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Butterfly fauna (Lepidoptera: Rhopalocera) in and around Hirpora Wildlife Sanctuary, Shopian Kashmir, J&K UT, India

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Abstract

Butterflies (Lepidoptera: Rhopalocera) of Hirpora Wildlife Sanctuary and its adjoining areas are presented. The sanctuary is situated at the foothills of Pir Panjal mountain range (Inner Himalayas) in the southern escarpment of Kashmir's Shopian District. The study was carried out from April to October 2021. A total number of 25 species from five families were recorded. The highest number of species were recorded from the family Nymphalidae followed by the family Pieridae. Additional field surveys and explorations in the upper reaches of the sanctuary will add further species to the butterfly inventory of the region.

Key words: Butterflies, Hirpora Wildlife Sanctuary, Shopian, Kashmir, India

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Hirpora Doğal Hayatı Koruma Alanı içinde ve çevresinde kelebek faunası (Lepidoptera: Rhopalocera), Shopian Kashmir, J&K UT, Hindistan

Özet

Hirpora Doğal Hayatı Koruma Alanı ve ve bölge çevresindeki farklı habitatlardan toplanan kelebek örnekleri (Lepidoptera: Rhopalocera) sunulmuştur. Kutsal alan, Keşmir'in Shopian Bölgesi'nin güney yamacındaki Pir Panjal sıradağlarının (İç Himalayalar) eteklerinde yer almaktadır. Çalışma Nisan-Ekim 2021 arasında gerçekleştirildi. Beş familyadan toplam 25 tür kaydedildi. En fazla tür Nymphalidae familyasından kaydedilmiştir, bunu Pieridae familyası izlemiştir. Çevresinde özellikle kuzey kısmında yürütülecek yeni çalışmalar ile bölge için yeni tür kayıtlarının ve yeni türlerin tespit edilebileceği öngörülmektedir.

Anahtar kelimeler: Kelebekler, Hirpora Yaban Hayatı Koruma Alanı, Shopian, Keşmir, Hindistan

1. Introduction

Kashmir Valley is one of the most ecologically sensitive areas covered with lush green forest, sky-scraping snow-clad mountains, panoramic grasslands and diverse agrarian and natural ecosystems which provides the habitat to an immense number of Insects. Assessment of the diversity of Entomofauna from the region has not been reported in the recent past other than some studies on a few taxa. To assess the diversity of butterfly fauna, Hirpora Wildlife Sanctuary Shopian and its adjoining areas were selected for field surveys. Order Lepidoptera has gained a remarkable position in the phylum Arthropoda as the most distinguished class among other orders and classes of Insects. The butterflies apparently exemplify the largest clade with 20,000 described species across the globe and for which the inventory of these species is nearly completed (Pinkert et al., 2022). With their attractiveness, multicoloured omnipresence and ecosystem services, butterflies have attained an exceptional place in the animal kingdom (Kunte, 2000). India is home to around 1,501 butterfly species, out of which Skippers (321 species) assume the largest group of butterflies followed by Swallowtails (107), Whites and Yellows (109 species), Brush-footed (521 species), and Blues (443 species) (Kehimkar,

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2008). In Jammu and Kashmir union territory, around 408 species belonging to 25 subfamilies from 5 families are known to occur in the three distinct biogeographic regions of the Union territory (Jammu, Kashmir, and Ladakh) which account for ca. 27% of India's butterfly fauna (Dar et al., 2021; Gupta & Sheikh, 2021; Parey & Sheikh, 2021; Qureshi et al., 2013; Qureshi, 2020; Sheikh, 2021; Sheikh & Parey, 2019a, 2019b; Sheikh et al., 2021; Singh & Sheikh, 2021; Sheikh & Gupta, 2022).

2. Materials and methods

Hirpora Wildlife Sanctuary issituated between 33°41′N 74°43′E at the foothills of Pir Panjal Mountain range surrounded by the snowclad and skyscraping mountain ranges of the Inner Himalayas at an altitude of 2546 m (Figure 1). The sanctuary is home to many species of both plants and animals. The Sanctuary comes under the jurisdiction and forest division of District Shopian which lies in the southern escarpment of Kashmir Valley (Figure 2). The Sanctuary has a total area of 341.25 km2; with most of the landcover is under forest cover followed by pastures, wastelands and water bodies including alpine lakes (Riyaz & Reshi, 2021). The average temperature lies in between 20 º C to 25º C during summers and autumn, while the minimum temperatures lie between -15 º C to 10 º C during winter and early spring. The field survey was carried out from April to October 2020. A single individual species/subspecies from each genus were collected using an aerial net and then transferred into glass jars filled with Plaster of Paris at the base and cotton dipped in Ethyl acetate. The killed specimens were then mounted using Bohemia Pins (5 and 1 no.respectively) on a wooden insect spreading board. After three days, the mounted specimens were photographed using Redmi Note 8 Pro Smartphone + 20 mm macrolens. The specimens were preserved and kept in the Insect Museum of Division of Taxonomy & Biodiversity, Entomology Research Institute, Loyola College, Chennai, Tamil Nadu, India as reference material. The identification of the species was carried out by consulting the literature, pictorial fieldguides, catalogues and the keys (Evans, 1932; Kunte, 2000; Pajni et al., 2006; Varshney & Smetacek, 2015).

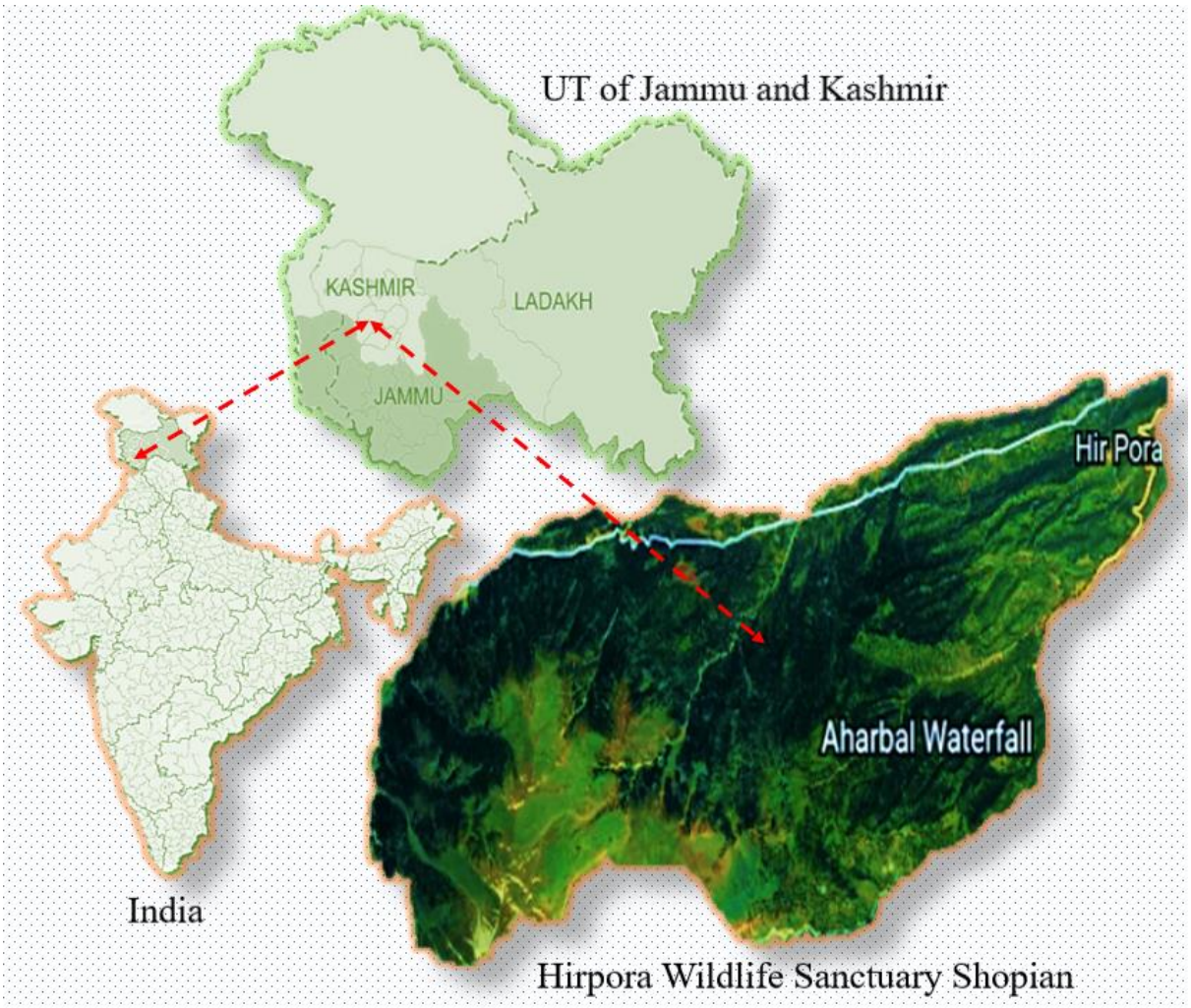

Figure 1. Map of Hirpora Wildlife Sanctuary Shopian Kashmir

Figure 2. An inside view of Hirpora Wildlife Sanctuary, Shopian Kashmir
(Photo Muzafar Riyaz)

3. Results

During the study, a total number of 25 species {Table, 1 and Figure 3. (A-Y)} were collected belonging to 5 families of the order Lepidoptera. Among these five families, the highest number of species/subspecies were collected from the family Nymphalidae (12 Species) followed by the family Pieridae (05 species), Lycaenidae (03 species), Papilionidae (01 species) and Hesperidae (01 species). Most of the species were active and observed from April to October with maximum day temperature ranges between 20-25ºC. The species *Aglais caschmirensis caschmirensis* Kollar, 1844 (Nymphalidae: Lepidoptera) was the first species to become active and recorded after hibernating through long and harsh winters. The most abundant species recorded during the study period was *Pieris brassicae nepalensis* Gray, 1846 that was active in both forest and agricultural ecosystems. The occasional visiting species recorded were *Papilio machaon* Moore,1884 and *Phalanta phalantha* Drury, 1773. The present study was a brief survey and exploration of Butterfly species in the Hirpora Wildlife Sanctuary, Shopian and its adjoining areas. The study observed 25 Butterfly species from 5 different families. The study also aims to provide an updated checklist of the butterflies of the Sanctuary and will also aim to explore more areas in the future as well, since the area is yet to be fully explored, it's very likely that many new species are awaiting the discovery.

Table 1**.** Checklist of Butterflies (Lepidoptera: Rhopalocera) in and around Hirpora Wildlife Sanctuary Shopian

S. No.	Family	Taxa	Common Name/ English Name	Location Coordinates	Habitat Type
1	Hesperidae	*Parnara guttatus mangala* Moore,1866	Straight Swift	33º40'39"N 74º44'41"E	Forest/ Agricultural
2	Lycaenidae	*Aricia agestis nazira* Moore, 1865	Orange-Bordered Argus	33º40'39"N 74º44'41"E	Forest/ Agricultural
3	Lycaenidae	*Lycaena phlaeas phlaeas*, Linnaeus, 1761	Common Copper	33º40'39"N 74º44'41"E	Forest/ Agricultural
4	Lycaenidae	*Polyommatus pseuderos* Moore,1879	Kashmir Meadow Blue	33º40'39"N 74º44'41"E	Forest/ Agricultural

Table 1. Continued

5	Papilionidae	*Papilio machaon* ladakensis Moore,1884	Common Yellow Swallowtail	32º42'25"N 74º57'45"E	Agricultural
6	Pieridae	*Colias fieldi* Menetries, 1855	Dark Clouded Yellow	33º42'22"N 74º56'25"E	Forest/ Agricultural
7	Pieridae	*Gonepteryx rhamni nepalensis* Doubleday, 1847	Himalayan Common Brimstone	33º40'39"N 74º44'41"E	Forest
8	Pieridae	*Eurema brigitta* Stoll, 1780	Small Grass Yellow	33º40'39"N 74º44'41"E	Forest/ Agricultural
9	Pieridae	*Pieris brassicae nepalensis* Gray, 1846	Large Cabbage White	33º40'39"N 74º44'41"E	Forest/ Agricultural
10	Pieridae	*Pieris canidia indica*, Evans, 1926	Indian Cabbage White	33º40'39"N 74º44'41"E	Forest/ Agricultural
11	Pieridae	*Pontia duplice moorei*, Röber, 1907	Bath White	33º40'39"N 74º44'41"E	Forest/ Agricultural
12	Nymphalidae	*Argynnis jainadeva persephone*, Hemming, 1934	Highbrown Silverspot	33º40'18"N 74º42'16"E	Forest
13	Nymphalidae	*Argynnis kamala* Moore, 1858	Common Silverstripe	33º40'39"N 74º44'41"E	Forest
14	Nymphalidae	*Aulocera swaha swaha* Kollar, 1848	Common Satyr	33º40'18"N 74º42'16"E	Forest
15	Nymphalidae	*Aglais caschmirensis caschmirensis* Kollar, 1844	Kashmir Tortoiseshell	33º40'39"N 74º44'41"E	Forest/ Agricultural
16	Nymphalidae	*Issoria lathonia lathonia* Linnaeus, 1758	Queen of Spain Fritillary	33º40'39"N 74º44'41"E	Forest
17	Nymphalidae	*Phalanta phalantha* Drury, 1773	Common Leopard	33º42'22"N 74º56'25"E	Agricultural
18	Nymphalidae	*Vanessa indica indica* Herbst, 1794	Indian Red Admiral	33º40'39"N 74º44'41"E	Forest
19	Nymphalidae	*Vanessa cardui* Linnaeus, 1758	Painted Lady	33º40'39"N 74º44'41"E	Forest/ Agricultural
20	Nymphalidae	*Callerebia nirmala daksha* Moore, 1874	Common Argus	33º40'39"N 74º44'41"E	Forest
21	Nymphalidae	*Hyponephele pulchra pulchra* C. and R. Felder, 1867	Dusky Meadowbrown	33º40'39"N 74º44'41"E	Forest
22	Nymphalidae	*Hypolimnas misippus* Linnaeus, 1764	Danaid Eggfly	33º42'22"N 74º56'21"E	Agricultural
23	Nymphalidae	*Junonia orithya* Linnaeus, 1758	Blue Pansy	33º43'12"N 74º58'28"E	Agricultural
24	Nymphalidae	*Neptis sappho* Pallas, 1771	Pallas Sailor	33º42'22"N 74º56'25"E	Forest
25	Nymphalidae	*Danaus genutia* Cramer, 1779	Common Tiger	33º42'21"N 74º56'29"E	Agricultural

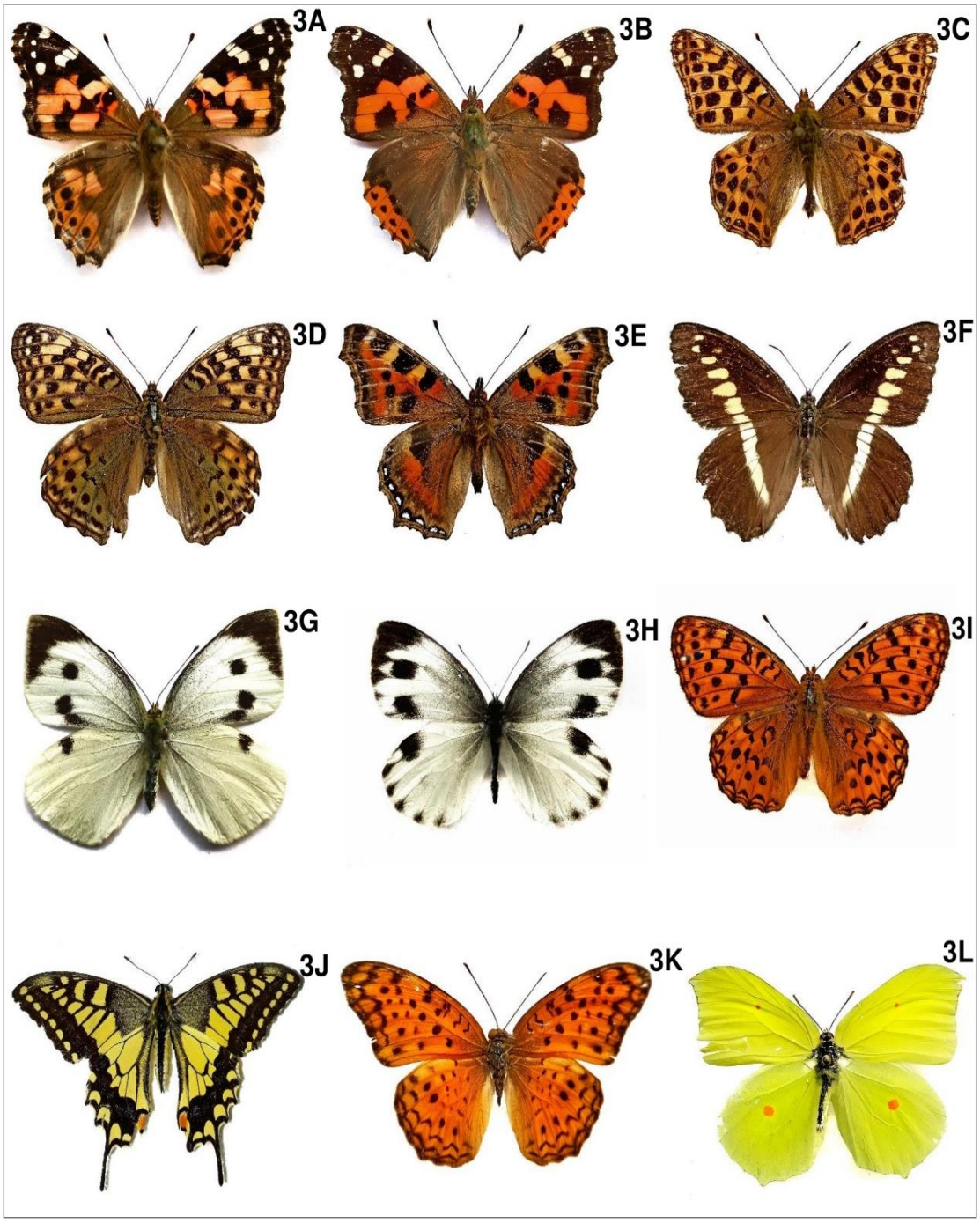

Figure 3. Mounted specimens of collected butterfly species/subspecies

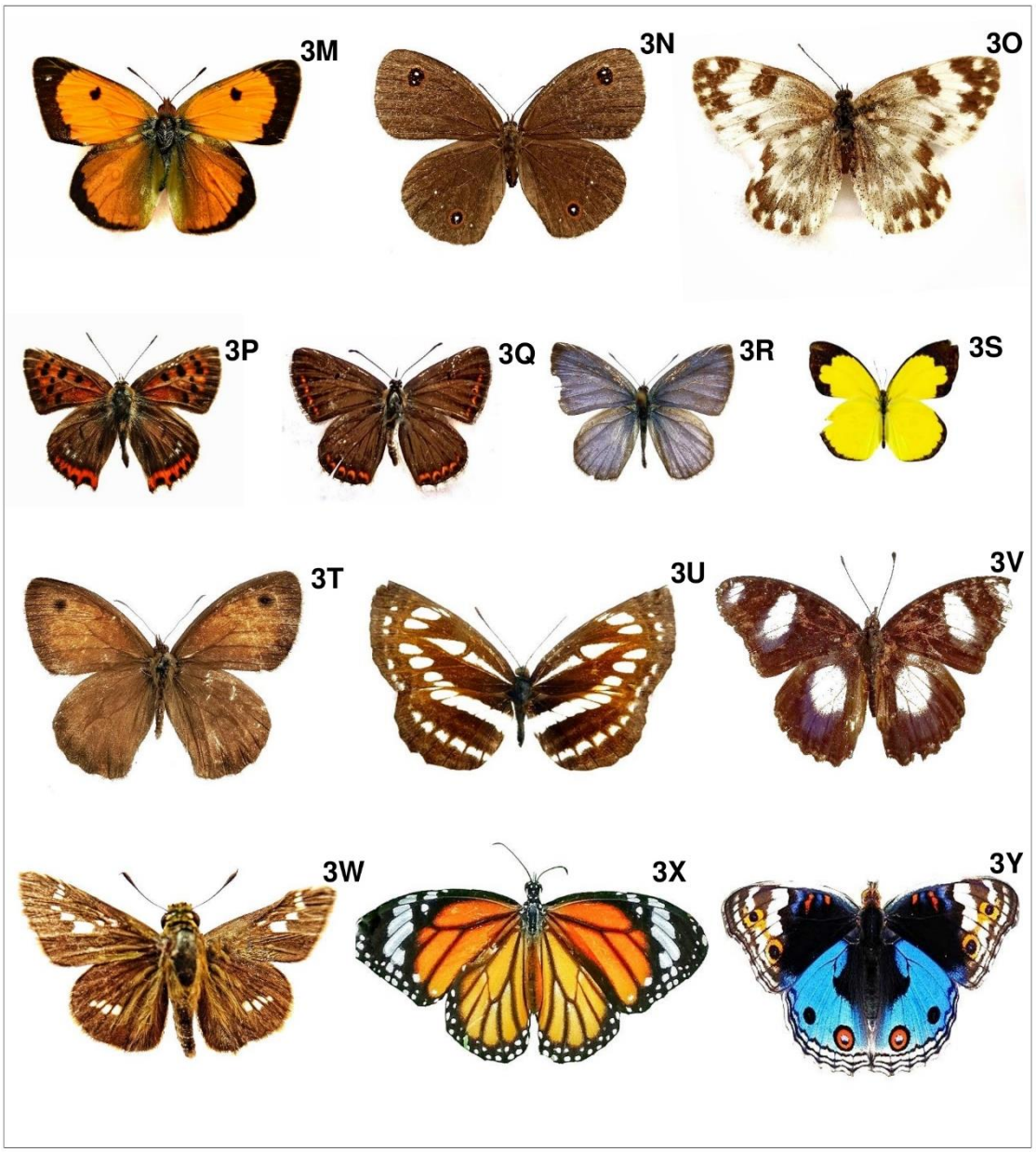

Figure 3. Continued

3A. *Vanessa cardui*, 3B. *Vanessa indica indica*, 3C. *Issoria lathonia lathonia*, 3D. *Argynnis kamala* 3E. *Aglais caschmirensis caschmirensis*, 3F. *Aulocera swaha swaha*, 3G. *Pieris brassicae nepalensis*, 3H. *Pieris canidia indica*, 3I. *Argynnis jainadeva persephone*, 3J. *Papilio machaon ladakensis*, 3K. *Phalanta phalanta*, 3L. *Gonepteryx rhamni* nepalens*is*, 3M. *Colias fieldi*, 3N. *Callerebia nirmala daksha*, 3O. *Pontia duplice moorei*, 3P. *Lycaena phlaeas phlaeas*, 3Q. *Aricia agestis nazira*, 3R. *Polyommatus pseuderos*, 3S. *Eurema brigitta*, 3T. *Hyponephele pulchra pulchra*, 3U. *Neptis sappho*, 3V. *Hypolimnas misippus*, 3W. *Parnara guttatus mangala*, 3X. *Danaus genutia*, 3Y. *Junonia orithya*

4. Conclusions and discussion

The Indian butterfly fauna is veryvast and diverse that are confined to many geographic regions across the country. Until this date, no Indian butterfly has been known to be extinct, however,there are very few studies and reports on lesser-known taxa of butterflies and their existence of them in several cases are yet to be determined. In the Himalayan and south region of India, there is an end number of endemic butterflies, which are estimated around 8% of Indian butterflies. North-western Himalayas, mainly the Kashmir region is one of the major biodiversity hotspots of India. The region is rich in both flora and fauna and the revision of the fauna particularly the insect diversity in the region has not been well documented inthe recent past besides aided by some old checklists from British India and authors of the different

parts of India as well. The Governmental efforts inbiodiversity conservation and management particularly the insect fauna failed miserably. With the prompt expansion in human populations, industrialization, urbanization, deforestation, large-scale utilization of agrochemicals and natural resource exploitation, the threat to become endangered and extinct might be experienced in most of the insect species in the Himalayan region. Long-term conservation and management of the fauna particularly the insects through an educated approach is a need of the hour. With these short notes and mini-revisions of the insect species, many young researchers will come forward to survey the unexplored areas of the Kashmir Himalayas as new many species await discovery. The monitoring of the biodiversity in the region will sequentially aid in the management and conservation of the Entomofauna in the future.

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