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REVIEW OF DISTRIBUTION AND DIVERSITY OF BUTTERFLIES IN MAHARASHTRA

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ABSTRACT: The objective of this paper is to review the available literature of butterfly diversity, distribution and composition in different regions of Maharashtra, either in forests, cities, districts and protected areas. It brings about the importance of butterflies in ecology as pollinators and pest, and explore the possibilities of using them as bioindicators to evaluate the sustainability of protected areas in conserving the biodiversity. Many parameters have been used by authors to designate composition and species richness of different butterfly families. Some parameters such as very common, common, rare, very rare, moderate, evenness index and other ecological statistical have been used. According to this review, it has been noticed that family Nymphalidae found to be most dominant in number of individuals and very less individuals found in family Lycaenidae. Other butterfly families shows moderate occurrence in various regions of Maharashtra. The observation of literature indicate that every butterfly family has its own importance in maintaining biodiversity of ecosystem so in view of this there is need of future planning for effective butterfly conservation and their host plants as well as nectar food plants conservation. It also aims to review the current status of biodiversity of butterflies in Maharashtra state and the protected areas of its locality.

Key words: - Butterflies, Geographic distribution, Maharashtra, dominance

INTRODUCTION :

Butterflies are one of the beautiful creature of the largest phylum Arthropoda of kingdom Animalia. Butterflies belong to the order Lepidoptera (the tiny scales that cover the wings) of class Insecta. Butterflies are found everywhere around the world except near the poles. India has 329 million hectare of total geographical area. India constitutes only 2.5% of land area of the world it accounts for 7.8% of the global recorded species of rich biological diversity of flora and fauna. About 1504 species of butterflies were reported in the India.(Smetacek, 1992; Gaonkar, 1996) and Larsen (1986) reported 334 butterfly species in Western Ghats. Butterflies are belong to 'Flagship taxa' in biodiversity inventories (New *et al.*,1995; Lawton *et al.*,1998). Larsen (1997 a; b; c) describes that butterflies are the most studied group among the insects. Many scientists have worked on butterflies in the world. Pioneers of them were Bingham (1905, 1907) , Seitz (1906-1928), Antram (1928), Evens (1932), Wynter-Blyth (1957), Cantile (1963), Marshall and DeNiceville (1982-1890), Varshney (1985, 1990, 1997) Smith C.(1989) and Bridges (1998).

According to the geographic distribution patterns of plants and animals, the world divided into six regions namely Nearctic, Neotropical, Palearctic, Ethiopian, Oriental and Australasian (Evens, (1932) Wynter-Blyth, (1957). At the meeting point of the Palearctic and Oriental regions India is situated. About 512 butterflies reported from North East Himalayan region by Antram(1924). Later in 1986 he rediscribed morphological characters,

wing venation and habitat structure in detail with their elevation for the butterflies belonging to families Pieridae, Papilionidae and Nymphalidae in which he enlisted 77 Papilionidae species represented by 5 genera, 79 Pieridae species represented by 19genera and another 354 species represented by 92 genera. Many researchers like Betham (1890,1891) , Witt (1909),Talbot (1939), Singh(1977), Forsayeth(1984), Swinhoe (1986), Gupta (1987), Chaudhari (1995), Chandra (2000; 2002; 2006), Smetacek (2006-2007) have added several species of butterflies in the faunal volume from central India.

BIODIVERSITY OF BUTTERFLIES IN MAHARASHTRA:

Kunte (1997) studied seasonal pattern in butterfly abundance and species diversity in four tropical habitats in the Northern Western Ghats; Kunte (2001) studied the butterfly diversity of Pune city along the human impact gradient; Rane and Ranade (2004) studied butterflies of Tamhini Dongarwadi area, Mulshi, Maharashtra; Padhye *et al.*(2006) studied season and landscape wise distribution of butterflies in Tamhini, northern western Ghats of India; Sharma (2009) studied the fauna of Bhimashankar wildlife Sanctuary, Maharashtra; Tiple *et al.*(2006) studied factors influencing nectar plant resource visits by butterflies and implications for conservation on Amravati university campus. D'Abreu (1931) reported 92 species of butterflies from Nagpur region, Central provinces. Later in 2014, Patil and Shende have reported 92 species of 59 genera from Gorewada International Bio Park, Nagpur, Central India. Padhye *et al.* (2012) prepared and inventory of butterfly diversity adjacent to the Tata Power hydro lakes in Pune that showed 60 species of butterflies in six families. During their aquatic diversity surveys of six hydropower lakes, Shirawata lake and adjacent area were found to support good butterfly diversity due to minimal human interference and important conservation value. Patil and Shende (2019) carried out the investigations on Butterfly diversity in relation to their ecological status at Gosekhurd region of Godavari basin across Wainganga river. A total of 122 species of butterflies are recorded belonging to 5 families and 76 genera. 20 rare butterfly species specifically reported during this study.

Nimbalkar *et al.* (2011) recorded 64 butterfly species from Bhor Tahsil, Pune district Maharashtra in which family Nymphalidae dominate in the study area followed by Lycaenidae, Pieridae, Hesperidae and Papilionidae. Nineteen nectar food plants were identified belonging to 10 plant families. Plants of the Asteraceae family are more used by butterfly as nectar food plants. Visits of butterfly were more frequent to flowers with tubular corollas than to non-tubular once, to flowers coloured red, yellow, blue and purple than those coloured white and pink and to flower sources available for longer periods in the year. Species abundance reached the peak in the months during August to November. A decline in Species abundance was observed from December to January and continued up to the end of May. Kharat *et al.* (2018) was estimated butterfly diversity from North Maharashtra using random survey and line transact methods and recorded 91 species of butterflies belonging to family; Papilionidae, Pieridae, Nymphalidae, Lycaenidae and Hesperidae as well as 65 genera from North Maharashtra. They were recorded 91 species from Nashik district, 75 species from Dhule district, 77 species from Jalgaon district and 79 species from Nandurbar district. Among 91 species recorded from North Maharashtra 12 species comes under the protection category of the Indian Wildlife (Protection) Act 1972. Shannon diversity index and Margalef's species richness index was recorded highest in Nashik district and lowest in Dhule district. Pielou's

evenness index and sorensen similarity index was recorded above 0.9 suggesting less variation in the entire region. Highest Berger-Parker index was recorded from Dhule district. This index is lowest in Nashik district indicating reduction in diversity and increase in dominance. Gaikwad *et al.* (2015) recorded 37 species of butterflies belonging to 26 genera and 6 families from Phaltan region of Satara district by random observation. Among these families, Lycaenidae was the most dominant family represented by 13 species followed by Nymphalidae with seven species and Hesperidae with six species. Kurve *et al.* (2013) studied diversity of butterflies and their resources such as food plants within the Jnandweepa College campus were studied 52 species of butterflies were recorded with Nymphalidae showing dominance over other four families with 22 species, followed by Pieridae and Lycaenidae with 10 species each, Papilionidae with 7 and Hesperidae with three species. The survey of plants showed around 30 species of larval food plants which justifies the diversity of butterflies. The survey also recorded some uncommon species such as Black Rajah and common Palmfly in the campus which were not found in the earlier reports. Their presence can be attributed to newly introduced plant species during horticultural and gardening activities. Pawar and Deshpande (2016) recorded about 52 butterflies of the family Nymphalidae belonging to the Satara tehsil. The purpose of generation of a authentic checklist of butterflies of family Nymphalidae has been done successfully. Patil *et al.* (2017) compiled total 84 species belonging to 5 families and 54 genera were recorded from Rawanwadi Reservoir, Bhandara. Among which 52.38% were common, 28.57% were occasional and 19.04% species were rare. Family Nymphalidae consist maximum number of species and minimum number of species were recorded in Papilionidae. Most of the species from family Lycaenidae were found near water body. Virani (2020) revealed presence of 103 species of butterflies belong to 5 families on the basis of level of protection provided by Indian wildlife (Protection) Act, 1972. 16 species recorded from study area belong to different schedules of this act of which 3 species are in schedule 1.The results of study prove that Pandharkawada forest division of Maharashtra has a healthy environmental set-up that accommodates rich butterfly diversity.

There are many researchers who worked on Butterfly diversity in Vidarbh region of Maharashtra. A total of 48 species of butterflies belonging to 35 genera were recorded from Lonar Crater Lake, Buldhana District (Palot and Soniya 2003); 45 butterflies were reported in the Pench Tiger Reserve by Singh (2004); 64 species belonging to 52 genera representing seven families reported from Pench Tiger Reserve (Sharma and Radhakrishnan 2004); 45 Species belonging to 36genera representing eight families compiled from Melghat Tiger Reserve (Sharma and Radhakrishnan 2005); 43 species of butterflies of 29 genera reported from Tiger Reserve in Tadoba National park, Maharashtra (Rai *et al.* 2006); 68 Species of butterflies of 50 genera were recorded from Tadoba Andhari Tiger Reserve (Sharma and Radhakrishnan 2006); 53 species belonging to 36 genera representing seven families reported from Lonar Wildlife Sanctuary, Buldhana District (Sharma 2008); 53 species of butterflies were reported in the Pohara Malkhed Reserve Forest, Amravati District by Kasambe and Wadatkar(2004); 52 species of butterflies belonging to five families in which 22 species of butterflies belongs to Nymphalidae, 12 species to Lycaenidae, 10 species to Pieridae, 5species to Papilionidae and 3 species to Hesperiidae were reported from Amravati University campus (Tiple *et al.* 2006, 2007); 51 butterfly species belonging to seven families were recorded from Melghat Tiger Reserve (Chandekar *et al.* 2007); 101 butterfly species

belonging to eight families and 19 subfamilies were recorded from Melghat Tiger Reserve (Wadatkar and Kasambe 2009) in which 22 species belongs to Nymphalidae, 6 of Danaidae, 10 of Satyridae , 23 of Lycaenidae, 1 of Riodinidae,16 of Pieridae, 9 of Papilionidae and 14 species of Hesperiidae family. 103 species of butterflies belonging to eight families and 19 subfamilies were recorded from Melghat Tiger Reserve (Wadatkar 2008) and 98 species belonging to Papilionidae (6 species), Pieridae (14 Species), Nymphalidae (39 species), Lycaenidae (24 species) and Hesperiidae (15 species) found in reserve forest area, Seminary Hill, Nagpur (Tiple and Khurad 2009 b). 145 species of butterflies at 8 study sites were reported by (Tiple and Khurad 2009 a) of which 62 species were new records for Nagpur city. Tiple (2011) compiled 167 species of butterflies belonging to 90 genera representing 5 families. The highest number of butterflies recorded from Nymphalidae (50 species), followed by Lycaenidae (47 species), Hesperiidae (34 species), Pieridae (23 species) and Papilionidae (13 species) from Vidarbh region of Maharashtra. Out of that 14 species comes under the protected category of the Indian Wildlife (Protection) Act, 1972.Some butterflies like *Graphium antiphates, Papilio crino, Ypthima avanta, Everes argiades* and *Hasora chabrona* from Vidarbh were not seen in recent years due to loss of habitats by over expanding urbanization along with broader climatic variations (Tiple *et al.* 2007). Recently, Kuchanwar and Kamble (2021) carried out the field investigations in the Tadoba Andhari Tiger Reserve of Chandrapur district revealed 66 species of butterfly fauna from five families. The IUCN status of butterflies revealed eight (12%) are the least concern and 58 (88%) are not evaluated. Three butterfly species *Hypolimnas misippus, Hypolimnas bolina* and *Delias eucharis* found in these area are legally protected and included in the schedules of the Indian Wildlife (Protection)Act, 1972.

CONCLUSION:

In recent years there is some progress in the study of butterfly diversity from Maharashtra. However most of the researches are confined to certain area only like forests, sanctuaries and parks. Throughout the Maharashtra Nymphalidae remains the largest representing family with nearly one-third of known butterfly species. A detailed survey can only establish the current status of butterfly biodiversity from Maharashtra. A remarkable work has been done in the protected areas but still attempts should be made to start monitoring the tehsils, cities and towns where there is need of initiation.

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