pieridae	10
3	Papilionidae	4
4	Lycaenidae	4
5	Hesperiidae	3
6	Total	47

Conclusion

Present study illustrates the importance of the area as a good habitat for butterfly fauna. 47 species of butterflies, belonging to 5 families, were recorded during the study. Control of habitat destruction, exploitation of its wilderness, human interference and pollution by visitors and students can be helpful in conservation of these winged beauties. The present investigation revealing that Nougraun village which is situated in Mandi district of Himachal Pradesh is rich in both flora and fauna wealth including butterflies. But the

biological diversity of this place has not been documented till date thus it cannot be concluded whether the butterfly fauna is increasing or decreasing. Therefore, this area needs continuous monitoring and efforts should be made to document its unknown flora and fauna and there is an essential need to have a vision document on the sustainable development and conservation of its rich biodiversity. This study contributes to our understanding of butterfly ecology and emphasizes the importance of preserving diverse habitats for these delicate insects. Butterflies play essential roles in ecosystems, including pollination, and are also part of the food chain for spiders, birds, reptiles, and other predatory insects. They are sensitive to environmental changes, making them valuable indicators. In summary, this study contributes to our knowledge of butterfly diversity and underscores the need for conservation efforts to protect these delicate and ecologically significant insects.

- Understanding the abundance of various butterfly species in this range.
- Informing future studies and conservation efforts.
- Assessing the impact of environmental changes on the ecosystem of the region.

Therefore, it is suggested and recommended that the area under study and other such areas should be continuously surveyed and monitored to add new taxa to the existing biodiversity.

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