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Species diversity, relative abundance and status of butterflies of Betul district, Madhya Pradesh

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Abstract
Butterflies have great economic, cultural and aesthetic value and are sensitive to fractional variation in climatic factors. They form an important biota of the class Insecta, belonging to the order Lepidoptera. The present investigation on species diversity and abundance of butterfly was carried out in Betul district, Madhya Pradesh during April-2017 to December-2019. In the present survey a total number of 35 species belonging to 24 genera falling under six different families were observed and identified. The highest number was recorded from family Nymphalidae (15 species, 43%) followed by Pieridae (7 species, 20%) Danaidae and Papilionidae (4 species each with 11%) however, Hesperiidae and Lycaenidae recorded 3 and 2 species with 9% and 6% of relative abundance, respectively.

Keywords: Butterfly, diversity, family, species, Madhya Pradesh

Introduction
Butterflies are generally regarded as one of the best taxonomically studied group of insects. Worldwide there are more than 28,000 species of butterflies; with about 80 percent found in tropical regions [12] and absent in Antarctica continent; while according to Gaonkar [7] and Kunte [11] there are about 17,200 species of butterflies found throughout the world. India host about 1504 species of butterfly fauna [19] Butterflies and their caterpillars are dependent on specific host plants for food, thus the diversity of butterflies indirectly reflects the overall plant diversity especially that of shrubs and herbs in the given area. Some butterflies are migratory. In winter, these butterflies fly thousands of miles to warmer places and return back in the spring. More than 50 economically important plant crops are pollinated by butterflies and they serve as important plant pollinators in the local environment [2]. Butterflies are also good indicators of environmental change as they are sensitive to habitat degradation and climate changes [11]. Conservation of these butterflies is the need of the hour but such kind of study has not been carried out in the area. Hence, the present study was taken up for the assessment of the diversity and abundance of butterflies found in the selected study area.
Betul district is situated in the southern part of Madhya Pradesh on the Satpura Plateau between 21°22'-22°24' N latitude and 77°04'78°-33' E longitude. The district is bounded in the north by Hoshangabad district, in the south by Amarawati district and in the east by Chhindwara district and in the west by Hoshangabad, East Nimar and Amrawati districts (Map.1). Total area of the district is 10,043 sq.km. Average temperature is 24.3 0C with precipitation 1129.6 mm.
Betul district is rich in forests and biodiversity. Teak is the main timber species of Betul forest. Many miscellaneous types of trees such as Haldu, Saja, Dhaoda, Mahua, Aonla etc. are found in abundance. Also, many medicinal plants are found in the forest areas of Betul. Bamboo (*Dendrocalamus strictus*) is found scattered in various parts of the district [1].

Materials and Methods
Study area: The present study was conducted during April 2017 to December 2019. Survey was carried out in selected sites of three ranges of Betul district viz. Bhoura – North (N 22°16'53.6" E 77°52'12.6") Mahupani (Tapti) – West (N 21°53'14" E 77°42'37") Chunahajuri – South (N22°5'59.3"E77°37'17.4")

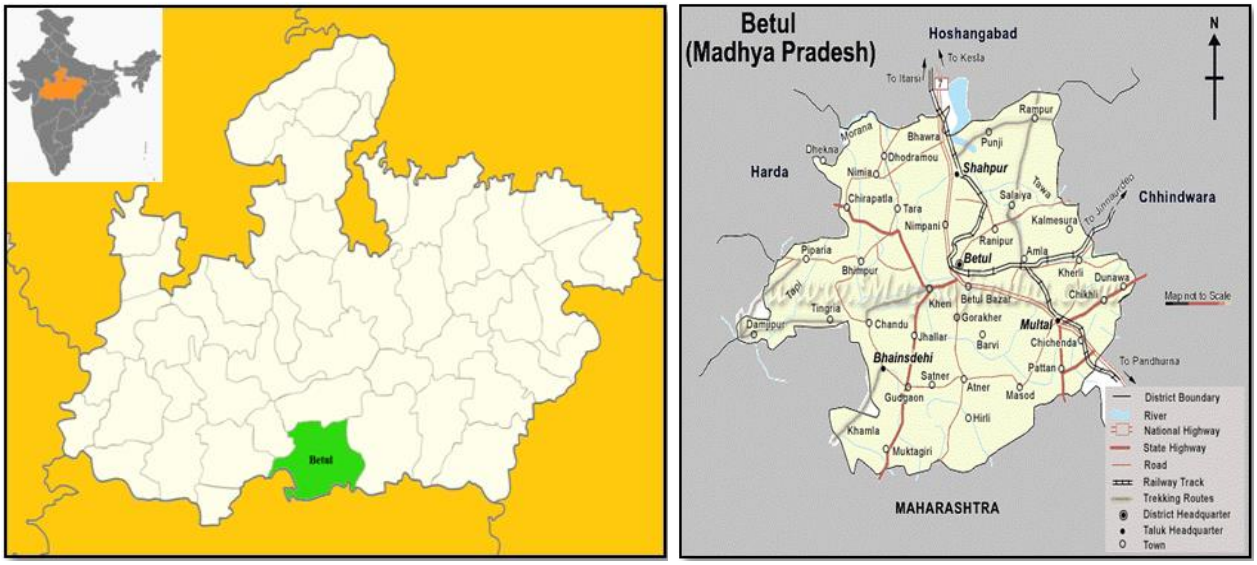

Fig 1: Map of Madhya Pradesh with Betul District

The sampling sites fall broadly into three categories namely reserve forest, open forest and agriculture land reflecting level of disturbances. At each sites sampling was carried out in different one hectare plots in all the seasons [6].

Collection & Identification: The random survey on butterflies was carried out on sunny days seasonally. The observations were made from 0800hr to 1100hr, which is a peak time for butterfly activity. Butterflies were primarily identified directly in the field or in difficult cases, following capture or photography. In critical conditions specimens were collected only with handheld aerial sweep nets. Each specimen was placed in a plastic bottle and carried to laboratory. All the specimens of butterflies were pinned, dried & were transferred to air tight insect boxes containing powdered naphthalene [6, 23]. Species of butterflies were identified from relevant literature [5, 15, 16, 22, 10, 11]. Some species were identified after their comparison with reference collection housed at TFRI and ZSI Jabalpur. All scientific names followed in the present study are in accordance to Vershney [21]. The observed butterflies were categorized in five categories on the basis of their abundance in the selected sites of Betul district. VC- Very common (>100 sightings), C–Common (50–100 sightings), NR-not rare (2–15 sightings) VR–Very rare (1–2 sightings) [18].

Table 1: Check list of butterfly species collected from Betul district, Madhya Pradesh

S.N.	Scientific name	Family	Relative Abundance (%)	Status
1	*Danais chrysippus* (Linnaeus)	Danaidae	3.38	VC
2	*Danais genutia* (Cramer)	Danaidae	1.08	NR
3	*Danais limniace* (Cramer)	Danaidae	2.43	C
4	*Euploea core core* (Cramer)*	Danaidae	5.28	VC
5	*Hasora chromus* (Cramer)	Hesperiidae	0.81	NR
6	*Pelopidas mathias* (Fabricius)	Hesperiidae	0.54	R
7	*Telicota colon* (Fabricius)	Hesperiidae	0.40	VR
8	*Jamides celeno*(Cramer)	Lycaenidae	0.81	NR
9	*Lampides boeticus* (Linnaeus)*	Lycaenidae	0.94	NR
10	*Acraea violae* (Fabricius)	Nymphalidae	3.38	VC
12	*Ariadne ariadne* (Linnaeus)	Nymphalidae	2.43	C
13	*Hypolimnas bolina* (Linnaeus)	Nymphalidae	2.84	C
14	*Hypolimnas missipus* (Linnaeus)*	Nymphalidae	3.65	VC
15	*Neptis hylas* (Linnaeus)	Nymphalidae	3.79	VC
16	*Pentaporia perius* (Linnaeus)	Nymphalidae	2.71	C
17	*Phalanta phalanta* (Drury)	Nymphalidae	6.09	VC
18	*Euthalia nais* (Forster)	Nymphalidae	3.38	VC
19	*Melantis leda* (Linnaeus)	Nymphalidae	2.43	C
20	*Mycalesis mineus* (Linnaeus)	Nymphalidae	2.03	C
21	*Junonia atlites* (Linnaeus)	Nymphalidae	0.27	VR
22	*Junonia iphita* (Cramer)	Nymphalidae	0.40	VR
23	*Junonia lemnios* (Linnaeus)	Nymphalidae	3.92	VC
24	*Junonia hierta* (Fabricius)	Nymphalidae	1.62	NR
25	*Junonia orithya* (Linnaeus)	Nymphalidae	0.81	R
26	*Graphium doson* (Felder)	Papilionidae	2.71	C
27	*Pachliopta aristolochiae* (Fabricius)	Papilionidae	3.11	VC
28	*Papilio demoleus* (Linnaeus)	Papilionidae	5.55	VC
29	*Papilio polytes* (Linnaeus)	Papilionidae	4.20	VC
30	*Eurema blanda* (*Boisduval*)	Pieridae	5.42	VC

31	*Eurema hecabe* (Linnaeus)	Pieridae	6.36	VC
32	*Cepora nerissa* (Fabricius)*	Pieridae	0.54	R
33	*Delias eucharis* (Drury)	Pieridae	2.43	C
34	*Catopsilia crocale* (Cramer)	Pieridae	6.50	VC
35	*Catopsilia pyranthe* (Linnaeus)	Pieridae	4.33	VC
36	*Catopsilia Pomona* (Fabricius)	Pieridae	3.25	C

VC-Very common (>100sightings), C-Common (50-100sightings), NR-not rare(15-50 sightings) R-rare (2-15sightings) VR-Very rare (1-2sightings),*-Listed in Indian Wildlife (Protection) Act 1972

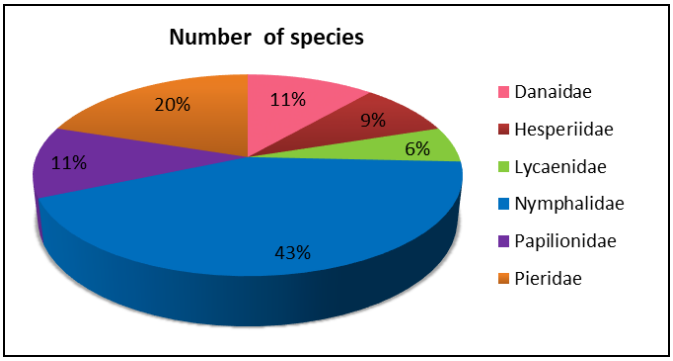

Fig 2: Percentage composition of each family of butterflies in Betul

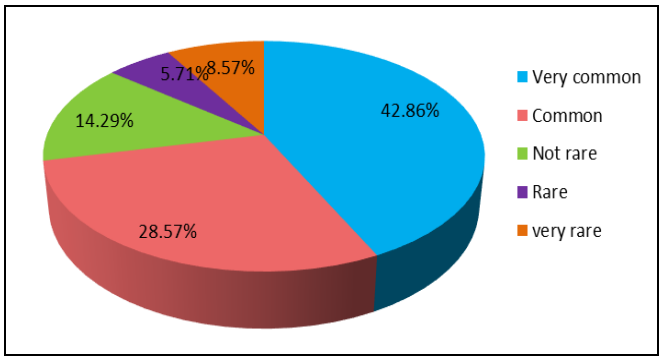

Fig 3: Percentage composition of status of butterfly species in Betul

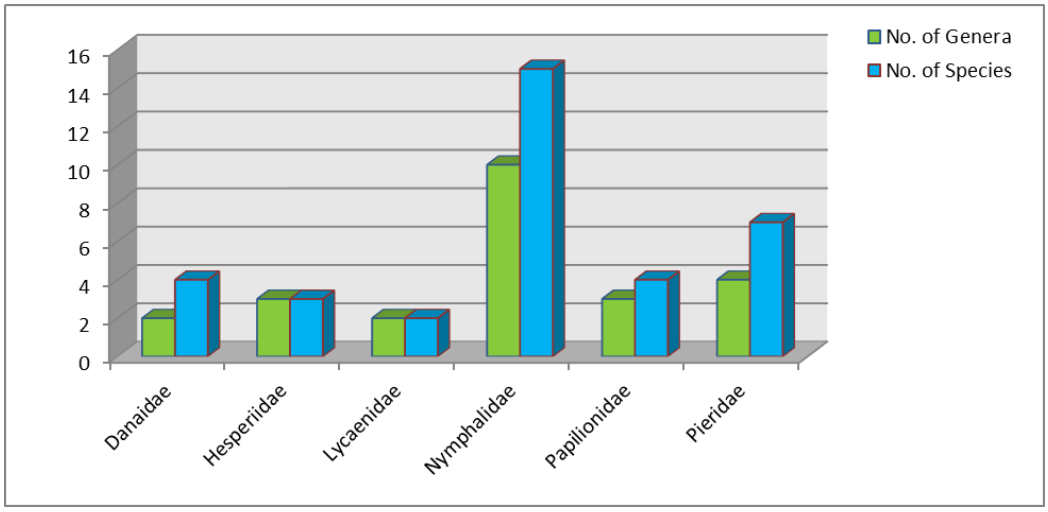

Fig 4: Distribution of genera and species of butterflies in respective families

Results and Discussion

During present study a total of 738 individuals butterfly were recorded. Total 35 species of butterflies were recorded belonging to 24 genera and 6 families. The family Danaidae, Hesperiidae, Lycaenidae, Nymphalidae, Papilionidae, and Pieridae were consisted of 2 genera and 4 species; 3 genera and 3 species; 2 genera and 2 species; 10 genera and 15 species; 3 genera and 4 species and 4 genera and 7 species respectively (Fig. 4) were observed in Betul district. On the basis of number of collected species, highest number was recorded from Nymphalidae (15 species, 43%) followed by Pieridae (7 species, 20%), Danaidae and Papilionidae (4 species each with 11%) however, Hesperiidae and Lycaenidae recorded 3 and 2 species with 9% and 6% of relative abundance (Fig.2). As far as the enlisting of different species in the Wild life Protection Act, 1972 is concerned four species are enlisted in the Act [11, 8] (Table -1).

Among these 35 species, 3 (8.57%) were recorded as very rare, 2 (5.51) as rare species, 5 (14.29%) as not rare 10 (28.57%) as common species and 15 (42.86%) as very common species (Fig.3). The preference of butterflies for particular habitats is associated with availability of larval host plants and adult nectar plants. The rich diversity of butterflies, especially the Nymphalids in Betul district indicates a varied assemblage of floral species and healthy climatic conditions. The flora in studied site is of mixed type with herbs and shrubs dominating the vegetation in the tropical climate [1]. Similar results were also reported by Deokar and Shukla [5] who reported 65 species of butterflies from Kolamarka Conservation Reserve, Central India and the highest number of species was observed from family Nymphalidae and lowest from Hesperiidae. Singh and Koshta [13] incorporated the account of butterflies of 135 species and total 48 species were recorded for the first time from Central India. Thakur and Bhardwaj [19, 9, 4, 14] reported that the Nymphalidae is the most diverse family in lower Himachal Pradesh, Madhya Pradesh and Andhra Pradesh, India respectively. Umesh kumar *et al* [20] recorded 126 butterfly species belonging to 74 genera and 5 families from Pench Tiger Reserve, Madhya Pradesh. Whereas in the present study in all 35 species of butterflies were encountered.

Conclusion

During the present study family-Nymphalidae carries the maximum number of species 15 (43%) than remaining families. Among the species, 3 were recorded as very rare

(*Telicota colon, Junonia atlites, Junonia hierta*) and 2 as rare species (*Pentaporia perius, Cepora nerissa)* Butterflies also serve as major pollinators of both wild and cultivated plants [18]. Owing to habitat destruction for developmental activities in urban environment and unscientific management of natural resources, much of our native butterflies are fast disappearing and at present, their survival is under threat. Careful planning and proper maintenance of the plantation can provide grounds for not only an increase in diversity of butterflies but also in its conservation and research.

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References

1. Anand Kumar, Khanna KK. Studies on the flora of Betul district, Madhya Pradesh. Journal of Economic. Botany, 1998, 22(3).
2. Borges RM, Gowda V, Zacharias M. Butterfly pollination and high- contrast visual signals in a low density distylous plant Oceologia. 2003; 136(4):571-573,
3. Chandra K, Chaudhary LK, Singh RK, Koshta ML. Butterflies of Pench Tiger Reserve, Madhya Pradesh. Zoos' Print Journal. 2002; 17(10):908-909.
4. Deokar A, Shukla PN. A preliminary survey of butterfly diversity in Kolamarka Conservation Reserve, Central India. International Journal of Advanced Research. 2015; 3(8):12-17.
5. Evans WH. Identification of Indian butterflies. Bombay Natural History Society, Bombay, India, 455.
6. Gadagkar R., K. Chandrashekara and Padmini Nair (1990). Insect species diversity in the Tropics: Sampling method and Case study, Journal of the Bombay Natural History Society. 1932; 87(3):337-353.
7. Gaonkar H. Butterflies of Western Ghats, India including SriLanka; A biodiversity assessment of threatened mountain system. A report submitted to Centre for Ecological Sciences IISc, Bangalore, 2003; 86:1996
8. Gupta IJ, Mondal DK. Red Data Book—Part II: Butterflies of India. Zoological Society of India, Kolkata, 2005, 535.
9. Harsh S. Butterfly Diversity of Indian Institute of Forest Management, Bhopal, Madhya Pradesh, India. Journal of Insects. 2014, 1-4.
10. Kehimkar I. The book of Indian butterflies. Bombay Natural History Society, Mumbai. 2008, 497.
11. Kunte K. Butterflies of Peninsular India .Universities Press (Hyderabad) and Indian Academy of Sciences (Bangalore), 2000, 254.
12. Robbins RK, Opler PA. Biodiversity II, understanding and protecting our biological resources. Joseph Henry Press, Washington, 1997.
13. Singh RK, Kostha ML. On a collection of butterflies (Lepidoptera: Rhopalocera) from Kanha National Park, Madhya Pradesh, India. Records of the Zoological Survey of India. 1998; 96(1-4):15-23.
14. Siva Rama Krishna I, Swamy AVVS. Butterfly diversity at Nagarjunasagar-Srisailam Tiger Reserve. International Journal of Applied Biosciences. 2014; 2(1):48-63.
15. Talbot G. The fauna of British India including Ceylon and Burma, Butterflies-2nd Edition Taylor & Francis Ltd, London. 1939; 1:600.
16. Talbot G. The fauna of British India including Ceylon and Burma, Butterflies–2nd Edition Taylor & Francis Ltd, London. 1947; 2:506.
17. Thakur MS, Bhardwaj S. Study on diversity and host plants of butterflies in lower Shiwalik hills, Himachal Pradesh. International Journal of Plant, Animal and Environmental Sciences. 2011; 2(1):33-39.
18. Tiple AD, Deshmukh VP, Dennis RLH. Factor influencing nectar plant resource visits by butterflies one university campus: implications for conservation. Nota Lepidoptera logica. 2006; 28:213-224.
19. Tiple AD. Butterflies of Vidarbha region Maharashtra, India; are view with and implication for conservation. Journal of Threatened Taxa, 2011; 3(1):1469-1477.
20. Umesh Kumar, Tiwari L, Jyotirmay Jena, Dungriyal NS. Butterflies of Pench Tiger Reserve, Madhya Pradesh .Indian Forester, 2010 1403-1404.
21. Varshney RK. Index *Rhopalocera indica* part II. Common names of butterflies from India and neighbouring countries. Records of the Zoological Survey of India. Occasional. 1983; 47:1-49.
22. Wynter - Blyth MA. Butterflies of the Indian Region. Bombay Natural History Society, 1957, 523.
23. ZSI. Manual of Collection, Preservation, and Identification for Insects. ZSI, Calcutta, India, 1990, 114.