



## Diversity of Butterflies (Lepidoptera: Insecta) from Balh Valley (District Mandi in Himachal Pradesh), INDIA

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**ABSTRACT:** Butterflies are important bio indicators which should be protected to conserve the biodiversity and environment. Butterflies diversity in Himachal Pradesh is very rich and diversified, primarily due to varied climatic conditions ranging from tropical in the foothill to arctic environment in the Trans-Himalayan region. The Balh Valley, also Known as Sunder Nagar Valley, lies in Mandi district of Himachal Pradesh, situated in the lap of North Western Himalaya at an altitude of 800 m above sea level in lower Himalayan region of Himachal Pradesh has been explored during the course of present investigation. Different species of plants and habitats of Balh Valley attract wide variety of butterfly fauna, which play a vital role in pollination of various flowering plants besides a key component of food chain. Butterflies studies carried out in Balh valley, during different seasons of the year 2012-2013 revealed the presence of 40 butterfly species belonging to 31 genera and 8 families of order Lepidoptera viz., Nymphalidae, Pieridae, Satyridae, Papilionidae, Danaidae, Lycaenidae, Hesperidae and Erycinidae. . During the course of present studies it was observed that the family Pieridae represented by 9 species was the most dominant followed by Nymphalidae and Satyridae (8 species each), Papilionidae and Danaidae (5 species each), Lycaenidae (2 species), Hesperidae (1) species) and Erycinidae (1species) respectively. These findings have been based on one year of field work. Such studies on monitoring the species diversity of butterflies can give valuable information on their population dynamics

**Key words:** Butterfly diversity, seasonal variation, BalhValley.

### INTRODUCTION

Butterflies are the most tantalizing and beautiful creatures, among the insect group. These are perhaps the most studied and well- known insect groups. Butterflies belong to the order Lepidoptera. In terms of indicator organism for biodiversity studies on butterflies are an excellent choice as they are common almost everywhere, attractive and easy to observe. Beside their aesthetic value, butterflies have important roles in the functioning of forest ecosystems. Because of their diversity, wide distribution, specificity to vegetation, rapid response to perturbation, taxonomic tractability they have been considered useful organisms to monitor environmental changes. Perusal of literature reveals that the workers contributed and documented their work in this field were de Niceville (1886, 1890), Moore (1890-1903), Marshall and de Niceville (1882), ( Swinhoe (1893, 1905-1912), Bingham (1905, 1907), Evans (1932), Talbot (1939, 1947), Wynter-Blyth (1957) and presently Alfred *et al.* (1998) Alfred (2005), Thakur *et al.*(2006), Mani (1986), Mehta *et al.*(2002), Arora *et al.* (1995, 2005), (Uniyal and Mathur, (1998), Thakur *et al.* (2002, 2006) and Singh (2007) etc. enriched this field. Although India has a rich butterfly fauna, but due to various reasons such as habitat destruction, fire, use of pesticides and weedicides and illegal collection for trade, many species have been become very rarer. Therefore, the present study makes a modest attempt to explore the existing diversity of butterflies from this region.

## MATERIAL AND METHODS

**Study Area:** The Balh Valley, also Known as Sunder Nagar Valley, lies in Mandi district of Himachal Pradesh, situated in the lap of North Western Himalaya at an altitude of 800 m above sea level. This is broad open valley which stretches from Gutker in the North to Sundernagar in the South, Baggi in the East and Gulma in the West. The economy of the region is predominately agrarian as about 80% of the total population is dependent on agriculture and activities allied to it, for earning their livelihood. The soil found in this valley is loam in texture and light grey to brown in colour. The main crops are sugarcane, maize, wheat, ginger and paddy in the region. Dairy farming, mixed farming, horticulture and animal husbandry are some of the main occupations of the villagers living in the valley. This region of Himachal Pradesh has been explored for the butterfly community structure. This study area included the areas of lower hilly terrain as the valley is surrounded by hills on the almost all sides. The present study area support agriculture, sub-tropical forest patches, scrub areas and a number of human settlements. The flora of the area is dominated by species like *Emblica officinalis*, *Saccharum officinarum*, *Adathoda vasica*, *Centella asiatica*, *Dalbergia sisso*, *Toona ciliata*, *Tinospora cordifolia*, *Murraya koenigii*, *Casia fistula*, *Ficus carica*, *Ficus religiosa*, *Acacia catechu*, *Eucalyptus sp.*, *Butea monosperma*, *Lanaea coromandelica*, *Morus alba*, *Lantana camara*, *Ipomea carnea*, etc. Moreover, fruit trees like *Mangifera indica*, *Psidium gujawa*, *Carica papaya*, *Cannabis sativa*, *Murraya koenigii*, *Zanthoxylum armatum*, *Bauhinia variegata* and *Syzygium cumini* are commonly found in the valley. The valley is drained by some perennial hill streams like Suketi khud and kansa khud. Besides, there are a number of small seasonal streams flowing throughout the valley. In addition, good vegetation in and around agricultural fields and human settlements is a characteristic feature of the study area. Earlier studies on the butterflies of Himachal Pradesh were initiated during British period because of the presence of the Imperial Summer capital at Shimla. Many investigators have studied the diversity, distribution, of butterflies from various parts of Himachal Pradesh but a little is known about the butterflies of lower Himalayan region of the western Himalaya. In addition, the present study represents the comprehensive picture of the butterfly community structure of a small representative area in the in the Himalayan region of India.

**Collection and taxonomic study of Butterfly:** An extensive and regular (monthly) collection of butterfly was made during October, 2012 to September, 2013 using a sweep net. The collected individuals were transferred into insect collection paper packs and were brought to the library where these were properly stretched, pinned and preserved in collection boxes. Identification of adult individuals was carried out using identification keys provided by de Niceville (1886, 1890), Moore (1890 -1903), Evans (1932), Talbot (1939, 1947) and Wynter-Blyth (1957).

## RESULTS AND DISCUSSION

Butterflies studies carried out in Balh valley, during different seasons of the year 2012-2013 revealed the presence of 40 butterfly species (Table I) belonging to 31 genera and 8 families of order Lepidoptera viz., Nymphalidae, Pieridae, Satyridae, Papilionidae, Danaidae, Lycaenidae, Hesperidae and Erycinidae. During the course of present studies it was observed that the family Pieridae represented by 9 species was the most dominant followed by Nymphalidae and Satyridae (8 species each), Papilionidae and Danaidae (5 species each), Lycaenidae (2 species), Hesperidae (1 species) and Erycinidae (1 species) respectively. The survey further revealed that *Parnassius hardwickei hardwickei* of family Papilionidae and *Pieris canidia indica* and *Pieris brassicae nepalensis* of family Pieridae were the first to emerge in the month of March and *Danaus chrysippus chrysippus*, *Danaus genutia* and *Euploea core core* of family Danaidae were the late arrival emerging in the month of August. Analysis of seasonal variation in the diversity of butterflies in different habitat of the valley revealed that maximum diversity has been recorded during pre and post monsoon periods. First peak in diversity was recorded in spring season (April-May) and second one was during autumn season (September). During this period, species like *Papilio polyctor polyctor*, *Papilio machanon asiatica*, *Pieris canidia indica*, *Lethe confusa confua*, *Aulocera padma padma*, and *Vanessa cashmirensis* were recorded in different study areas. On the

contrary, minimum diversity was seen during winter months of December and January. Butterfly species namely *Parnassius hardwickei hardwickei*, *Pieris canidia indica*, *Pieris brassicae nepalensis*, *Eurema laeta laeta*, *Danaus chrysippus chrysippus*, *Precis lemonias* and *Vanessa indica*, were collected from study sites during these months.

**Table1: Butterflies Diversity of BalhValley of District Mandi from Himachal Pradesh.**

Sr. No	Family/Scientific Name	Common Name	Flight Period
	<b>Family: Papilionidae</b>		
1.	<i>Polydorus dasarada ravana</i> (Moore)	The Great Windmill	Mar-Sep
2.	<i>Chilasa agestor govindra</i> (Moore)	The Tawny Mime	Mar-Nov
3.	<i>Papilio polyctor polyctor</i> Boisduval	The Common Peacock	Mar-Oct
4.	<i>Papilio machanon asiatica</i> Menetries	The Common Yellow Swallowtail	Mar-Jul
5.	<i>Parnassius hardwickei hardwickei</i> Gray	The Common Blue Apollo	Mar-Dec
	<b>Family: Pieridae</b>		
6.	<i>Leptosia nina nina</i> (Fabricius)	The Common Psyche	Jun-Sep
7.	<i>Metaporia leucodice soracta</i> (Moore)	The Himalayan Blackvein	Apr-Oct
8.	<i>Delias eucharis</i> (Drury)	The Common Jezebel	Jun-Sep
9.	<i>Pieris canidia indica</i> Evans	The Indian Cabbage White	Mar-Oct
10.	<i>Pieris brassicae nepalensis</i> (Doubleday)	The Large Cabbage White	Mar-Dec
11.	<i>Ixias marianne</i> (Cramer)	The White Orange Tip	Jul-Nov
12.	<i>Catopsilia pyranthe pyranthe</i> (Linn.)	The African Emigrant	Jul-Oct
13.	<i>Eurema laeta laeta</i> (Boisduval)	The Spotless Grass Yellow	Mar-Dec
14.	<i>Colias electo fieldi</i> Menetries	The Dark Clouded Yellow	May-Oct
	<b>Family: Danaidae</b>		
15.	<i>Danaus chrysippus chrysippus</i> (Linn.)	The Plain Tiger	Mar-Oct
16.	<i>Danaus genutia</i> (Cramer)	The Common Tiger	Aug-Nov
17.	<i>Parantica aglea melanoides</i> Moore	The Glassy Tiger	May-Nov
18.	<i>Euploea core core</i> (Cramer)	The Common Indian Crow	Aug-Nov
19.	<i>Euploea mulciber mulciber</i> (Cramer)	The Striped Blue Crow	Mar-Nov
	<b>Family: Satyridae</b>		
20.	<i>Mycalesis mineus mineus</i> (Linn.)	The Dark Brand Bushbrown	May-Aug
21.	<i>Lethe rohria rohria</i> (Fabr.)	The Common Tree Brown	Apr-Jun
22.	<i>Lethe insane insane</i> (Kollar)	The Common Forester	Mar-Jul
23.	<i>Rhaphicera moorei moorei</i> Butler	The Small Tawny Wall	Mar-Oct
24.	<i>Aulocera padma padma</i> (Kollar)	The Great Satyr	May-Oct
25.	<i>Aulocera swaha swaha</i> (Kollar)	The Common Satyr	May-Oct
26.	<i>Ypthima sakra nikaia</i> Moore	The Himalayan Fivering	May-Oct
27.	<i>Melanitis leda ismene</i> (Cramer)	The Common Evening Brown	Mar-Oct
	<b>Family: Nymphalidae</b>		
28.	<i>Neptis mahendra</i> Moore	The Himalayan Sailer	May-Oct
29.	<i>Hypolimnas misippus</i> (Linn.)	The Danaid Eggfly	May-Oct
30.	<i>Precis hierta</i> (Fabr.)	The Yellow Pansy	May-Oct
31.	<i>Precis orithya</i> (Linn.)	The Blue Pansy	May-Oct
32.	<i>Precis lemonias</i> (Linn.)	The Lemon Pansy	May-Oct
33.	<i>Vanessa indica</i> (Herbst)	The Red Admiral	May-Oct
34.	<i>Argynnis lathonia</i> (Linn.)	The Queen of Spain Fritillary	Mar-Oct
35.	<i>Auzakia danava</i> (Moore)	The Commodore	Mar-Oct
	<b>Family: Erycinidae</b>		
36.	<i>Libythea lepita</i> Moore	The Common Beak	May-Oct

	<b>Family: Lycaenidae</b>		
37.	Castalius rosimon (Fabr.)	The Common Pierrot	May-Oct
38.	Euchrysops cnejus (Fabr.)	The Gram Blue	May-Sep
	<b>Family: HesperIIDae</b>		
39.	Suastus gremius (Fabr.)	The Indian Palm Bob	Jun-Oct

Abbreviations in Table 1: Jan-January; Feb-February; Mar-March; Apr-April; Jun-June; Jul-July; Aug-August; Sep-September; Oct-October; Nov-November; Dec-December.

## CONCLUSION

The present investigation revealed that Balh region is rich in both floral and faunal wealth including butterflies. However its biological diversity has not been documented till date. We cannot conclude whether the butterfly fauna of the area is increasing or decreasing. The area needs to be continuously monitored and efforts be made to document its unknown floral and faunal wealth and there is essential need to have a vision document on the sustainable development and conservation of its rich biodiversity.

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