

# STUDIES ON DIVERSITY AND SPECIES RICHNESS OF BUTTERFLY IN REWA DISTRICT (M.P.)

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**ABSTRACT:-** Butterflies are among the most charismatic and widely recognized insects, and they play a critical role in many ecosystems as pollinators, indicators of ecosystem health, and food sources for other animals. Research on butterfly diversity and species richness can help us understand patterns of biodiversity and the factors that influence them. For example, studies may investigate how different environmental factors such as climate, habitat type, and landscape fragmentation affect butterfly populations and diversity. Butterfly monitoring programs can also provide valuable information about the effectiveness of conservation efforts and the impact of human activities on biodiversity. Additionally, research on the interactions between butterflies and their host plants can help us understand how changes in vegetation affect butterfly populations.

**KEYWORDS:** - Butterflies, Pollinators, Indicators, Diversity and Species Richness.

## INTRODUCTION:-

To understand the biodiversity we study biological indicators and they clarify us the importance of ecosystem of forests and their management (Pearce and Venier, 2006, Maleque et al., 2009). Mostly the biodiversity of insects are studied for the ecosystem of forests (Kwon et al., 2013, Lee and Kwon, 2014, Lee et al., 2014). In insects, the butterfly fauna is the best indicator as they are high in number, their generation is short, their movement is good and they have high sensitivity for change in environment (Lee and Kwon, 2012, Lee and Kwon, 2014, Kwon et al., 2014). The butterflies are easily studied using the line transect technique (Pollard and Yates 1993). Butterfly is identified as the representation of grace and beauty (Rafi et al., 2000). They are the diurnal insects and are easily

identified due to its cheerful colour and stunning shapes (Javaid, 1978). Butterflies are best for pollination and has good artistic and market values (Ahsan and Javaid, 1975).

The Butterflies belong to order Lepidoptera which is the second big class in the insects and comprising of approximately 1,50,000 species up till now. The order Lepidoptera includes Butterflies and Moths of which about 17,820 are Butterflies (Shields, 1989). Butterflies are most familiar insect to mankind due to their large size, brilliant coloration and sunshine loving habits. They amuse us by their brilliant coloration. Due to their attractiveness and omnipresence they have acquired a niche in the prose and poetry of various cultures. The children are more fascinated by them. Butterflies are the next pollinating agents after the bees and in fact success of angiosperms depends on these pollinating agents. The number of Indian Butterflies count to one fifth of the world total of Butterfly species. The Himalayan mountain range harbors major share of the Indian Butterfly diversity (Haribal, 1992).

Butterflies are one of the attractive and lovely comparing to other insects, which distinguish them from other order lepidoptera. The butterflies helps in pollination as they fly from one plant to the other. Most of the butterflies species are season specific and select a specific habitat (Kunte, 1997) and they are the best good indicators which show the unwanted activities and disruption in the environment (Kocher and Williams, 2000). Butterflies are called dayflying insects which are in the order of Lepidoptera, Lepidos means “scales” and Ptera means “wings”. The order Lepidoptera is ecologically very important. The adult butterflies generally feed on nectar and serve as important pollinators of flowering plants and their larvae feed on foliage frequently as the primary herbivores in ecosystems and are important in the

transfer of radiant energy fixed by plants, making it available to the other organisms in the ecosystem. Butterflies are potentially useful ecological indicators of urbanization because sensitive to changes in microclimate, temperature (Thomas et al., 1998).

The most significant findings from butterfly diversity studies is the role of habitat fragmentation and loss in reducing butterfly populations and diversity. Studies have shown that butterflies are particularly sensitive to changes in their habitat, and habitat fragmentation can lead to reduced genetic diversity and population size, as well as increased vulnerability to local extinction. studies on butterfly diversity and species richness are crucial for understanding the ecological importance of these insects and promoting their conservation. The findings from these studies can inform policy and management decisions to protect butterfly populations and the ecosystems they support.

#### MATERIAL AND METHODS:-

##### Study Area:

**Sample collection:** The current research study was conducted from March to August 2022 from 2 Tehsils of District Rewa for the collections of butterflies' species. The line transect method was used for the collection of butterflies species. A total of 12 line transect were installed in different potential sites of the study area, length of transect was 300m while width is normal 15m. In this method three peoples were involved, two of them walking on zigzag direction to search the specimens and one person walking in middle of transect to record the species detail. Most of the transects were placed in the field with the suitable habitat surrounded. Butterflies were also collected using aerial nets method near by the transect of each potential sites. After collection, the specimen were tagged temporally by writing the current date, time, locality, and collector, than keep the particular record with each specimen in small glass bottles.

**Killing method:** A small piece of cotton soaked with chloroform and was kept in each glass bottle individually which contains the collected specimens.

**Identification:** Identifications of the specimens was carried out with help of standard available literature already identified species, thesis, research articles (Sabir et al., 2000) (Munir et al., 2008) (Abbas et al., 2002).

**Pinning and Preservation:** After Identifications, For the small specimens a small drop of hydro soluble glue was put on the small hard whites card the than the specimens were put/mounted on it an d than the cards were hang through the small entomological pen in the wooden insects box. The large specimens were pinned on the right elytra behind the pronotum and keep for the permanent storage in the wooden insect's boxes and keep Naphthalene balls in each box to protect against microbes and fungal infections.

#### RESULTS AND DISCUSSION:-

In this study a totals of 50 specimens were collected from all localities. In this study 5 different species were identified belonging to 2 families and 4 genera. The species were *Papilio polite*, *Papilio demoleus*, *Danaus chrysippus*, *Cynthia cardui* and *Junonia orithya*. In the recorded 5 species *Danaus chrysippus* was the most common species of the district Rewa and the most rear specie was *Papilio polite* during this study. The current explorative work was the new detailed work on the butterfly from district Rewa (M.P.). The details of collected species are given in Table -1.

**Table-1: Taxonomic position of collected species from different localities of Rewa.**

Family	Genus	Species
Papilionidae	<i>Papillio</i>	<i>Papillio polytes</i>
		<i>Papillio demoleus</i>
Nymphalidae	<i>Dannus</i>	<i>Dannus chrysippus</i>
	<i>Cynthia</i>	<i>Cynthia cardui</i>
	<i>Junonia</i>	<i>Junonia orithya</i>

#### Description of collected species:

- Papilo polytes:** The body length of the specie is 3.5 cm and width is about 7.8 cm. Body colour is black with yellow patches present on fore and hind wings.

Patches present on fore wings are small and are not very much distinctly clear, whereas the hind wings has clear patches present in series.

- 2. *Papilio demoleus*:** The body length of the specie is 2.8 cm and width is 7.3 cm. Over all body colour is black with creamy to white colour patches of different size. The fore wings has almost similar colour of creamy colour patches whereas the hind wings has 2 unique red to brown patches.
- 3. *Danaus chrysippus*:** The body length of the specie is 2.9 cm and width is 7.2 cm. Body has grey and black colour combination. The fore wings is much brighter in colour. The hind wings has 3 to 4 black patches. Over all body of the specie is covered by black lining.
- 4. *Cynthia cardui*:** The body length of the specie is 1.7 cm and width about 6.2 cm. It has blackish to light pink red colour marking on body. Wings contain black and white dots. The colour of the specimens was shiny and light but after collection the colour become dull.
- 5. *Junonia orithya*:** The body length of the specie is 1.6 cm and width of the specie is 4.1 cm. Body colour is very attractive containing blue, black and grey colour combination. Wings contain 8 blue round ocelli covered by brown lining. The color was very shiny and bright at collection time but become dull after preservation.

The present survey was conducted to explore the biodiversity of butterflies of Rewa in the period of March to August 2022. During the course of the study the butterflies were collected from 2 Tehsil including 12 localities. The totals of 50 specimens were collected from all localities. During this research 5 different species were recognised belonging to 2 families and 4 genera. A study was conducted in district Charsadda to explore the diversity and to prepare key for documentation of butterfly fauna from August 2014-May 2015. The reported species were belonging to 3 different families, 18 genera and 23 species. The collected butterflies were comprised of families Nymphalidae 50% > Pieridae 43% > Papilionidae 7% (Khan and Haroon 2016). To study the 3 different territories around the botany garden the line transect method was used from

June to July 2010. A total of 57 species of butterflies were identified belongs to 9 different families (Alarapae et al. 2015). In present study a total of 50 specimens were collected which belong to 2 families, 4 genus and 5 species. The highest recorded species were belonging to family Nymphalidae. The variation in the species might be due to seasonal and environmental change in the study area.

A study was conducted on butterflies of Takht-e-Nusrati Karak region of Pakistan in which 17 species from families Namphalidae, Papilionidae and Pieridae cover 35%, 12%, and 53% of the butterflies were reported. Family Namphalidae included species *Argynnis hyperbius*, *Cynthia cardui*, *Ariadne merione*, *Junonia orithya*, *Phalanta phalantha* and *Hipparchia parisati*. Family Papilionidae: *Catopsilia Pomona*, *Colias croceus*, *Colotis etrida*, *C. protractus*, *Eumera hecab*, *Pieris ajaka*, *P. brassicae*, *P. rapae* and *P. napae* respectively. While Pieridae included *Papilio demoleus* and *P. polytes* only (Usman et al. 2017).

#### **CONCLUSION:-**

The current study was the first attempt to explore the butterflies' fauna of district Rewa (M.P.). In present study 5 different species were identified belonging to 2 families and 4 genera. The species were *Papilio polite*, *Papilio demoleus*, *Danaus chrysippus*, *Cynthia cardui* and *Junonia orithya* is rich in flora and provide a much suitable environment and place for biodiversity. It is concluded from this study that the butterflies' fauna of district Rewa is very rich.

#### **REFERENCES:-**

1. Abbas, M, Rafi, M.A, Inayatullah, M, Khan, M.R, Pavulaan, H, 2002. Taxonomy and distribution of butterflies (Papilionoidea) of the Skardu region, Pakistan. Tax. Rep. Intl. Lepidop. Surv 3, 1–5.
2. Ahsan, M., Javaid, I., 1975. A contribution to the butterflies of Lahore with the addition of new records. Biologia 24, 238–247.

3. Attaullah, M., Haq, N., Buneri, I.D., Ullah, R., Rahim, A., 2018. Diversity of butterfly fauna of Doag Dara, Sheringal, Dir Upper, Pakistan. *Journal of biodiversity and environmental sciences* 13, 297–305.
4. Haq, F., Ahmad, H., Alam, M., Ahmad, I., & Rahatullah. 2010. Species diversity of vascular plants of Nandiar valley western Himalaya, Pakistan. *Pak. J. Bot., Special Issue (S.I. Ali Festschrift)* 42, 213-229.
5. Haq, Faizul, 2012. The Critically Endangered Flora and Fauna of District Battagram Pakistan. *Advances in Life Sciences* 2 (4), 118–123.
6. Haribal, M. 1992. *The Butterflies of Sikkim, Himalaya and their Natural History*. Natraj Publishers, Dehradun. 217.
7. Hassan, S. A. 1994. Butterflies of Islamabad and Murree Hills. 1-68, Asian Study Group, Islamabad, Pakistan Javaid, I., 1978. Preliminary report of butterflies of district Rawalpindi and Islamabad. *Biologia* 24, 238–247.
8. Khan, M.R., Rafi, M.A., Munir, M., 2007. Biodiversity of butterflies from districts Kotli, Mipur and Azad Kashmir. *Pakistan Journal of Zoology* 39, 27–34.
9. Kocher, S.D., Williams, E.H., 2000. The diversity and abundance of North American butterflies vary with habitat disturbance and geography. *Journal of Biogeography* 27, 785–794.
10. Kunte, K., 1997. Seasonal patterns in butterfly abundance and species diversity in four tropical habitats in Northern Western Ghats. *Journal of Bioscience* 22, 593– 603.
11. Kwon, Tae-Sung, Lee, Cheol Min, Kim, Sung-Soo, 2014. Northward range shifts in Korean butterflies. *Climatic Change* 126 (1-2), 163–174.
12. Kwon, Tae-Sung, Park, Young Kyu, Lim, Joo-Hoon, Ryou, Sae Han, Lee, Cheol Min, 2013. Change of arthropod abundance in burned forests: different patterns according to functional guilds. *Journal of Asia-Pacific Entomology* 16 (3), 321–328.
13. Lamb production under different systems of management on rangelands of Balochistan. *Pak. Vet. J* 28, 68–70.
14. Lee, C.M., Kwon, T.S., 2012. Characterization of the butterfly community of a fragmented urban forest, Hongneung Forest. *Korean Journal of Applied Entomology* 51, 317–323.
15. Lee, Cheol Min, Kwon, Tae-Sung, 2014. Change of butterfly communities after clear cutting in Gwangneung Forest. *Korean Journal of Applied Entomology* 53 (4), 347–354.
16. Lee, Cheol Min, Kwon, Tae-Sung, Park, Young Kyu, Kim, Sung-Soo, Sung, Joo Han, Lee, Young Geun, 2014. Diversity of beetles in Gariwangsan Mountain, South Korea: Influence of forest management and sampling efficiency of collecting method. *Journal of Asia-Pacific Biodiversity* 7 (3), 319–346.
17. Maleque, M. Abdul, Maeto, Kaoru, Ishii, Hiroaki T., 2009. Arthropods as bioindicators of sustainable forest management, with a focus on plantation forests. *Applied Entomology and Zoology* 44 (1), 1–11.
18. Muhammad, S. 2004. Resource Management Plan Allai forests. Munir, M, Jasral, A.W, Rafique, S, 2008.
19. Pearce, Jennie L., Venier, Lisa A., 2006. The use of ground beetles (Coleoptera: Carabidae) and spiders (Araneae) as bioindicators of sustainable forest management: a review. *Ecological Indicators* 6 (4), 780–793.

20. Shields, O., 1989. World numbers of Butterflies. Journal of the Lepidopterists Society 431, 178–183.
21. Thomas, J.A., Simcox, D.J., Wardlaw, J.C., Elmes, W.G., Hochberg, M.E., Clark, R.T., 1998. Effects of latitude, altitude and climate on the habitat and conservation of the endangered butterfly *Maculinea arion* and its *Myrmica* ant host. J Sect conserve 2, 39–46.
22. Usman, K., Rehman, H.U., Pervaiz, K., Khan, H., Ahmad, N., Khattak, B., 2017. Exploring Butterfly fauna at Takht-e-Nasrati, Karak Khyber Pakhtunkhwa, Pakistan. Journal of Entomology and Zoology Studies 5, 968–971.