

# Species Diversity and Distribution of Butterflies from Daulatabad Fort area of Aurangabad District (MS), India

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## ABSTRACT

Butterflies are an integral part of the forest ecosystem. They show distinct patterns of habitat utilization. Being highly sensitive to changes in the environment, they are easily affected by even relatively minor perturbations in the habitat, so much so that, they have been considered as indicators of environment quality and health of an ecosystem. In the present study, for 2017 the study is divided in three seasons viz., Pre-Monsoon, Monsoon and Post Monsoon, selected sites were visited twice in each season between 7.30 am to 12.30 pm and butterflies were identified for their systematic diversity studies by using insects net, insects boxes, spreading boards, oven, butter paper envelopes, camera, hygrometer, GPS instrument etc. 35 species of butterflies belonging to 12 genera from 3 families and 4 subfamilies are recorded from the study area. During present investigation, it was found that 2 (*Leptosia nina* and *Graphium doson*) species are rare, while describing their status and justifies its inclusion in Scheduled List suggesting the need for its strict conservation measures. These findings are important with respect to monitoring butterfly diversity and defining conservation strategies in the Daulatabad Fort area of Aurangabad District (MS).

**Keywords:** Butterfly diversity, conservation, Daulatabad Fort area.

## INTRODUCTION

The Butterflies belong to order Lepidoptera which is the second largest order among the insects and is made up of about 1,50,000 species so far known. The order Lepidoptera includes Butterflies and Moths of which about 17820 are Butterflies [1]. 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 [2]. Although, only a quarter of India's Butterfly diversity is represented in the Western Ghats, it has the characteristic of high alpha diversity of Butterflies in certain locations [3, 4].

To accommodate an ever increasing population, man has ruthlessly exploited and destroyed Wildlife habitats. Loss, fragmentation or transformation of habitats have been mainly due to changes in use of land such as urbanization, industrialization, agricultural development, vegetation manipulation, shifting cultivation, introduction of exotics etc. Natural habitats such as forests, grassland, deserts, wetlands, mangroves, coral reefs etc. are under tremendous pressure due to increasing population densities and activities of human beings. Wildlife habitats are getting destroyed at an alarming rate with disastrous effects on biodiversity. While a large number of species have become extinct in the recent past, the survival of many others is threatened. Thus, habitat loss is considered as major threat to biodiversity of Butterflies (World Resources, 1994-95). In the conservation of this rich environment, a Butterfly plays its important role. To be focus on these colourful and elegant creatures which always fascinated the world we chose the focal point to study the species

diversity and distribution patterns of butterflies from Daulatabad Fort area of Aurangabad District (MS) India.

## METHODOLOGY

**Insect Net:** Insect net was used for collection of Butterflies from the field. It contains aluminum handle, nearly 18 inch in length, having a circular metal ring 9 inch in diameter and collecting bag of 30 inch in depth made up of ordinary nylon mosquito netting cloth, which was attached to the metal ring.

**Camera:** DSLR Camera Nikon D 5300, 24.2 Mega Pixels

**Hygrometer:** Hi-Tech Temperature Clock / Humidity HTC-1

**Global Positioning System (GPS) Instrument**  
: Garmin Montana 600

**Statistical Analysis:** Statistical analysis of the data was carried out using Ecological Analysis Package PAST, 2017 (Table 2).

**Study area:** The Daulatabad Fort area (19° 56' 42" N and 75° 13' 19" E) is situated at the area spread in the Satmala hill ranges of Sahyadri in the proximity of Aurangabad. Southern tropical dry deciduous forest is the main forest type in this track which includes draught resistant trees like Anjan, Khair, Dhawada. Hills tops have sparse vegetation, slopes are covered with *Euphorbia* spp., river valleys support moist zone species such as Arjun and Chandan valleys have got diversified vegetation. Grass lands at hill tops, plain growth have good growth grasses. Thus the diversified vegetation scattered intermittently support rich faunal diversity. Butterfly species were identified directly in the field visually with the help of field guides followed by photography, in difficult cases, rarely by capture and release method. Collection was restricted to those specimens that could not be identified directly. All scientific names follow Varshney [5] and common English names follow Wynter-Blyth [6]. Classification of butterflies is after Gaonkar [3].

## RESULTS

In the present analysis, indicates that the highest Shannon's index is observed for the monsoon season followed by postmonsoon and premonsoon seasons. The Simpson's index of Diversity (1-D) is directly proportional to the extent of diversity in the habitat as is the case with the Simpson's Reciprocal index of Diversity (1/D). The table indicate that the highest

diversity is seen during the monsoon season. Margaleff's index for all the samples under analysis, the monsoon sample showed highest diversity followed by the postmonsoon and premonsoon. SHE analysis follows the way these parameters change with increasing sampling effort. For SHE analysis, it can be seen that postmonsoon season has a very slight variation in the H number.

**Table 1. Status of butterflies recorded in 2017 from Daulatabad Fort area of Aurangabad District (MS)**

<b>I. Family: Papilionidae (05)</b>							
<b>1. Subfamily: Papilioninae [05]</b>							
Sr. No.	Common Name	Scientific Name	Seasonal Sightings				Status
			Pre Monsoon	Monsoon	Post Monsoon	Total	
1	Common Rose	<i>Pachliopta aristolochiae</i> Fabricius, 1775	2	14	16	32	C
2	Blue Mormon	<i>Papilio polymnestor</i> Cramer, 1775	1	7	10	18	NR
3	Common Blue Bottle	<i>Graphium sarpedon</i> Linnaeus, 1758	0	10	5	15	R
4	Crimson Rose*	<i>Pachliopta hector</i> Linnaeus, 1758	4	12	15	31	C
5	Red Helen	<i>Papilio helenus</i> Linnaeus, 1758	0	8	11	19	NR
		<b>Total</b>	<b>7</b>	<b>51</b>	<b>57</b>	<b>115</b>	
<b>II. Family: Pieridae (01)</b>							
<b>1. Subfamily: Coliadinae [01]</b>							
1	Three Spot Grass Yellow	<i>Eurema blanda</i> Boisduval, 1836	2	8	12	22	NR
			<b>2</b>	<b>8</b>	<b>12</b>	<b>22</b>	
<b>2. Subfamily: Pierinae [02]</b>							
1	Psyche	<i>Leptosia nina</i> Fabricius, 1773	0	7	6	13	R
2	Pioneer	<i>Belenois aurota</i> Fabricius, 1793	7	11	18	36	VC
		<b>Total</b>	<b>7</b>	<b>18</b>	<b>24</b>	<b>49</b>	
<b>III. Family: Nymphalidae (04)</b>							
<b>1. Subfamily: Danainae [04]</b>							
1	Striped Tiger	<i>Danaus genutia</i> Cramer, 1779	4	12	20	36	C
2	Plain Tiger	<i>Danaus chrysippus</i> Linnaeus, 1758	10	15	20	45	VC
3	Glassy Tiger	<i>Parantica aglea</i> Stoll, 1782	2	11	15	28	C
4	Common Indian Crow*	<i>Euploea core</i> Cramer, 1780	8	13	18	39	VC
		<b>Total</b>	<b>24</b>	<b>51</b>	<b>73</b>	<b>148</b>	

**Table 2. Diversity Indices of Butterflies recorded from Daulatabad Fort area of Aurangabad District in 2017 (MS)**

Diversity Indices	Pre Monsoon	Monsoon	Post Monsoon
Individuals	40	128	166
Dominance_D	0.1613	0.08826	0.09363
Simpson_1-D	0.8387	0.9117	0.9064
Shannon_H	1.976	2.455	2.416
Evenness_e^H/S	0.8012	0.9704	0.9336
Margalef	2.169	2.267	2.152

## DISCUSSION

A detailed survey of butterflies from Daulatabad Fort area of Aurangabad District (MS) India was carried out in 2017. The butterfly species abundance starts from the monsoon i.e. June to July and peak in August to November. Wynter-Blyth [7] reported that March-April and October is peak period for butterfly abundance in India. However, our study reports peak period in the months from September to November, in line with the findings of Kunte [8]; Nimbalkar et al., [9]. Significant correlation regarding butterfly diversity and spring season indicates abundances of diverse species were positively affected by warmer days, humidity and rainfall [10]. Studies of Gutierrez and Mendez [11] reported that abundance of butterflies is not affected by altitudes but it is related to the availability of food plants. Prajapati et al., [12] reported that plants have importance in increasing the butterfly diversity and their abundance in the area of Daman of Makawanpur District of central Nepal. Shinde et al., [13] reported that changes in species richness are small relative to the magnitude of shifts in community composition between regions or patch size. Chandekar et al., [14] reported 85 species of butterflies were recorded from Maval Tahsil, Chandekar and Nimbalkar [15] reported 56 species of Butterflies from Khed Tahsil of Pune District (MS) India along with 15 nectar food plants from study area. Shinde et al., [16,17] reported the correlation between the vegetation characteristic features in different habitats along with the host plant density and diversity is important variable that influence on diversity of butterflies. In our study we found that grazing animals, use of pesticides, change in land use pattern,

construction of highway and infiltration of tourist adversely affected diversity of butterflies. In study area, maximum species of butterflies were recorded on forest and scrub biotope.

In the present study butterfly from two species are designated rare while describing their status and justifies its inclusion in scheduled list suggesting the need for strict conservation measures (Table 1). Kunte [8] reported that, an objective revision of the scheduled list will be very useful in providing appropriate and adequate legal protection to Indian butterflies. The findings of present study are important for monitoring diversity of butterflies to increase the ecological utility and conservation strategies from the study area.

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