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Diversity of butterfly fauna of Union Council Koaz Bahram Dheri, Pakistan

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Abstract

The present studies were performing to explore the diversity of butterfly fauna of union council Koaz Bahram Dheri, District Charsadda, Khyber Pakhtunkhwa, Pakistan. The study was conducted from July 2012 to October 2012 of 12 localities of said area. For the collection of butterflies sweep net and naked hands were used. Total of 232 butterflies were collected are belonging to 13 species, 11 genera and 3 families. The family Nymphalidae comprises largest number (49%) followed by Pieridae (37%) and Papilionidae (14%). Family Nymphalidae species are *Junonia orithya*, *Cynthia cardui*, *Danaus chrysippus*, *Catopsilia pyranthe*, *Phalanta phalantha*, *Junonia almana* and *Cercyonis sthenele*. Family Pieridae species are *Eurema hecabe*, *Colias croceus*, *Catopsilia pomona*, *Colotis amata*, *Pieris canidia* and Family Papilionidae only one species *Papilio demoleus* were recorded. The result of the present study shows that the *Danaus chrysippus* is the most common species in union council Koaz Bahram Dheri. Related analysis should be conducted on large scale to fully evaluate and explore the butterfly fauna of District Charsadda as it is least concern region of Khyber Pakhtunkhwa in this regard.

Keywords: Diversity, Butterflies, Nymphalidae, Pieridae, Papilionidae

1. Introduction

Butterflies belong to class Insecta, order Lepidoptera. Generally butterflies and other insects are divided into three regions head, thorax and abdomen^[1]. They are the most beautiful and attractive insects which play an important role in ecosystem^[2]. They are valuable pollinators when they move from plant to plant, gathering nectars and important food for the birds, reptiles, spiders and predatory insects they are also good indicators of environment^[3]. Lepidoptera are divided into moths, butterflies, and skippers^[4]. The number of different species and their relative frequency is known as Diversity^[5].

2. Material and Methods

The objectives of present research were exploring the butterfly fauna and there diversity in union council Koaz Bahram Dheri, District Charsadda, Khyber Pakhtunkhwa, Pakistan.

2.1 Study Area and duration

The present study was conducted from 12 localities of Union Council Koaz Bahram Dheri, District Charsadda include the Hajji Sargund Kally, Fazal Kally, Aslam Khan Kally, Landi Shah, Gulandy Kally, Soor Kamar, Sewan, Bahram Dheri, Mardhand, Toor Khat Kally, Pally Qalla, and Aratt Kally during, July to October, 2012. Union Council Koaz Bahram Dheri, District Charsadda is located 34°8'43N 71°43'51E with an altitude of 276 meters (908 feet) and situated 29 kilometers from the provincial capital Peshawar (Figure 1). Total area of the District is about 996 square kilometers (243753 acres). According to census report of (1998), the population is more than 10, 22,000; most of the people are agriculture list^[6].

2.2 Materials

Sweep net, chloroform bottle, digital camera, and insect's pins, setting boards, insect boxes, naphthalene balls, ruler and field book.

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2.3 Collection and Preservation

Butterflies were collected randomly by using sweep net and naked hands, collected species were killing then placed them in chloroform bottle. Bottles were provided with cotton soaked chloroform in order to kill butterflies. They were pinned and their body parts were set on thermopile setting board in laboratory. Specimens were tagged with scientific name and area of collection along with date. On drying these were properly labeled and mounted in the collection boxes. Naphthalene balls were placed in the boxes to keep them safe from the pests.

2.4 Identification

Butterflies were identified with the help of keys, and available literature. Help was also taken by already identified specimens placed in National Insect Museum, (NARC) Islamabad by Dr.

Muhammad Ather Rafi Director National Insect Museum Islamabad Pakistan. All the identified specimens were deposited in the museum of Department of Zoology Hazara University Mansehra Pakistan.

2.5 Morphological study

Identified specimens were subjected for measurement of their total body length and wing span with the help of graph paper and ruler.

2.6 Photography

After the identification and measurement of specimens, they were placed one by one on top of a light blue paper. Photographs were taken on ventral side as well as by dorsal side by using digital camera, Yashica (14.2 megapixels), made in China.

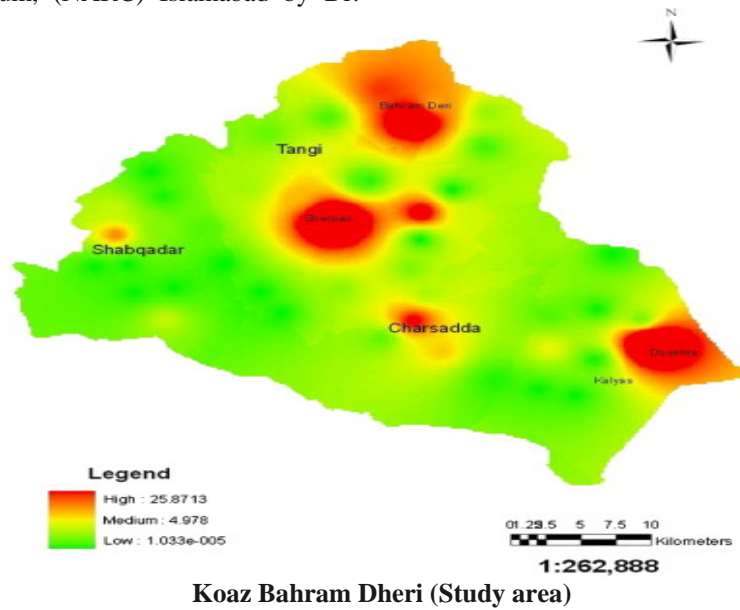


Fig 1: Map of District Charsadda Source [6]

3. Results

The present studies were conducted on the identification and distribution of butterflies (Class, Insecta; Order, Lepidoptera) of Union Council Koaz Bahram Dheri. Total of 232 specimens were collected from 12 localities. The identified specimens of butterflies

were belonging to 13 species 11 genera and 3 families. Family Nymphalidae comprises largest number of Butterflies, 114 (49%) followed by Pieridae 86 (37%) and 32 (14%) of Papilionidae (Figure 2).

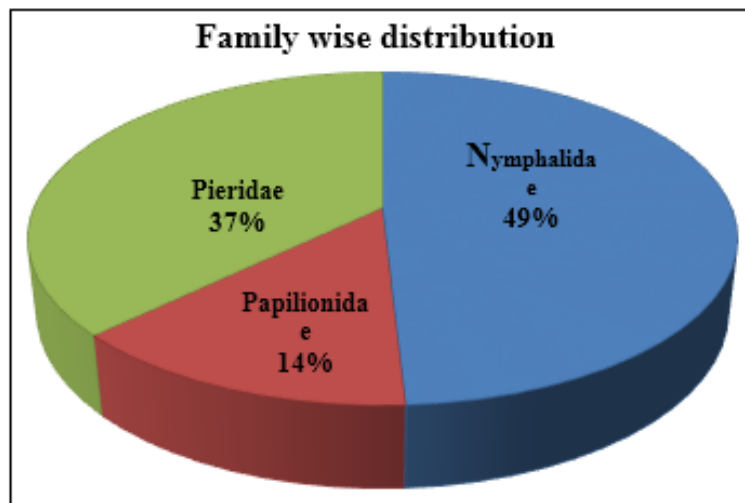


Fig 2: Distribution of butterflies' families in Union Council Koaz Bahram Dheri

The maximum morphometry of *P. demoleus* (9.8 ± 0.40^a W.S), (2.9 ± 0.16^a B.L) and followed by *D. chrysippus* (8.2 ± 0.20^a W.S), (2.5 ± 0.23^a B.L) are significantly ($P < 0.05$) higher than other

species. While *C. sthenele* (3.75 ± 0.40^b W.S), (1.05 ± 0.05^b B.L) and *E. hecabe* (4.5 ± 0.4^b W.S), (1.5 ± 0.13^b B.L) are not significantly higher.

Table 1: Wing Span (cm) and Body Length (cm) of butterfly species collected from union council Koaz Bahram Dheri.

S. No	Names of Species	n	Wing span (cm)	Body length (cm)
			(Mean±SD)	(Mean±SD)
1	<i>Danaus chrysippus</i>	72	8.2 ± 0.20^a	2.5 ± 0.23^a
2	<i>Eurema hecabe</i>	39	4.5 ± 0.4^b	1.5 ± 0.13^b
3	<i>Papilio demoleus</i>	32	9.8 ± 0.40^a	2.9 ± 0.16^a
4	<i>Catopsilia pyranthe</i>	16	6.1 ± 0.47	2 ± 0.22
5	<i>Junonia orithya</i>	15	4.8 ± 0.30	1.5 ± 0.08
6	<i>Catopsilia ponoma</i>	12	6.5 ± 0.42	2 ± 0.14
7	<i>Pieris canidia</i>	12	5.4 ± 0.38	1.6 ± 0.05
8	<i>Cynthia cardui</i>	11	5.5 ± 0.68	1.7 ± 0.18
9	<i>Catopsilia pomona,</i>	8	3.75 ± 0.40^b	1.05 ± 0.05^b
10	<i>Junonia almana</i>	5	5.7 ± 0.54	1.9 ± 0.24
11	<i>Colias croceus</i>	5	4.8 ± 0.72	1.8 ± 0.11
12	<i>Phalantha phalantha</i>	3	5.6 ± 0.40	1.7 ± 0.11
13	<i>Colotis amata</i>	2	5.05 ± 0.35	1.75 ± 0.07

Table 2: Number of butterfly species collected from different area of Union Council Koaz Bahram Dheri.

S. No	Area	Species	N	Date of collection
1	Hajji Sargand Kally	<i>P. demoleus</i>	5	25/09/2012
		<i>C. ponoma</i>	7	08/10/2012
		<i>C. pyranthe</i>	6	15/08/2012
		<i>E. hecabe</i>	10	03/08/2012
		<i>D. chrysippus</i>	8	22/07/2012
		<i>C. sthenele</i>	8	05/07/2012
		<i>P. demoleus</i>	5	09/09/2012
2	Aslam khan Kally	<i>P. canidia</i>	7	05/08/2012
		<i>D. chrysippus</i>	7	05/08/2012
		<i>E. hecabe</i>	8	05/08/2012
		<i>P. phalantha</i>	3	22/09/2012
3	Landi Shah	<i>J. orithya</i>	7	26/09/2012
		<i>P. canidia</i>	5	24/08/2012
		<i>E. hecabe</i>	8	07/08/2012
		<i>D. chrysippus</i>	5	24/08/2012
4	Fazal Kally	<i>P. demoleus</i>	3	06/09/2012
		<i>D. chrysippus</i>	3	13/09/2012
		<i>J. orithya</i>	8	25/08/2012
		<i>E. hecabe</i>	7	11/09/2012
5	Gulandy Kally	<i>P. demoleus</i>	4	08/09/2012
		<i>D. chrysippus</i>	6	07/09/2012
		<i>C. amata</i>	2	09/10/2012
		<i>C. ponoma</i>	5	08/10/2012
6	Sewaan Kally	<i>J. almana</i>	5	16/07/2012
		<i>C. cardui</i>	7	03/08/2012
		<i>D. chrysippus</i>	4	10/07/2012
7	Mardhand	<i>D. chrysippus</i>	8	30/09/2012
		<i>E. hecabe</i>	6	11/09/2012
8	Pally Qalla	<i>C. pyranthe</i>	4	03/09/2012
		<i>P. demoleus</i>	5	05/07/2012
		<i>D. chrysippus</i>	5	25/09/2012
9	Soor Kamar	<i>D. chrysippus</i>	8	05/08/2012
		<i>C. cardui</i>	4	13/08/2012
10	Aratt Kally	<i>C. pyranthe</i>	2	03/09/2012
		<i>P. demoleus</i>	7	04/07/2012
		<i>D. chrysippus</i>	4	21/09/2012
		<i>C. croceus</i>	4	08/10/2012
11	Bahram Dheri	<i>D. chrysippus</i>	7	11/08/2012
		<i>C. pyranthe</i>	4	09/07/2012
12	Toor Khat Kally	<i>P. demoleus</i>	3	04/07/2012
		<i>D. chrysippus</i>	8	03/08/2012

3.1 Species wise distribution of butterflies in 12 localities of union council Koaz Bahram Dheri The species wise distribution of butterflies shows the great difference between studies areas. The maximum number 43 of butterflies species were recorded from Hajji Sargund Kally followed by Aslam Khan Kally 30, Landi Shah 25, Fazal Kally 21, Gulandy Kally 16, Sewan Kally 16, Pally Qalla 15, Aratt Kally 15, Mardhand 14, Soor Kamar 12, Bahram Dheri 11 and Toor Khat Kally 11 (see Table 2).

3.2 Over all species wise occurrence

In the present study the overall species wise occurrence was also determine. It was found the maximum no of butterflies species were recorded of *D. chrysippus* 72 (31.03%), followed by *E. hecabe* 39 (16.81%), *P. demoleus* 32 (13.79%), *C. pyranthe* 16 (6.89%), *J. orithya* 15 (6.47%), *C. ponoma* 12 (5.17%), *P. canidia* 12 (5.17%), *C. cardui* 11 (4.74%), *C. sthenele* 8 (3.45%), *J. almanac* 5 (2.16%), *C. croceus* 5 (2.16%), *P. phalantha* 3 (1.30%) and *C. amata* 2 (0.86%) as shown in figure 3.

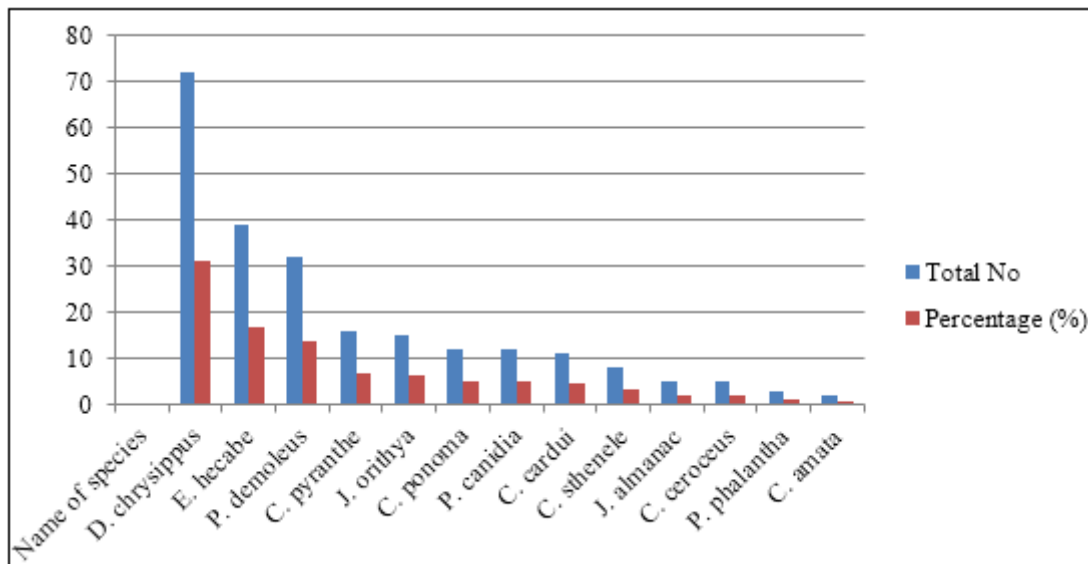


Fig 3: Species wise occurrence of butterflies in Union Council Koaz Bahram Dheri.

3.3 Month wise occurrence

The month wise occurrence of butterflies shows that the maximum number of butterflies was recorded in the month of August 98

(42.24%) followed by September 72 (31.03%), October 44 (18.97%) and July 18 (7.76%) as shown in figure 4.

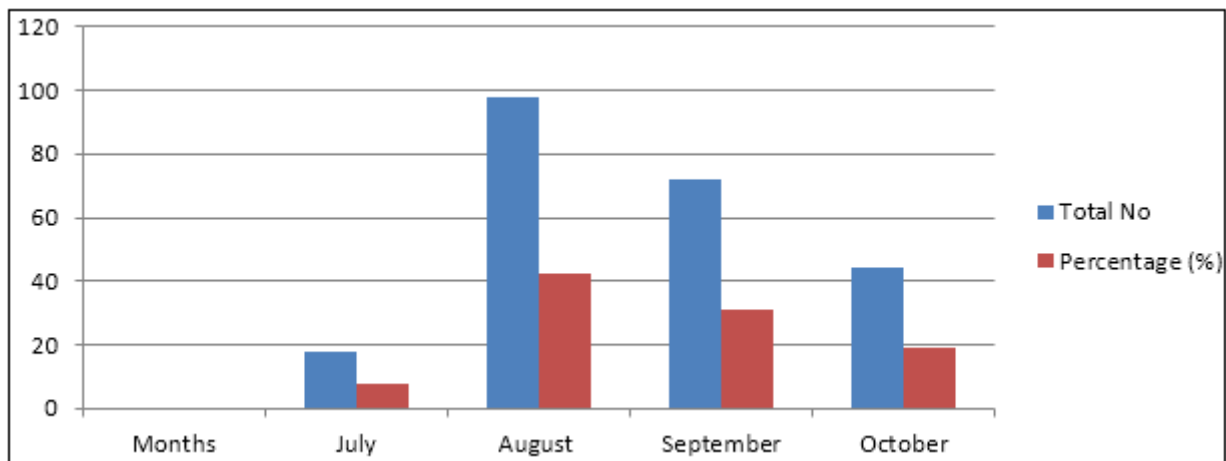


Fig 4: Month wise occurrence of butterflies' species in union council Koaz Bahram Dheri.

4. Discussions

The diversity of butterfly communities has been studied in different parts of the world [7]. This is the first study of butterfly fauna and documentary report of the said area. In the present study two new species of butterflies were identified from Hajji Sargund Kally and Gulandy Kally. A total of 232 specimens were collected and preserved sampling. Identification revealed that 13 different species in 11 genera belonging to 3 families were identified from study area. Shah et al. [8] first time studied the butterfly fauna of Kohat and reported 10 species belonging to only family Pieridae

from 7 different localities. Naz et al. [9] analyzed the diversity of butterfly fauna of Buner. A total of 450 specimen were collected and identified, 36 species were recorded falling in 25 genera and belonging to 8 families where as only 15 species were recorded from 12 genera belonging to 3 families in result of the present survey. Family Pieridae is bring up as comprising largest number while in present survey family Nymphalidae were put down large numbers of individuals followed by family Pieridae. However they show greatest similarity in both areas. Fitzherbert et al. [10] studied the diversity of butterflies a total of 90 species were recorded from

Gilgit and Khunjerab at high altitude. Due to climate variation some species are not recorded from study area. Perveen and Ahmad^[11] explore the butterfly fauna of Kohat, Pakistan. Twenty one species were identified belonging to 3 families; Pieridae covered 57%, Nymphalidae 33% and Papilionidae 10%, of total numbers of collected butterflies of Kohat. Pieridae is reported as dominant family during survey. Similarly these three families were also reported in the present survey. Verma et al.^[12] reported the different genera of butterflies taking place in Pakistan, Sarilanka, India, Myanmar, Bangladesh, Bhutan, and Nepal. They reported 15 genera of Papilionidae, 25 Pieridae, 6 Danaidae of the same country in present study Pieridae and Papilionidae were recorded and family Danaidae was absent. Jalil et al.^[13] analyzed a total number of 174 species of butterflies from Malaysia belonging five families, Papilionidae, Pieridae, Nymphalidae, *Lycaenidae* and *Hesperioidea*. The major families i.e. Nymphalidae, Pieridae and Papilionidae were also reported from present survey. Houlihan et al.^[14] recorded 445 species from *Borneo* peat-swamp forest including 384 individuals from at least eleven species.

5. Conclusions

From the present study it was concluded that the *D. chrysippus* is the most common species while the *P. phalantha* and *C. amata* are recorded in less number in Union Council Koaz Bahram Dheri.

6. Recommendation

Related analysis should be conducted on large scale to fully evaluate and explore the butterfly fauna of District Charsadda as it is least concern region of Khyber Pakhtunkhwa, Pakistan in this regard. Proper protective measures should be taken in attention in order to minimize the natural habitat loss, as butterfly fauna is dependent upon accurate environmental conditions.

7. Competing interest

The authors declare that they have no competing interest.

8. Acknowledgements

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