



ISSN : 0973-7057

Int. Database Index: 616 www.mjl.clarivate.com

Inventory report of the butterflies (Lepidoptera: Rhopalocera) of family Nymphalidae, Pieridae and Papilionidae at the Kanke, Ranchi

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Received : 20th June, 2021 ; Revised : 28th July, 2021

Abstract- Butterflies are the most attractive arthropods due to their beautiful and diverse colours. They have a great economic importance due to their ability to act as a pest on many of the economically important plants and they play a role as pollinators as well. Present study was an attempt to investigate the biodiversity of the butterflies at Kanke, Ranchi in the year 2019 (Jan-Dec). The collection time for the samples was 7:00 a.m. to 10:00 a.m. in the interval of 15 days. Total 153 individuals of butterflies belonging to 21 species under the three families Nymphalidae, Pieridae and Papilionidae with their host plants reported. Nymphalidae was the most dominant family with 13 species among three and Pieridae and Papilionidae with four species each.

Key words: Lepidoptera: Rhopalocera, Nymphalidae, Pieridae, Papilionidae, Kanke, Ranchi

INTRODUCTION

Butterflies are one of the most commonly known insects to human because of its widespread distribution and bright colours¹. They belong to order Lepidoptera along with moths^{2,3}. They are economically significant winged insects⁴. For the biodiversity studies, butterflies belongs to "flagship of taxa"^{5,6}. About 15,000 to 20,000 species of butterflies have been reported at global level while about 1500 species in India⁶. Among the ten families of butterflies, three of them were studied during the collection work. Butterflies are considered as bio indicator and used as a sample organism because of their habitat patterns⁷. Being pollinator the role of butterflies is noticeable⁸. India is known place for the butterflies because of recorded data of several authors⁹⁻¹⁵. In the present study, distribution of butterflies in the Kanke area of Ranchi was done. This area is witnessing fast-urbanized

colonies. Lawton *et al.* (1998)¹⁶ reported the anthropogenic disturbance affect the species richness of butterflies. The aim and objective of the work is to develop an inventory of butterflies during the 2019-21. Important point is to note that Covid pandemic lock down situation was there in during 1920-21. So, the significance of the work was also noticeable for the species richness point of view.

MATERIALS & METHOD

Collection, Identification and Preservation of samples:-

Collection of butterflies of Kanke, Ranchi accomplished through flying net technique. One of the each species preserved for reference and rest released. Counting made through quadrat method. For the preservation, butterflies were killed using ethyl acetate in an airtight killing jar. Stretching of wings and proper pinning done as per prescribed format¹⁶. Identification done with the help of available literatures¹⁷ and by comparing with the reference collection available at the Zoological Survey of India and National Centre for

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Biological Science. After a few days of spreading, the dried specimens shifted from the spreading board to the wooden box by removing the pins and preserving them with the labelling. The collection work were divided into three seasons - Pre-monsoon (January to April), Monsoon (May to August) and Post-monsoon (September to December).

Identification of the collected butterflies was accomplished by the study of the literature that contains keys of original species and their taxonomy. The following manuscripts were consulted for the identification and other related purposes¹⁸⁻³¹.

Geo-coordinate of the sites at Kanke, Ranchi :-

23° 26' 4.3764" N and 85° 19' 14.5272" E

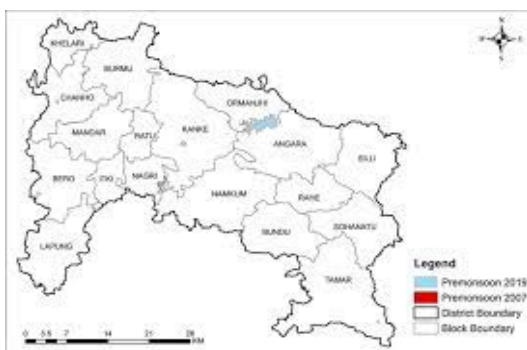


Figure 1: Map of Ranchi, Jharkhand



Figure 2: Map of Kanke, Ranchi (Collection area)

RESULTS & DISCUSSION

Author collected and identified butterflies in the Kanke, Ranchi during 2019-2021. Although, there is lack of any record that show comprehensive review of the butterflies in this area. The butterfly survey at Kanke, Ranchi signified the range of types of them belonging to the three species taken in the title of the work.

The 13 species of butterflies belonging to Nymphalidae family, four-four species of Pyridae, and Papilionidae family were recorded (Table-1). The thirteen species of Nymphalidae family were *Danaus chysippus chysippus* (NYM001), *Melanitis phedima bela*

Table 1: - List of butterflies collected from Kanke, Ranchi during 2019 – 21.

Sl. no	Name Of The Butterfly Species	Sample Code	Common Name	Family
1.	<i>Danaus chysippus chysippus</i>	NYM001	Plain Tiger	Nymphalidae
2.	<i>Melanitis phedima bela</i>	NYM002	Dark Evening Brown	Nymphalidae
3.	<i>Junonia almana</i>	NYM003	Peacock Pansy	Nymphalidae
4.	<i>Callerebia scanda opima</i>	NYM004	Pallid Argus	Nymphalidae
5.	<i>Areadne merione merione</i>	NYM005	Dakhan Common Coster	Nymphalidae
6.	<i>Melanitis phedima varaha</i>	NYM006	Dark Evening Brown	Nymphalidae
7.	<i>Junonia atlites atlites</i>	NYM007	Grey Pansy	Nymphalidae
8.	<i>Rohana perisatis perisatis</i>	NYM008	Black Prince	Nymphalidae
9.	<i>Danaus genutia genutia</i>	NYM009	Oriental Plain Tiger	Nymphalidae
10.	<i>Euploea core core</i>	NYM010	Indian Common Crow	Nymphalidae
11.	<i>Neptis hylas nicobarica</i>	NYM011	Common Sailor	Nymphalidae
12.	<i>Lasippa viraja viraja</i>	NYM012	Yellow jack Sailor	Nymphalidae
13.	<i>Acraea terpsicore</i>	NYM013	Indian Tawny coster	Nymphalidae
14.	<i>Eurema andersonii</i>	PIE001	One Spot Grass Yellow	Pieridae
15.	<i>Delias eucharis</i>	PIE002	Common Jezebel	Pieridae
16.	<i>Catopsilia pomona</i>	PIE003	Lemon Emigrant	Pieridae
17.	<i>Belenois aurota aurota</i>	PIE004	Pioneer White	Pieridae
18.	<i>Graphium macareus indicus</i>	PAP001	Lessor Zebra	Papilionidae
19.	<i>Papilio polytes romulus</i>	PAP002	Indian Common Mormon	Papilionidae
20.	<i>Papilio demolus demolus</i>	PAP003	Oriental Lime swallowtail	Papilionidae
21.	<i>Pachliopta aristolochiaearistolochiae</i>	PAP004	Common Rose	Papilionidae

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(NYM002) *Junonia almanac* (NYM003), *Callerebia scanda opima* (NYM004), *Areadne merione merione* (NYM005), *Melanitis phedima varaha* (NYM006), *Junonia atlites atlites* (NYM007) *Rohana perisatis perisatis* (NYM008) *Danaus genutia genutia* (NYM009) *Euploea core core* (NYM010), *Neptis hylas nicobarica* (NYM011), *Lasippa viraja viraja* (NYM012), and *Acraea terpsicore* (NYM013). Four species of butterflies of the family Pieridae were *Eurema andersonii* (PIE001), *Delias eucharis* (PIE002), *Catopsilia Pomona* (PIE003), and *Belenois aurota aurota* (PIE004). Four species of butterflies of the family Papilionidae were *Graphium macareus indicus* (PAP001), *Papilio polytes Romulus* (PAP002), *Papilio demolus demolus* (PAP003), and *Pachliopta aristolochiae aristolochiae* (PAP004). Table 2 depicted that NYM004 were most counted and were found in all three seasons in the year 2021. While from

family Pieridae, PIE001 was counted throughout the year. PAP002 were most abundant throughout the year belonging to family Papilionidae. Table 3 depicted that NYM004 were most counted and were found in all three seasons in the year 2021. While from family Pieridae, PIE001 was counted throughout the year. PAP001 and PAP002 were most abundant throughout the year belonging to family Papilionidae. Table 4 depicted that NYM001, NYM002, NYM004, and NYM009 were most counted and were found in all three seasons in the year 2021. While from family Pieridae, PIE001 was counted throughout the year. PAP001 and PAP002 were most abundant throughout the year belonging to family Papilionidae. The distribution of PIE001 was found similar to the protected area of Arunachal Pradesh³². Butterflies of families Nymphalidae and Pieridae were reported from Kathara Coalmine Area of Jharkhand³³.

Table 2:- Collection report of butterflies belongs to three families Nymphalidae, Pieridae and Papilionidae at Kanke in the year 2019.

SN	Species collected	Pre Monsoon					Monsoon					Post Monsoon					Grand Tot (A+B+C)		
		Jan	Feb	Mar	Apr	Tot (A)	May	Jun	Jul	Aug	Tot (B)	Sep	Oct	Nov	Dec	Tot (C)			
1	NYM001	0	0	0	0	0	0	0	0	0	0	1	1	1	1	4	4		
2	NYM002	0	0	0	0	0	0	0	0	0	0	2	1	2	1	6	6		
3	NYM003	0	0	0	0	0	0	0	0	0	0	1	2	1	0	4	4		
4	NYM004	0	0	0	0	0	1	2	3	1	7	2	3	2	1	8	15		
5	NYM005	0	0	0	0	0	0	1	2	1	4	1	2	1	1	5	9		
6	NYM006	0	2	1	0	3	1	1	2	2	6	0	0	0	0	0	9		
7	NYM007	0	0	0	0	0	0	1	1	1	3	0	1	1	0	2	5		
8	NYM008	0	0	0	0	0	0	1	2	2	5	2	2	1	0	5	10		
9	NYM009	0	0	0	0	0	0	0	0	0	0	0	2	1	2	5	5		
10	NYM010	0	0	0	0	0	0	0	0	0	0	1	2	2	0	5	5		
11	NYM011	0	0	0	0	0	0	1	1	1	3	1	2	1	2	6	9		
12	NYM012	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	3		
13	NYM013	0	0	0	0	0	0	1	1	1	3	0	0	0	0	0	3		
14	PIE001	0	1	1	0	2	0	2	3	1	6	2	3	1	1	7	15		
15	PIE002	0	0	0	0	0	1	1	2	1	5	1	1	1	0	3	8		
16	PIE003	0	1	1	0	2	1	2	1	2	6	1	2	1	0	4	12		
17	PIE004	0	0	0	0	0	0	0	0	0	0	2	2	1	0	5	5		
18	PAP001	0	1	0	0	1	0	0	0	0	0	1	2	0	1	4	5		
19	PAP002	0	0	0	0	0	0	1	2	1	4	1	2	1	0	4	8		
20	PAP003	0	0	0	0	0	1	2	1	2	6	0	0	0	0	0	6		
21	PAP004	0	1	1	0	2	0	0	0	0	0	1	2	1	1	5	7		
						10						58						85	153

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Table 3:-Collection report of butterflies, belonging to three families Nymphalidae, Pieridae and Papilionidae at Kanke in the year 2020.

SN	Species collected	PreMonsoon					Monsoon					Post Monsoon					Grand Tot (A+B+C)		
		Jan	Feb	Mar	Apr	Tot (A)	May	Jun	Jul	Aug	Tot (B)	Sep	Oct	Nov	Dec	Tot (C)			
1	NYM001	2	3	1	1	7	1	2	2	1	6	1	2	1	1	5	18		
2	NYM002	1	2	1	1	5	0	4	2	1	7	2	2	2	1	7	19		
3	NYM003	1	1	0	0	2	1	3	1	2	7	1	2	1	0	4	13		
4	NYM004	1	1	1	1	4	1	3	2	2	8	2	3	2	1	8	20		
5	NYM005	1	2	0	0	3	1	2	1	2	6	2	2	1	1	6	15		
6	NYM006	3	2	1	0	6	1	4	2	1	8	1	1	0	0	2	16		
7	NYM007	2	1	0	1	4	1	3	2	1	7	1	1	1	0	3	14		
8	NYM008	2	2	0	0	4	0	2	1	1	4	2	2	1	0	5	13		
9	NYM009	3	2	1	0	6	1	2	2	1	6	2	1	1	2	6	18		
10	NYM010	1	1	0	1	3	0	3	1	2	0	2	1	2	0	5	8		
11	NYM011	2	2	1	0	5	0	2	1	1	4	1	2	1	2	6	15		
12	NYM012	1	1	0	0	2	0	1	2	0	3	0	1	1	1	3	8		
13	NYM013	3	1	1	0	5	1	2	2	1	6	1	1	0	0	2	13		
14	PIE001	2	2	1	1	6	0	2	1	2	5	3	2	1	1	7	18		
15	PIE002	1	2	0	0	3	0	1	1	0	2	2	1	1	0	4	9		
16	PIE003	0	1	1	0	2	1	1	2	1	5	1	2	1	0	4	11		
17	PIE004	2	1	0	1	4	0	1	2	1	4	2	2	1	0	5	13		
18	PAP001	1	1	1	0	3	0	1	1	0	2	1	2	1	1	5	10		
19	PAP002	1	1	1	0	3	0	1	1	1	3	1	2	1	0	4	10		
20	PAP003	0	1	1	0	2	0	1	1	0	2	1	1	1	0	3	7		
21	PAP004	0	1	1	0	2	0	1	1	0	2	1	1	0	0	2	6		
						81						97						96	274

Table 4:-Collection report of butterflies, belonging to three families Nymphalidae, Pieridae and Papilionidae at Kanke in the year 2021.

SN	Species collected	PreMonsoon					Monsoon					Post Monsoon					Grand Tot (A+B+C)		
		Jan	Feb	Mar	Apr	Tot (A)	May	Jun	Jul	Aug	Tot (B)	Sep	Oct	Nov	Dec	Tot (C)			
1	NYM001	2	2	1	1	6	1	2	2	1	6	1	2	1	1	5	17		
2	NYM002	1	2	1	1	5	0	3	2	1	6	1	2	2	1	6	17		
3	NYM003	1	1	1	1	4	1	3	1	2	7	1	2	1	0	4	15		
4	NYM004	1	1	1	1	4	1	1	2	2	5	2	3	2	1	8	17		
5	NYM005	1	2	0	0	3	1	2	1	2	6	2	2	1	1	6	15		
6	NYM006	3	2	1	0	6	1	3	2	1	7	1	1	1	0	3	16		
7	NYM007	2	1	0	1	4	1	3	2	1	7	1	1	1	0	3	14		
8	NYM008	2	2	0	0	4	0	2	1	1	4	2	2	1	0	5	13		
9	NYM009	3	2	1	0	6	1	2	1	1	5	2	1	1	2	6	17		
10	NYM010	1	1	0	1	3	0	3	1	2	6	2	1	2	0	5	14		
11	NYM011	2	2	1	0	5	0	2	1	1	4	1	2	1	2	6	15		
12	NYM012	1	1	0	1	3	0	1	2	1	4	0	1	1	1	3	10		
13	NYM013	3	1	1	0	5	1	2	2	1	6	1	1	1	1	4	15		
14	PIE001	2	2	1	1	6	0	2	1	2	5	1	2	2	1	6	17		
15	PIE002	1	2	1	0	4	0	1	1	1	3	2	1	1	0	4	11		
16	PIE003	0	1	1	1	3	1	1	2	1	5	1	2	1	1	5	13		
17	PIE004	2	1	0	1	4	0	1	2	1	4	2	2	1	0	5	13		
18	PAP001	1	1	1	0	3	0	1	1	0	2	1	2	1	1	5	10		
19	PAP002	1	1	1	0	3	0	1	1	1	3	1	2	1	0	4	10		
20	PAP003	0	1	1	0	2	0	1	1	0	2	1	1	1	0	3	7		
21	PAP004	0	1	1	0	2	0	1	1	0	2	1	1	0	0	2	6		
						85						99						98	282

CONCLUSION

Kanke area of Ranchi is rich in butterflies' diversity. Results clearly indicated the richness of species of Nymphalidae was more than the Pieridae and Papilionidae families. Kanke area of Ranchi city was rich in the diversity of butterflies.

ACKNOWLEDGEMENT

I acknowledge the support of the Head, University Department of Zoology, Ranchi University, Ranchi for her support.

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