



Rhopalocera Diversity (Lepidoptera) of District Kupwara from Jammu and Kashmir State (India)

Aijaz Ahmad Qureshi*, R.C. Bhagat** and P.C. Pathania***

*Islamic University of Science and Technology, Awantipora, Pulwama, (J&K), India

**P.G. Department of Zoology, University of Kashmir, Srinagar, (J&K), India

***Department of Entomology, Punjab Agricultural University, Ludhiana, (PB), India

ABSTRACT: The survey-cum-collection tour were undertaken in the Kupwara district of J&K from 2007-2009 to know the butterfly fauna of the area, highlighting their month wise distribution, seasonal distribution, and flight period and other bio-ecological components. Thirty six species of butterflies belongs to 8 families and 30 genera were collected. The butterfly activity was observed from March to November and the highest abundance was in summer season (June-August) whereas there was no butterfly activity in winter (December-February). The most dominant family was Nymphalidae followed by Pieridae, Satyridae and Lycaenidae. Highest distribution was observed in habitats like forests, hilly areas, gardens near forests in areas like Batpora (Magam), Drugmulla, Karnah, Langate, Lolab Valley, Mawar, Panzgam, Rajwar, Trehgam, and Villgam. The other floral and faunal elements of the area need to be studied so that the biodiversity of the area can be compiled and documented.

Keywords: Abundance, butterflies, distribution, Kupwara

INTRODUCTION

District Kupwara was carved out as a separate district from the erstwhile district Baramulla in July 1979. Situated at an average height of 5300 feet (above sea level) with geographical area of 2379 sq kms (Anonymous, 1999), it is located about 90 kilometers from Srinagar in the north-east corner of Kashmir Valley at 34.3 to 35.5 degree latitude in the north and 73.4 to 74.9 degree longitude in the east (Fig. 1). This socio-economic backward district consists of 377

census villages, comprising of two Municipal Committees, three Tehsils and eleven Community Development Blocks with many areas like Machil, Teethwal, Keran, Karnah etc situated on Line of Control (LoC). Kishanganga is the important river originating from Himalayan range, flows through the outer north-east areas of the district from east to west. It passes through Keran and Teethwal areas and finally merges with river Jhelum at Domail in Muzaffarabad (Anonymous, 2001).

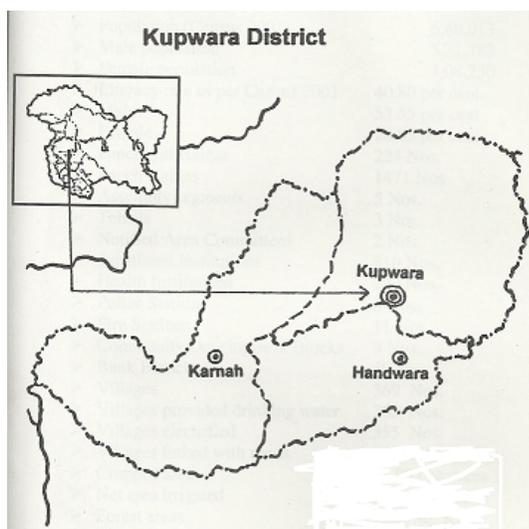


Fig. 1. Map showing location of district Kupwara in J&K State.

The district with varied topography possesses rich forests with 1500 sq kms of forest land having deodar, elm, fir, forest products, kail, medicinal herbs, minerals, pine, etc in abundance and provide favourable environment for many faunal elements like birds (Bulbul, Crows, Doves, Pigeons, Sparrows, Swallows, Vultures, Wild cock, Wild duck, Woodpecker), and mammals (Black Bear, Fox, Jackal, Markhore, Monkeys, Musk Deer, etc). The district produces fruits, rice, wheat, oil seeds, vegetables, maize, pulses, honey, walnuts in good quantity and agriculture is backbone of the economy (Anonymous, 2009). The district is famous for many beautiful valleys, health resorts, tourist spots, springs, mountains, passes etc like BangusValley, Lolab Valley, Chokibal, Chandigam, Reshwari, Nazi Nag, Trehgam Nag, ZatiShah Nag, Kazi Nag mountain, Tumar pass, etc (Anonymous, 2001). Known by their beautiful colours and graceful flight, butterflies are the most abundant group of insects on the earth (Khan *et al.*, 2004). They are one of the important food chain components of many organisms and being good indicators of environmental quality they are regarded as indicator taxa (Sathe *et al.*, 2004). In spite of being rich and diverse in biodiversity, the floral & faunal part including butterflies of this area is still untouched, poorly documented & studied and unexplored. The baseline study was conducted to know the butterfly fauna of this border district for the first time.

METHODOLOGY

Field observations were made during the years March 2007 – November 2009 in different areas/places (like Batpora, Drugmulla, Handwara, Karnah, Khanpora, Langate, Lolab, Magam, Mawar, Nelipora, Panzgam, Rajwar, Trehgam, Villgam, and Vodhpura) with varied habitats like gardens, hilly areas, parks, mountains, forests, orchids, vegetable areas, open fields, agricultural areas and other cultivated avenues in district Kupwara. Butterflies were collected by Insect Collecting Net and killed with the help of vapours of ethyl acetate. The specimens of the collected butterflies have been deposited in the P.G. department of Zoology, University of Kashmir, Srinagar & are also with first author. (Evans, 1932, Talbot, 1939, 1947, Wynter-Blyth, 1957, Haribal, 1992, Kunte, 2006, Pajni *et al.*, 2006; Kehimkar, 2010) were followed For identification.

RESULTS AND DISCUSSION

During the course of present field investigations, 36 species of butterflies distributed under 8 families *viz.*, Danaidae, Hesperidae, Libytheidae, Lycaenidae, Nymphalidae Papilionidae, Pieridae and Satyridae of

30 genera have been reported. The detail list of family, name of species and their common name, flight period and habitat is provided (Table 1).

Nymphalidae was found to be the most dominant (36%) family represented by (11 genera, 13 species), followed by Pieridae (22%) (6 genera, 8 species), Satyridae (17%) (5 genera, 6 species), Lycaenidae (11%) (4 genera, 4 species), and Papilionidae (5%) (1 genus, 2 species), whereas Danaidae (3%), Hesperidae (3%), Libytheidae (3%) were represented by 1 genus and 1 species each (Fig. 2).

The present study revealed that *Aglais cashmirensis* (Nymphalidae) and *Pieris brassicae* (Pieridae) were the first to emerge (from March) and *Pelopidas mathias* (Hesperidae) was the most late arrival emerging in the month of June. The peak butterfly activity was observed in the months of June, July, August, and September incorporating all the 8 families under 30 genera, covering 36 species. The highest butterfly diversity was in summer season (Table 2), however there was no butterfly activity during the winter season *i.e.*, in the months of January, February and December (Table 3). The overall butterfly activity was observed from March to November from 7.30 am to 7.00 pm, depending upon weather, month, season, host-plants, temperature and type of the species concerned.

Four species *i.e.*, *Aglais cashmirensis*, *Colias electo fieldi*, *C. erate* and *Pieris brassicae* were found in all the months surveyed during the present observations. The widely prevalent genera/ species included Hesperidae (*Pelopidas mathias*), Lycaenidae (*Aricia agestis*, and *Lycaena phlaeas*), Nymphalidae (*Aglais cashmirensis* and *Cynthia cardui*), Pieridae (*Colias electo fieldi*, *C. erate*, *Pieris brassicae* and *Pontia daplidice*). Species like *Aporia leucodice*, *Argyreus hyperbius*, *Aulocera brahminus*, *A. padma*, *Callerebia mani*, *Childrena childreni*, *Danaus chrysippus*, *Eurema hecabe*, *Gonepteryx rhamni*, *Hypolimnas missipus*, *Issoria gemmata*, *I. lathonia*, *Junonia orithya*, *J. iphita*, *Kaniska canace*, *Lampides boeticus*, *Libythea lepita*, *Maniola pulchella*, *Melanitis phedima*, *Neptis hylas*, *Papilio machaon*, *P. arcturus*, *Pararge everesmanni cashmirensis*, *Phalanta phalanta*, *Pieris canidia*, *Rapala nissa* and *Vanessa indica* showed restricted distribution. Species such as *Argyreus hyperbius*, *Childrena childreni*, *Colias erate*, *Cynthia cardui*, *Danaus chrysippus*, *Gonepteryx rhamni*, *Hypolimnas missipus*, *Issoria lathonia*, *Papilio machaon*, *P. arcturus*, *Phalanta phalanta* and *Vanessa indica* were witnessed to be the quick fliers in which *Callerebia mani* was the most shy species while as *Papilio arcturus* was the quickest one.

Table 1: Butterflies of district Kupwara, Kashmir.

S. No.	Family / Scientific Name	Common Name	Flight Period	Habitat
	Danaidae			
1	<i>Danaus chrysippus</i> Linnaeus	Plain Tiger	May-Sep	Forests, hilly areas, mountains
	Hesperiidae			
2	<i>Pelopidas mathias</i> (Fabricius)	Small Branded Swift	Jun-Oct	Hilly areas, damp areas, gardens, parks, rice fields
	Libytheidae			
3	<i>Libythea lepita</i> Moore	Common Beak	Apr-Sep	Forests, hilly areas, damp areas, rice fields
	Lycaenidae			
4	<i>Aricia agestis</i> (Denis and Schiffermuller)	Orange-Bordered Argus	Apr-Oct	Forests, hilly areas, damp areas, rice fields, parks, gardens
5	<i>Lampides boeticus</i> Linnaeus	Pea Blue	May-Sep	Forests, hilly areas, gardens, damp areas, rice fields, parks, gardens
6	<i>Lycaena phlaeas</i> (Linnaeus)	Common Copper	May-Sep	Forests, Hilly areas, damp areas, rice fields, parks, gardens
7	<i>Rapala nissa</i>	Common Flash	June-Oct	Orchids, gardens,
	Nymphalidae			
8	<i>Aglais cashmirensis</i> (Kollar)	Indian Tortoiseshell	Mar-Nov	Forests, hilly areas, parks, gardens, agricultural fields, damp areas, parks, gardens, open areas, mountains
9	<i>Argyreus hyperbius</i> (Johanssen)	Indian Fritillary	May-Oct	Forests, hilly areas, mountains, open areas, mountains
10	<i>Childrena childreni</i> (Gray)	Large Silverstripe	May-Oct	Forests, hilly areas, mountains, open areas
11	<i>Cynthia cardui</i> (Linnaeus)	Painted Lady	Apr-Nov	Forests, hilly areas, parks, gardens, agricultural fields, damp areas, open areas, parks, gardens,
12	<i>Hypolimnas misippus</i> (Linnaeus)	Danaid Eggfly	May-Oct	Forests, hilly areas, mountains, open areas
13	<i>Issoria gemmata</i> Butler	Gem Silverspot	May-Sep	Forests, hilly areas, mountains, open areas
14	<i>Issoria lathonia</i> (Linnaeus)	Queen of Spain Fritillary	May-Sep	Forests, hilly areas, mountains, open areas
15	<i>Junonia iphita</i> (Crammer)	Chocolate Pansy	May-Sep	Forests, hilly areas, mountains,
16	<i>Junonia orithya</i> (Linnaeus)	Blue Pansy	May-Oct	Forests, hilly areas, open areas, mountains
17	<i>Kaniska canace</i> Linnaeus	Blue Admirable	Apr-Oct	Forests, hilly areas, mountains
18	<i>Neptis hylas</i> (Linnaeus)	Common Sailor	May-Sep	Forests, hilly areas, mountains
19	<i>Phalanta phalanta</i> (Drury)	Common Leopard	May-Sep	Forests, hilly areas, mountains, open areas
20	<i>Vanessa indica</i> (Herbst)	Indian Red Admirable	May-Sep	Forests, hilly areas, mountains, open areas
	Papilionidae			

21	<i>Papilio arcturus</i> Rothschild	Blue Peacock	May-Sep	Forests, hilly areas, mountains,
22	<i>Papilio machaon</i> Menetries	Common Yellow Swallowtail	Apr-Sep	Forests, hilly areas, mountains, open areas
	Pieridae			
23	<i>Aporia leucodice</i> (Eversmann)	Himalayan Blackvein	Apr-Oct	Forests, hilly areas, mountains, open areas
24	<i>Colias electo fieldi</i> Menetries	Dark Clouded Yellow	Apr-Nov	Forests, hilly areas, parks, gardens, agricultural fields, damp areas, rice fields, mountains, open areas, orchids, gardens, parks
25	<i>Colias erate</i> Esper	Pale Clouded Yellow	Apr-Nov	Forests, hilly areas, parks, gardens, agricultural fields, damp areas, orchids, mountains, open areas, gardens, parks
26	<i>Eurema hecabe</i> (Linnaeus)	Common Grass Yellow	Jun-Sep	Hilly areas, gardens near forests, mountains
27	<i>Gonepteryx rhamni</i> Linnaeus	Common Brimstone	Apr-Nov	Forests, hilly areas, mountains, open areas,
28	<i>Pieris brassicae</i> (Linnaeus)	Large Cabbage White	Mar-Nov	Forests, hilly areas, parks, gardens, agricultural fields, damp areas, vegetable gardens, rice fields, mountains, open areas, gardens, parks, orchids
29	<i>Pieris canidia</i> (Sparrman)	Indian Cabbage White	May-Oct	Forests, hilly areas, gardens, agricultural fields, damp areas, rice fields, vegetable gardens, mountains, open areas, gardens, parks
30	<i>Pontia daplidice</i> (Linnaeus)	Bath White	Apr-Nov	Forests, hilly areas, parks, gardens, agricultural fields, damp areas, rice fields, mountains, open areas, parks, orchids, gardens
	Satyridae			
31	<i>Aulocera brahminus</i> (Blanchard)	Narrow-Banded Satyr	May-Sep	Forests, hilly areas, damp areas, mountains
32	<i>Aulocera padma</i> (Kollar)	Great Satyr	May-Sep	Forests, hilly areas, damp areas
33	<i>Callerebia mani</i> (De Niceville)	Yellow Argus	Apr-Sep	Forests, hilly areas, damp areas, mountains
34	<i>Maniola pulchella</i> (Felder)	Tawny Meadowbrown	Jun-Sep	Forests, hilly areas, damp areas, mountains
35	<i>Melanitis phedima</i> (Stoll)	Dark Evening Brown	Jun-Sep	Forests, hilly areas, damp areas, mountains
36	<i>Pararge everesmanni</i> <i>cashmirensis</i> Eversmann	Yellow Wall	May-Oct	Forests, hilly areas, damp areas, mountains

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

Table 2: Seasonal distribution of families/genera/species.

Season	Family(ies)	Genus/Genera	Species
Spring (Mar-May)	7	26	31
Summer (Jun-Aug)	8	30	36
Autumn (Sep-Nov)	8	30	36
Winter (Dec, Jan, Feb)	0	0	0

(Abbreviations as in Table 1)

Table 3. Month wise distribution of families/genera/species.

Months	Families	Genera	Species
January	0	0	0
February	0	0	0
March	2	2	2
April	5	10	11
May	7	26	31
June	8	30	36
July	8	30	36
August	8	30	36
September	7	30	36
October	5	16	18
November	2	6	7
December	0	0	0

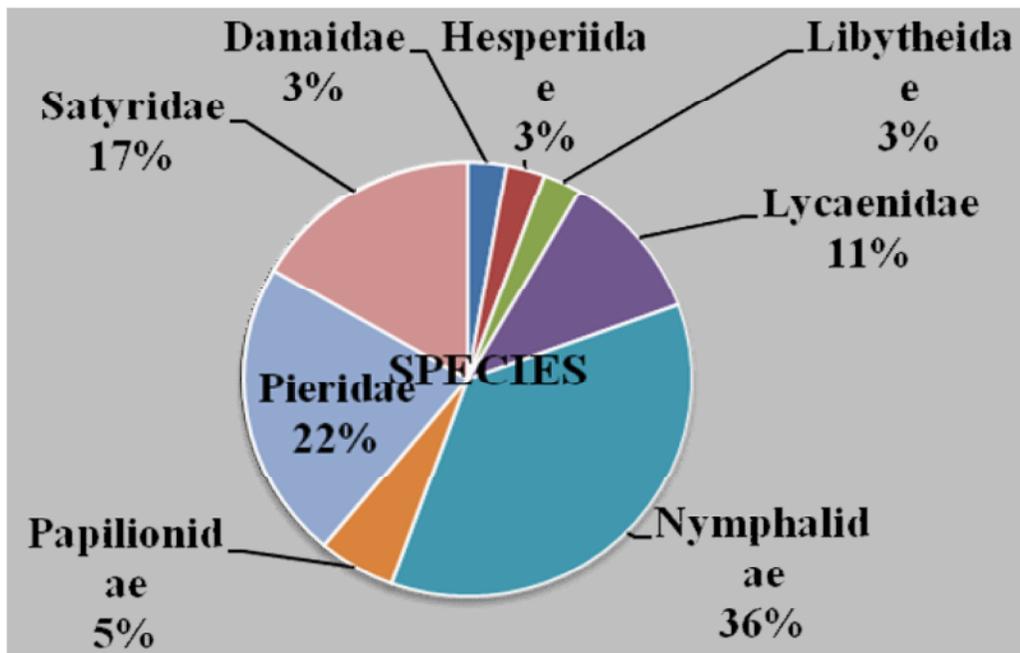


Fig. 2. Percentage of species in each family.

Species abundance was found highest in habitats like orchids/gardens near forests, dense forests, vegetable gardens, mountain areas, etc in areas like Batpora (Magam), Drugmulla, Karnah, Langate, Lolab Valley, Mawar, Panzgam, Rajwar, Trehgam, Villgam and Vodhpura.

Many species were found to act as pests of various fruits/vegetables like *Rapala nissa* on *Punica granatum* (Pomegranate), *Pieris brassicae*, *Pieris canidia*, *Pontia daplidice*, and *Pelopidas mathias* on *Brassica oleracea* var. *capitata* (Cabbage), *B. o.* var. *botrytis* (Cauliflower), *B. o.* var. *gongylodes* (Knolkhol), and *Rhaphanus sativus* (Raddish). Our observations match with those of (Atwal & Dhaliwal, 1999, Dar *et al.*, 2002). *Aglaia cashmirensis*, *Colias electo fieldi*, *C. erate*, *Cynthia cardui*, *Pieris brassicae* and *Pontia daplidice* were found in almost all the habitats from low-land to high-altitude areas surveyed during the present investigations. *Aporia leucodice*, *Argyreus hyperbius*, *Aulocera brahminus*, *A. padma*, *Callerebia mani*, *Childrena childreni*, *Danaus chrysippus*, *J. iphita*, *Kaniska canace*, *P. arcturus* were restricted to forest areas.

CONCLUSION

The present field investigations revealed that district Kupwara 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 of the district with care and focus on documentation and conservation of its rich biodiversity. Presently, 36 species belonging to 30 genera of 8 families of butterflies were collected. The butterfly activity was observed from March to November and the highest abundance was in summer season (June-August) whereas there was no butterfly activity in winter (December-February). The most dominant family was Nymphalidae followed by Pieridae, Satyridae and Lycaenidae. Highest distribution was observed in habitats like forests, hilly areas, gardens near forests in areas like Batpora (Magam), Drugmulla, Langate, Lolab Valley, Mawar, Panzgam, Karnah, Rajwar, Trehgam, and Villgam. The other floral and faunal elements of the area need to be studied so that the biodiversity of the area can be compiled and documented.

ACKNOWLEDGEMENTS

The authors are highly thankful to the Head, Department of Zoology, University of Kashmir, Srinagar, Jammu & Kashmir for extending all lab facilities and Dr. V.V. Ramamurthy, Principal Scientist & National Coordinator, NPIB, National Pusa Collection, Division of Entomology, IARI, New Delhi to give permission for the comparison of different species with the reference collection housed in the insect museum.

REFERENCES

- Anonymous 1999. *Gazetteer of India- Jammu & Kashmir State, Kashmir Region-Vol.1*. State Gazetteers Unit, Government of Jammu & Kashmir, Srinagar, pp. 369.
- Anonymous 2001. *Jammu & Kashmir 2001*. Information Department, Government of Jammu & Kashmir, pp. 392.
- Anonymous 2009. *Socio-Economic Profile of J&K 2009-10*. Directorate of Economics & Statistics, Government of Jammu & Kashmir, pp. 254.
- Atwal, A. S. and Dhaliwal, G. S. 1999. *Agricultural pests of South Asia and their management*. Kalyani Publishers, New Delhi, India. pp. 487.
- Dar, G. A., Bhagat, R. C. and Khan, M. A. 2002. *Biodiversity of the Kashmir Himalaya*. Valley Book House, Srinagar, India. pp.399.
- Evans, B. W. H. 1932. *The identification of Indian butterflies*. Diocesan Press, Madras, India. pp. 454.
- Haribal, M. 1992: *The Butterflies of Sikkim Himalaya and their Natural History*. SNCF, Gangtok, Sikkim. pp 217.
- Khan, M. R., Ahmed, R., Khan, M. R., Hayat, A and Khalid, M. 2003. Diversity of butterflies from district Bagh, Azad Kashmir. *Pakistan Journal of Biological Science*. **6**(24): 2007-2009.
- Kehimkar, I. 2008. *The book of Indian butterflies*. Bombay Natural History Society, Mumbai. pp. 497.
- Kunte, K. 2006. *India-A Lifescape, Butterflies of Peninsular India*. Universities Press (India) Private Ltd. Hyderabad, India. pp. 254.
- Pajni, H. R., Rose, H. S. and Walia, V. K. 2006. *Butterflies of North-West India*. Part-1. Atma Ram and Sons, Chandigarh, India. pp. 115.
- Sathe, T. V., Nayak, D. S., Mulani, A. C., Yadav, V. S. and Bhoje, P. M. 2004. Biodiversity of butterflies of Kolhapur city. pp. 229-246. In:

- Kumar, A. (ed.), *Biodiversity and Environment*. A. P. H. Publishing Corporation, New Delhi, India.
- Talbot, G. 1939. The Fauna of British India including Ceylon and Burma. Butterflies- Vol. I. Taylor and Francis Ltd. London. pp. 600.
- Talbot, G. 1947. The Fauna of British India including Ceylon and Burma. Butterflies- Vol. II. Taylor and Francis Ltd. London. Pp. 506.
- Wynter-Blyth, M. A. 1947. *Butterflies of the Indian Region*. Bombay Natural History Society, Bombay. pp. 527.