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A preliminary study on butterfly fauna (Order: Lepidoptera) from Mandi hills of Himachal Pradesh

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Abstract

The present preliminary study was conducted to explore the Butterfly fauna (Order: Lepidoptera) from Mandi hills of Himachal Pradesh 2015-2016. In total 35 species of butterflies belonging to 23 genera and 8 families were collected from Mandi hills of Himachal Pradesh. The results of present study revealed that maximum number of species belonged to family Pieridae (11 species), followed by Nymphalidae (9 species), Danaidae (6 species), Papilionidae (5 species), Satyridae, Lycaenidae, Erycinidae and Hesperidae (1 each). Percentage composition of each family revealed that Pieridae constituted around (11%) of the total butterfly fauna, followed by Nymphalidae (9%), Danaidae (6%), Papilionidae (5%), Satyridae, Lycaenidae, Erycinidae and Hesperidae (1% each).

Keywords: Butterfly, species, family, Mandi hills, Himachal Pradesh

1. Introduction

Insects comprise more than half of earth's diversity of species^[1]. Insects play critical roles in ecosystem function. They cycle nutrients, pollinate plants, disperse seeds, maintain soil structure and fertility, control populations of other organisms, provide a major food source for other taxa^[2]. Among all the insects, butterflies are planet's most majestic creature with brilliant colour and exquisitely patterned^[3], and have always been most fascinating to humankind from the time immemorial^[4]. The butterfly is a diverse insect, belonging to the class insecta and order Lepidoptera. Butterflies are generally very colorful winged insects with an overlay of tiny scales which are arranged much as the tiles of a roof with each scale having a single colour pattern. They are found in many colors and sizes. The butterfly plays an important role in ecosystems, acting as a strong pollinator, a food source and an indicator of the ecosystem's well-being. Butterflies are generally regarded as one of the best taxonomically studied group of insects^[5]. Worldwide there are more than 28,000 species of butterflies, with about 80 per cent found in tropical regions. The Indian subcontinent bearing a diverse terrain, climate and vegetation hosts about 1,504 species of butterflies^[6]. The ecological role of butterflies in an ecosystem is not only as herbivores, but also as important pollinators. Besides their attractiveness, butterflies are of interest because they can also be used to monitor environmental conditions. Change in butterfly abundance may indicate change in habitat conditions^[7, 8]. Butterflies are commonly referred to as "insects of the sun" with their eye catching colour and delicate charisma. They have been admired for centuries for their physical beauty and behavioral display^[9]. The butterflies are cosmopolitan in distribution and occur in every suitable environment, from forests to deserts and plains to valleys and hills^[10]. The diversity and distribution of a particular species of butterfly is dependent not only on the geography of the area and the ability of the species to move around within it, but also on the ecological demand^[11]. The nature of vegetation is an important factor, which determines the dependence and survival of a species on a particular habitat. Being highly sensitive to environmental changes, they are easily affected by even relatively minor disturbances in the habitat so much that they have been considered as indicators of environmental quality^[12]. Many investigators have studied the distribution of butterflies from different parts of the country^[13-20]. Therefore, an attempt has been made to study the diversity and distribution of butterfly from Mandi hills of Himachal Pradesh during 2015-2016.

2. Materials and Methods

2.1 Study Site

Himachal Pradesh is mainly a hilly state of the Indian Himalayas, situated between 30°22' to 33°12' North latitude and 75°47' to 79°04' East longitude.

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The physiography of this state is almost mountainous with elevation ranging from 350 to 7000 meters above mean sea level and the total area of the state is 55,673 sq.km. The state is bounded in the north by Tibet, in the northwest by Kashmir, in the east by Uttarakhand, where, Punjab bounds it on the south and on southeast it has common border with Harayana. The present study was conducted during 2015-2016 from

Mandi hills of Himachal Pradesh, which lies at 31°13'50" to 32°04'30" North latitude and 76°37'20" to 77°23'15" East longitude (Fig. 1). The district is bounded by Kangra on the northwest, Hamirpur and Bilaspur in the west, Arki tehsil of Solan district in South, Shimla district on southwest and Kullu district in east. The area of Mandi district is 3,950 sq.km and the average altitude of district is 754 meters.



Fig 1: Collection sites of Mandi hills of Himachal Pradesh considered during the present study.

2.2 Collection and preservation of specimens

Butterflies were collected using a net, which was placed over a resting insect, settled on the ground. A net consisted of a cloth bag or nylon net bag attached to a metal ring, which holds the mouth of the open bag and a handle to which the metal ring was attached. A ring made up of thick wire 38 cm in diameter was used. The depth of the bag was 75 cm. Butterflies were removed gently after they became enclosed in the bag by a rapid twist of the handle. The collected specimens were killed with the help of killing bottle, made up of glass jar with broad mouth and an airtight lid. In this technique, cotton soaked with benzene solution was kept at the base of glass jar above which a filter paper of the size of bottle diameter was kept. This technique is called as charging of the bottle. It was charged each day during the field collections. The freshly collected specimens were kept in a triangular paper envelope. Each envelope contains temporary label bearing physiographic details about locality such as latitude, altitude, longitude, temperature, humidity etc. for taxonomy or systematic study with a lead pencil. Butterflies were pinned by entomological pins of 38 mm length, nos. 3 and 5 for large and 20 for small specimen. Then the butterflies were allowed to dry in a desiccator for 2-3 weeks depending on the climatic conditions. The dried specimens were transferred to air tight insect boxes containing powdered naphthalene balls.

2.3 Identification of butterflies

With the help of relevant literature, species of butterflies were identified [21-30]. Some identifications were confirmed by comparison with the earlier records of Sociobiology and Behavioural Ecology Laboratory, Department of Biosciences, Himachal Pradesh University, Shimla and High Altitude Zoological Field Station, Zoological Survey of India, Solan.

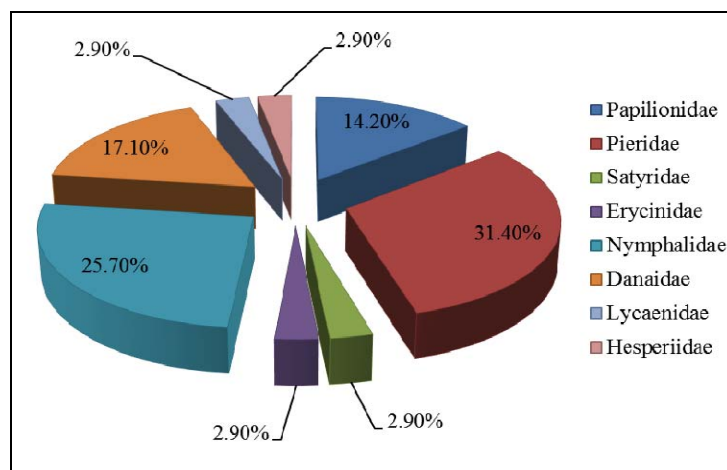
3. Results and Discussion

Butterflies studies were carried out in Mandi district of Himachal Pradesh, during different seasons of the year 2015-2016. During present study a total of 35 species of butterflies belonging to 23 genera and 8 families were collected and identified (Table 1). Out of 35 species specimens of 11 species belonging to family Pieridae, 9 species from family

Nymphalidae, 6 species from family Danaidae, 5 species from family Papilionidae and 1 species from each family Satyridae, Lycaenidae, Erycinidae and Hesperidae were collected. Maximum number of species belonged to the family Pieridae represented by 11 species (8 genera) followed by Nymphalidae 9 species (5 genera), Danaidae 6 species (4 genera), Papilionidae 5 species (2 genera), Satyridae 1 species (1 genera), Lycaenidae 1 species (1 genera), Erycinidae 1 species (1 genera) and Hesperidae 1 species (1 genera). As far as percent family composition is concerned the species belonged to the family Pieridae (31.40%) was the most dominant followed by family Nymphalidae (25.70%), Danaidae (17.10%), Papilionidae (14.20%) and Satyridae, Lycaenidae, Erycinidae and Hesperidae (2.90 % each) (Fig. 2). Present investigation revealed that most diversely distributed species in family Pieridae were: *Catopsilia pyranthe*, *Pieris canidia indica*, *Delias eucharis*, *Eurema hecabe fimbriata*. Moreover, most diversely distributed species in family Danaidae included *Euploea core core*, *Euploea mulciber mulciber*, *Parantica aglea melanoides*, *Tirumala hamata septentroidis*, *Tirumala limniace leopardus*, *Danaus chrysippus chrysippus* and of these *Danaus chrysippus chrysippus* was reported more than 7 study sites. Family Nymphalidae included 9 species belonging to 5 genera and of these *Phalanta phalantha* was most widely distributed species of this family. Family Papilionidae was represented by 2 genera and 5 species. Of these, *Papilio polytes romulus* were most widely distributed in Himachal Pradesh. Of the other families, species *Mycalis mineus mineus* was widely distributed in family Satyridae, whereas, *Libythea myrrha* was the widely distributed species of family Erycinidae, while, *Udaspis folus* was widely distributed species of family Hesperidae. The species *Telicada nyseus* was the least represented species of Himachal Pradesh. Similar studies were carried out by [31], on diversity of butterfly in Balh Valley of Mandi hills of Himachal Pradesh. They observed total 40 butterfly species belonging to 31 genera and 8 families viz., Nymphalidae, Pieridae, Satyridae, Papilionidae, Danaidae, Lycaenidae, Erycinidae and Hesperidae. Out of 8 families, Pieridae was the most dominant. Recently [32] studied the diversity of 107 species of butterflies belonging to 73 genera and 9 families from Himachal Pradesh.

Table 1: Checklist of butterfly species collected from Mandi hills of Himachal Pradesh

S. No.	Scientific name	Common name	Family
1	<i>Papilio protenor protenor</i>	Cramer- The Spangle	Papilionidae
2	<i>Papilio polytes romulus</i>	Cramer- The Common Mormon	Papilionidae
3	<i>Papilio polyctor polyctor</i>	Boisduval-The Common Peacock	Papilionidae
4	<i>Papilio demoleus demoleus</i>	Linnaeus-The Lime Butterfly	Papilionidae
5	<i>Graphium sarpedon luctatus</i>	Fruhst.-The Common Bluebottle	Papilionidae
6	<i>Catopsilia crocale</i>	(Cramer)-The Common Emigrant	Pieridae
7	<i>Catopsilia pyranthe</i>	(Linn.)Doubleday-The African Emigrant	Pieridae
8	<i>Gonepteryx rhamni nepalensis</i>	Doubleday-The Common Brimstone	Pieridae
9	<i>Pieris canidia indica</i>	Evans-The small Cabbage White	Pieridae
10	<i>Colias erate erate</i>	(Esper)-The Pale Clouded Yellow	Pieridae
11	<i>Colias electo fieldi</i>	Menetries-The Dark Clouded yellow	Pieridae
12	<i>Delias eucharis</i>	(Drury)-The Common Jezebel	Pieridae
13	<i>Eurema laeta laeta</i>	(Boisduval)-The Spotless Grass Yellow	Pieridae
14	<i>Eurema hecabe fimbriata</i>	(Wallace)-The Common Grass Yellow	Pieridae
15	<i>Pontia daplidice moorei</i>	(Rober)-The Bath White	Pieridae
16	<i>Aporia agathon caphusa</i>	(Grey)- The Great Blackvein	Pieridae
17	<i>Mycalesis mineus mineus</i>	(Linn.)-The Dark Brand Bushbrown	Satyridae
18	<i>Libythea myrrha</i>	Godart-The Club Beak	Erycinidae
19	<i>Ariadne merione</i>	(Cramer)-The Common Castor	Nymphalidae
20	<i>Phalanta phalantha</i>	(Drury)-The Common Leopard	Nymphalidae
21	<i>Vanessa cardui</i>	(Linn.)-The Painted Lady	Nymphalidae
22	<i>Vanessa cashmirensis</i>	(Kollar) The Indian Tortoiseshell	Nymphalidae
23	<i>Neptis hylas astola</i>	Moore- The Common Sailer	Nymphalidae
24	<i>Junonia iphita</i>	(Cramer)- The Chocolate Pansy	Nymphalidae
25	<i>Junonia hierta</i>	(Fabr.)- The Yellow Pansy	Nymphalidae
26	<i>Junonia orithyia</i>	(Linn.)-The Blue Pansy	Nymphalidae
27	<i>Junonia lemonias</i>	(Linn.)-The Lemon Pansy	Nymphalidae
28	<i>Euploea core core</i>	(Cramer)-The Common Indian Crow	Danaidae
29	<i>Euploea mulciber mulciber</i>	(Cramer)- The Striped Blue Crow	Danaidae
30	<i>Parantica aglea melanoidea</i>	Moore-The Glassy Tiger	Danaidae
31	<i>Tirumala hamata septentrionis</i>	(Butler)- The Dark Blue Tiger	Danaidae
32	<i>Tirumala limniace leopardus</i>	(Butler)- The Blue Tiger	Danaidae
33	<i>Danaus chrysippus chrysippus</i>	(Linn.)- The Plain Tiger	Danaidae
34	<i>Telicada nyseus</i>	- The Red Pierrot	Erycinidae
35	<i>Udasus folus</i>	(Cramer)- The Grass Demon	Hesperiidae

**Fig 2:** Percentage composition of each family of butterflies

4. Conclusion

The present investigation revealed that Mandi hills of Himachal Pradesh are rich in both flora and faunal wealth including butterflies. But the biological diversity of this area has not been documented till date thus it cannot be conclude 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 essential need to have a vision document on the sustainable development and conservation of its rich biodiversity.

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6. References

- May PG. Flower selection and the dynamics of lipid reserves in two nectarivorous butterflies. Ecology. 1992; 73:2181-2191.
- Majer JD. The conservation and study of invertebrates in remnants of native vegetation. In D. A. Saunders, G. W.

- Arnold, A. A. Burbridge, and A. J. M. Hopkins (eds). Nature Conservation: The Role of Remnants of Native Vegetation. Surrey Beatty and Sons, Sydney. 1987, 333-335.
3. Mayur AM, Hattappa S, Mahadevamurthy M, Chakravarthy AK. The impact of newly Established Bangalore international airport on local biodiversity. Global journal of biology, agriculture and health sciences. 2013; 2(2):49-53.
 4. Kehimkar I. The Book of Indian Butterflies. BNHS, Oxford University. Delhi Press, India. 2008, 497.
 5. Robbins RK, Opler PA. Butterfly diversity and a preliminary comparison with bird and mammal diversity. In: Biodiversity II, understanding and protecting our biological resources, Wilson, D.E., M.L. Reaka-Kudla and E.O. Wilson, (Eds.) Joseph Henry Press, Washington, DC, 1997.
 6. Tiple AD. Butterflies of Vidarbha region Maharashtra, India; a review with and implication for conservation. Journal of Threatened Taxa 2011; 3(1):1469-1477.
 7. Pollard E, Yates TJ. Monitoring Butterflies for Ecology and Conservation: The British Butterfly Monitoring Scheme. Chapman and Hall. Suffolk. 1995, 274.
 8. Goldsmith FB. Monitoring for Conservation and Ecology. Chapman & Hall. 1992, 87-111.
 9. Natural Resource Conservation Service Butterflies (Order: Lepidoptera). Fish and Wildlife Habitat Management Leaflet. 2000; 15:1-12.
 10. Mani MS. Butterflies of the Himalaya. Oxford and I.B.H., New Delhi. 1986, 181.
 11. Khan ZH, Raina RH, Dhar MA. Ramamurthy. Diversity and Distribution of Butterflies from Kashmir Himalayas. Journal of insect science. 2011; 24(1):45-55.
 12. Williams PH, Gatson KJ. Biodiversity indicators: Graphical techniques, smoothing and searching for what makes relationships work Ecography. 1998; 21(5):551-560.
 13. Alfred JRB, Das AK, Sanyal AK. Faunal diversity in India. Zoological Survey of India, Kolkata, 1998.
 14. Saraswat S. Insect diversity studies of Shimla hills, Himachal Pradesh. M. Phil, thesis, Himachal Pradesh University, Shimla, India, 2002.
 15. Mehta SL. Biosystematic studies on insect fauna in Shimla Hills, Himachal Pradesh. M.Phil. thesis, H.P. University, Shimla, India, 2003.
 16. Alfred JRB. Faunal Diversity in India. Zoological Survey of India, Kolkata, 2005.
 17. Singh M. Biosystematic and ecological studies on butterflies from Shiwalik hills. Ph.D. thesis, Himachal Pradesh University, Shimla, India. 2007, 222.
 18. Sharma G, Joshi PC. Diversity of Butterflies from Dholbaha dam in Punjab Shivalik, India. An International Journal. 2009; 1(2):11-14.
 19. Sharma KL, Kumar R. Diversity of Butterflies in Renuka Lake and its Vicinity of Himachal Pradesh. ISSN. 2013: 2319-7064.
 20. Nidup T, Dorji T, Tshering U. Taxon diversity of Butterflies in different habitat types in Royal Manas National Park. Journal of Entomology and Zoology Studies. 2014; 2(6):292-298.
 21. Evans W.H. The identification of Indian butterflies, 2nd edn. Bombay Natural History Society: Bombay. 1932, 464.
 22. Evans WH. A Catalogue of the Hesperidae from Europe, Asia and Australia in the British Museum. Trustees of B.M., London: 1949, 502.
 23. Wynter-blyth MA. Butterflies of the Indian region, Bombay natural History society Bombay. 1957; 20:523-72.
 24. Haribal M. The Butterflies of Sikkim Himalaya and their Natural history. Sikkim nature conserve foundation (SNCF), Sikkim. 1992, 217.
 25. Rose HS, Walia VK. Inventory of Butterfly Diversity of Chandigarh. Bionotes. 2003; 5(3):58-60.
 26. Thakur MS, Mattu VK, Mehta HS. Studies on the butterflies of Sukhna and Catchment area in Chandigarh, India. Journal of Entomological Research. 2006; 30(2):175-178.
 27. Uniyal VP. Butterflies in Great Himalayan Conservation Landscape, Himachal Pradesh, Western Himalaya. Entomon. 2007; 32:119-127.
 28. Kehimkar I. The book of Indian butterflies. Bombay Natural History Society Mumbai, India. 2008, 1-497.
 29. Talbot G. The fauna of British India including Ceylon and Burma (Butterflies), (published by Taylor and Francis, London.1939; 1(29-506):2.
 30. Talbot G. The fauna of British India including Ceylon and Burma (Butterflies), (published by Taylor and Francis, London.1939; 1(29-506):2.
 31. Kumar R, Mattu VK. Biosystematic and ecological studies on Butterflies from Himachal Pradesh Ph.d thesis, Himachal Pradesh University Shimla. 2009, 1-288.
 32. Thakur MS. Studies on Lepidopteran (Rhopalocera: Butterfly) diversity in Himachal Pradesh of the Western Himalaya. Asian Journal of Animal Science. 201, 198-202.